

**SOUTH EASTERN RAILWAY
CONSTRUCTION ORGANISATION**

TENDER DOCUMENT

FOR

Construction of Road Over Bridge of Span: 1x24.00m + 1x30.00m complete at Ramgarh including approaches and other miscellaneous works adjacent to existing ROB at Km: 406/11-12 between MAEL - RMT Station of South Eastern Railway

TENDER NOTICE NO. CE/CON/GRC/2/2016

DATED: 04.04.2016

(TWO PACKETS SYSTEM TENDER)

PLACE OF SUBMISSION & OPENING:

O/o Chief Administrative Officer(Con)

**South Eastern Railway, 11, Garden Reach Road,
Kolkata-43**

DATE OF SUBMISSION & OPENING: 19.05.2016

Value of Work: Rs 13,57,64,976/-

Cost of tender document: Rs.10,000/-

**PACKET – I
TECHNICAL BID DOCUMENT**

CHIEF ENGINEER (CON)-I

Garden Reach

South Eastern Railway

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Signature of Tenderer(s)

Tender Notice No. CE/CON/GRC/2/2016 Dated: 04.04.2016 (Two Packet)-TB

CHAPTER-I



Signature of Tenderer(s)

Tender Notice No. CE/CON/GRC/2/2016 Dated: 04.04.2016 (Two Packet)-TB

South Eastern Railway
(A) CHECK LIST OF IMPORTANT DOCUMENTS

The following document should be submitted along with tender duly flagged.

Sl. No.	Documents submitted	Put 'Yes' in the boxes if documents are submitted with the tender.
1.	Cost of tender document either in cash receipt or Demand Draft, if tender document downloaded from web site.	
2.	Earnest money in the requisite form.	
3.	List of Similar works completed along with their copy of completion certificate/ final bill paid etc as per para 3 of NIT.	
4.	List of attested certificates from the employer/client, audited balance sheet duly certified by Chartered Accountant as per para 3 of NIT [Chapter- I/(B)].	
5.	In case of JV firm, MOU as per Chapter-II (B).	
6.	In case of JV Firm, proper documents as per details in Para 15 of Chapter II (A).	
7.	Duly filled up MANDATE FORM.	
8.	List of works on hand indicating description of work, contract value, approximate value of balance work yet to be done their date of award and scheduled date of completion.	
9.	Information regarding Employment/Partnership etc. of Retired Railway Employees with the tender as per para 2 (f) of NIT [Chapter- I/(B)].	
10.	Affidavit as per para 2(g) of NIT [Chapter- I/(B)].	

Note:

- 1) In case of items (3) and (4) above, supportive documents/certificates from the organization with whom they worked/are working should be enclosed.
- 2) Certificates for work(s) executed in India with Central Government/ State Governments of India and Central/ State Government Public Sector Undertakings and Authorities of India shall only be considered. Certificates from private individuals for whom such works are executed/ being executed shall not be accepted.
Tenderer should submit clear certificate(s) issued by an officer of the rank not below Dy. Chief Engineer/ Sr. Divisional Engineer in Railways ; by Executive Engineer / Superintending Engineer of State Govt.; by Additional General Manager / General Manager or equivalent rank in charge of work in PSU's / Authorities for works executed under them. Separate certificate should be submitted for every single similar work. Certificates must also contain name, postal address & Telephone / Fax no. of issuing authority.

Signature of Tenderer(s)

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South Eastern Railway
(B) NOTICE INVITING TENDER (NIT)

1. Sealed tenders (Tender Notice No. CE/CON/GRC/2/2016 Dated 04.04.2016) in prescribed form as per **Two Packet System (Technical Bid & Price Bid)**, are invited by the under mentioned for and on behalf of President of India for execution of work of **“Construction of Road Over Bridge of Span: 1x24.00m + 1x30.00m complete at Ramgarh including approaches and other miscellaneous works adjacent to existing ROB at Km: 406/11-12 between MAEL - RMT Station of South Eastern Railway”**.
2. (a) Approx. cost of the work is **Rs. 13,57,64,976/-**, Earnest Money Deposit (EMD) is **Rs. 8,28,830/-**, (PEMD is not valid for this tender).

The Earnest Money should be in Cash or Banker’s Cheques /Demand Drafts in favour of FA & CAO/Con/ South Eastern Railway, Garden Reach, Kolkata executed by State Bank of India or any of the Nationalized Banks or by a Scheduled Bank.

Earnest Money in shape of Bank Guarantee Bond, Deposit Receipts, Pay Orders etc will not be accepted.

The Joint Venture firm shall be required to submit Earnest Money Deposit (EMD) alongwith the tender in terms of the provisions contained in Para 5 (Earnest Money) of Part-I of GCC.

- (b) Period of completion is **18 (Eighteen) months** from the date of issue of acceptance letter. **PVC is applicable** as per **GCC Clause 46A** and as detailed in the tender document.
- (c) The Joint Venture (JV) is **permitted** for the work as per the guidelines in the tender document. **In case of joint venture firms participating in the tender, all conditions mentioned in Para 15 of Chapter II(A) {Guidelines for participation of joint venture (JV) Firms} are to be strictly adhered to, and all necessary documents should be enclosed by JV Firm along with the tender.**
- (d) EMD and cost of tender document in acceptable form as mentioned in the tender document must be submitted in Technical Bid Document Envelope only.
- (e) Technical Bid and Price Bid must be submitted in two different sealed envelopes clearly super scribing on each envelope type of bid i.e. Technical Bid or Price Bid along with the name of firm/tenderer , Tender Notice No and Name of Work as per requirement given in the tender document.
- (f) **Information regarding Employment/Partnership etc. of Retired Railway Employees: The tenderer is required to submit information regarding Employment/Partnership etc. of Retired Railway Employees as per Part I of GCC, July 2014 vide Para 17 (a) of Tender Form (Annexure- I), with the tender offer or a statement to the effect that no such retired Engineer or retired Gazetted Officer is so associated with the tenderer, failing which the tender shall be rejected.**
- (g) **If the Tenderer(s) fails to submit the Affidavit as prescribed in Clause 2.3.1of Instruction to Tenderer(s) along with the offer, the tender offer shall be considered incomplete and will be rejected summarily.**

3. **ELIGIBILITY CRITERIA FOR THE ABOVE WORK:**

3.1 **The tenderer, other than JV, should fulfil the Eligibility Criteria mentioned at para (A) and (B) below:**

- (A) The tenderer should have completed at least one similar single work in the last three financial years (i.e. current year upto the date of opening of the tender and previous three financial years) for a minimum value of **35% of the approximate value of the work.**

Similar nature of work means: **“Any Bridge Work involving Open/Pile/Well Foundation, RCC/PSC Girder, Supply & Fabrication, Assembly and Launching of Composite/Steel of Span 18.30m or above Girder.”**

Details of works physically completed is to be submitted in the proforma as per para 2.19 of Instruction to Tenderer(s).

Signature of Tenderer(s)

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- (B) Total contract amount received during the last three financial years and in the current financial year upto the date of opening of the tender as per Payment attested certificate from employer or client/Audited balance sheet duly certified by the Chartered Accountant for a **minimum value of 150% of the approximate value of the work.**

3.2 The JV Firm should fulfill the Eligibility Criteria mentioned at para (A) and (B) below:

- (A) **Either the JV Firm or Lead Member of the JV Firm** must have satisfactorily completed in the last three previous financial years and the current financial year upto the date of opening of the tender, one similar single work for a minimum of 35% of estimated value of the tender.

Similar nature of work means: “As described in Para 3.1 (A)”.

NOTE for 3.2(A):

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

- (B) The contractual payments received by the JV Firm or the arithmetic sum of contractual payments received by all the members of JV Firm in the previous three financial years and the current financial year up to the date of opening of tender shall be **at least 150% of the estimated value of the work** as mentioned in the tender.

NOTE for 3.2(B):

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

NOTE for para 3 above:

- (a) Notwithstanding the Eligibility Criteria being satisfied, Railway reserves the right to reject/accept the tender after considering the various circumstances of the individual case.
- (b) Certificates for work(s) executed in India with Central Government/ State Governments of India and Central/ State Government Public Sector Undertakings and Authorities of India shall only be considered. Certificates from private individuals for whom such works are executed/ being executed shall not be accepted.
Tenderer should submit clear certificate(s) issued by an officer of the rank not below Dy. Chief Engineer/ Sr. Divisional Engineer in Railways ; by Executive Engineer / Superintending Engineer of State Govt.; by Additional General Manager / General Manager or equivalent rank in charge of work in PSU's / Authorities for works executed under them. Separate certificate should be submitted for every single similar work. Certificates must also contain name, postal address & Telephone / Fax no. of issuing authority.
- (c) Onus of producing the acceptable/sufficient documentary proof lies with the tenderer and it should be enclosed along with the tender.
- (d) Tenderer must submit the completion certificate of the works claiming in fulfilling the above eligibility criteria. For the purpose of submission of completion certificates, tenderer must adhere to the guidelines.
- (e) **Completion Certificate:**
 - (i) Similar nature of work physically completed within the **qualifying period**, i.e. the last three financial years and current financial year (even though the work might have commenced before the qualifying period) should **only** be considered in evaluating the eligibility criteria.
 - (ii) The total value of similar nature of work completed during the qualifying period and not the payments received within qualifying period alone, should be considered.
 - (iii) In case, the final bill of similar nature of work has not been passed and final measurements have not been recorded, the paid amount including statutory deductions is to be considered. If final measurements have been recorded and work has been completed with negative variation, then also the paid amount including statutory deduction is to be considered. However, if final measurements have been recorded and work has been completed with positive variation but variation has not been sanctioned, original agreement value or last sanctioned agreement value whichever is lower should be considered for judging eligibility.

Signature of Tenderer(s)

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- (f) *Tenderers are requested to visit the site before quoting the rates. They are also requested to submit a self-certificate in support of their site visit.*
4. a) Interested tenderers are requested to purchase the detailed tender document in person or through their authorised representative from the office of **Chief Administrative Officer/(Con)/S.E. Railway, 11, Garden Reach Road, Kolkata- 700043.**
b) Tender document will also be available at internet website <http://www.tenders.gov.in> at least 15 days before the date of opening of Tender. Tenderer may download the tender document and submit the same in original downloaded prints with necessary tender fee in the form of separate Demand Draft in favour of **FA&CAO/C/S.E. Railway, 11, Garden Reach Road, Kolkata-700043** or S.E. Railway Money Receipt with particulars and amount as mentioned in para-5 below.
c) The corrigendum/Addendum, if any, shall be made available on website <http://www.tenders.gov.in> at least 10 days in advance from the date of opening of tender and no further press notification shall be issued in this regard, All prospective tenderer(s) are advised to see the website regularly for corrigendum / addendum issued, if any, for tender.
5. Tender forms will be sold on production of Money Receipt/Demand Draft of **Rs.10,000/-** (Not refundable) (Allocation & Estimate No. **26- 3098-08 & 1675W/2015**) for each tender to be deposited as tender fees. Tenderer may deposit the tender fees in Cash either with **Divisional Cashier/(Con)/S.E. Rly./Garden Reach, Kolkata-700 043 or any Station Master of the S.E. Railway OR** tenderer may submit **Demand Draft** which should be drawn in favour of **FA&CAO/Con/South Eastern Railway, 11, Garden Reach Road, Kolkata-700043.** The Tender documents can be purchased on any working day earlier to the date of opening from **10.30 hrs to 17.30 hrs at locations** as mentioned at above para.
6. Tenderers not fulfilling the above criteria or not submitting the “cost of tender document” and/or “ requisite earnest money” in Technical Bid envelope and choose to submit the tender, shall do so at their risk, as the tender offer will be summarily rejected.
- Note : All Demand Drafts should be executed by State Bank of India or any of the Nationalized Banks or by a Scheduled Bank.**
7. Tenderer(s) can drop their Tenders **in the tender box kept in the office as mentioned in para4(a), up to 15-00 hrs on 19.05.2016 (Date of opening)** and these will be opened in **the same office at 15-15 hrs** on the same day.
Tenders should be submitted in sealed covers super scribing the Tender Notice Number, description of works, due date of opening on the cover without fail.
In the event of date of opening of tender is declared by State/Central Govt. a closed holiday, the tender will be opened on next working day.
8. TENDER DOCUMENT WILL NOT BE SENT AND/OR RECEIVED BY POST.
9. a) The work is in the jurisdiction of **Dy.CE/Con/Ranchi.** For clarifications and any information regarding the work including inspection of drawings, tenderer may contact **Dy.CE/Con/Ranchi, S.E. Railway, Tel : 09771484260.**
b) For clarifications and any information regarding tender document on internet website tenderer may contact **AXEN/Con/T/GRC, S.E.Railway, Kolkata-700043, Tel : 9133 – 2450-4746 & Sr.EDPM/S.E.Railway/GRC Kolkata-700043, Tel : 9133 – 2439-7715 / 2450-4310.**

Sd/-

For **CHIEF ENGINEER (CON)/GRC**

Signature of Tenderer(s)

Tender Notice No. CE/CON/GRC/2/2016 Dated: 04.04.2016 (Two Packet)-TB

South Eastern Railway

(C) PUBLICATION MATTER

"

Sl No	Tender Notice No.	Description of works	Completion Period (in months)	Approx. cost (in Rs.)	EMD (in Rs.)	Cost of Tender Document (in Rs.)	Date & Time for Submission of Tender	Date & Time for Opening of Tender
1.	CE/CON/GRC/2/2016 Dated 04.04.2016 (Two Packet)	Construction of Road Over Bridge of Span: 1x24.00m + 1x30.00m complete at Ramgarh including approaches and other miscellaneous works adjacent to existing ROB at Km: 406/11-12 between MAEL - RMT Station of South Eastern Railway.	18 (Eighteen)	13,57,64,976/-	8,28,830/-	Rs. 10,000/- (Not refundable)	Up to 15-00 hrs on 19.05.2016	At 15-15 hrs on 19.05.2016

Note: Details of tender notice along with required eligibility criteria and tender document will be available at website: <http://www.tenders.gov.in> and tender notice will be available on the Notice Board of the office of **Chief Administrative Officer/(Con)/S.E. Railway, 11, Garden Reach Road, Kolkata- 700043** and **Dy.CE/Con/Ranchi, S. E. Railway, Ranchi.**"

Sd/-
For **CHIEF ENGINEER (CON)/I/GRC**

Signature of Tenderer(s)

Tender Notice No. CE/CON/GRC/2/2016 Dated: 04.04.2016 (Two Packet)-TB

South Eastern Railway

(D) DECLARATION FROM TENDERERS

To,
The President of India,
Acting through the Chief Administrative Officer(c)/Chief Engineer (C),
Dy Chief Engineer (C)/Dy. Chief Engineer, Dist Engineer (Con)/
District Engineer, Divisional Engineer.

Sir,

Sub: “Construction of Road Over Bridge of Span: 1x24.00m + 1x30.00m complete at Ramgarh including approaches and other miscellaneous works adjacent to existing ROB at Km: 406/11-12 between MAEL - RMT Station of South Eastern Railway.”

I/Wehave read the various conditions to Tender attached hereto and agree to abide by the said conditions. I/We also agree to keep this Tender open for acceptance for a period of **120 (One hundred twenty) days** from the date fixed for opening the same and in default thereof, I/We will be liable for forfeiture of my/our “Earnest Money”. I/We offer to do the work for South Eastern Railway, at the rates quoted in the Rate Sheet of Price Bid Document and hereby bind myself/ourselves to complete the work in all respect within **eighteen months** from the date of issue of letter of acceptance of the tender.

2. I/We also hereby agree to abide by the General Conditions of Contract corrected upto latest printed/advance correction slips 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, SERUSSOR-2010 corrected up to latest correction slips.

3. A sum of **Rs. 8,28,830/- (Rupees eight lakh twenty eight thousand eight hundred thirty only)** is herewith forwarded as earnest money. The full value of the earnest money shall stand forfeited without prejudice to any other rights or remedies if :-

- a) I/We do not submit Performance Guarantee within stipulated period as mentioned in Para 2.7 of Instruction to tenderer(s), or
- b) I/We do not execute the contract documents within seven days from the date of receipt of notice issued by Rly that such documents are ready, or
- c) I/We do not commence the work within **fifteen** days after receipt of orders to the effect.

4. 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.

5. We declare and certify that we have not made any misleading or false representation in the forms, statements and attachments in proof of the qualification requirements.

6. We declare that the information and documents submitted along with the tender by us are correct and we are fully responsible for the correctness of the information and documents, submitted by us.

7. We understand that if the contents of the certificates are found to be false at any time, it will lead to forfeiture of the bid security and liable for action for banning of business with the firm and its constituents.

Dated

Tenderer's address :

Signature of the Witness

Signature of Tenderer(s)

Tender Notice No. CE/CON/GRC/2/2016 Dated: 04.04.2016 (Two Packet)-TB

South Eastern Railway

(E) VENDOR MANDATE FORM

TENDER NOTICE NO.: CE/CON/GRC/2/2016 DATED: 04.04.2016

1. PARTICULARS OF THE PARTY:

- a) NAME: _____
- b) ADDRESS: _____
- (i) HOLDING NO/PREMISES: _____
- (ii) ROOM NO: _____
- (iii) STREET NAME: _____
- (iv) CITY/VILLAGE/TOWN: _____
- (v) DISTRICT: _____
- (vi) STATE: _____ COUNTRY: _____
- c) PHONE NO.: _____ MOBILE: _____ FAX No.: _____
- E.MAIL: _____
- d) I. TAX PAN No.: _____ VAT/ST REGISTRATION NO.: _____

2. PARTICULARS OF BANK ACCOUNT:

- a) BANK NAME: _____
- b) BRANCH NAME & ADDRESS: _____
- c) BANK TEL No.: _____ d) BANK MICR CODE (9 DIGIT): _____
- e) BANK'S IFS CODE: _____ f) BANK ACCOUNT No: _____
- g) ACCOUNT TYPE (SAVINGS/CURRENT/CASH CREDIT): _____

h) DECLARATION BY THE PARTY:

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 the User Institution, i.e. FA&CAO/C/S.E. Rly/GRC will not be held responsible. I have understood the scheme and agree to discharge the responsibility for which I am liable as a participant under the scheme. I also declare that in absence of acknowledgement regarding the above payment which has been credited to my Bank Account, no further payment to be made by FA&CAO/CON/GRC).

Encl: 1. One cancelled cheque. 2. Photocopy of PAN. 3. Photocopy of VAT/ST Registration certificate.

Date: _____ Signature of the contractor with stamp

Certified that the particulars furnished above are correct as per our records.

Bank's seal _____ Signature of the authorised official of the bank

Signature of Tenderer(s)

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South Eastern Railway

(F) TOP SHEET

1.	Name of Tenderer	:	
2.	Address	:	
3.	Telephone no with STD code	:	
4.	Tender document fee (Non refundable) {The tender fee amount must be paid separately as per tender notice (It is not included with EMD) in the form of Demand Draft in favour of FA&CAO/Con/South Eastern Railway, Garden Reach, Kolkata or S.E. Railway Money Receipt and it should be enclosed with the tender}	:	Railway Money Receipt/Demand Draft No. and Place Name of Tenderer.....
5.	Earnest Money Deposit (EMD) particulars	:	Amount Rs. Date Name of Tenderer.....
Note :	(a)	In case of any discrepancy between the submitted tender document and the approved copy of tender document available with Railways, the later will be used for preparing agreement.	
	(b)	Tenderer should sign on each page of tender documents.	
	(c)	Railway is not responsible for failure of the internet sites.	
	(d)	The successful tenderer will be advised to sign the agreement documents.	
	(e)	Any amendment and corrigendum issued from time to time before opening is to be seen on website http://www.tenders.gov.in , which will be made available on website at least 10 days in advance from the date of opening of tender. The same should be submitted duly signed as enclosure of tender document.	

Signature of Tenderer(s)

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(G)Method of submission of Bid Documents

The tender shall be submitted as per “two packet system” as described below:-

- (1) The sealed envelope super scribed as Technical Bid must contain the Technical Bid documents along with the documents in support of fulfilling the eligibility criteria & other requirements as asked for this work duly signed on each page . The other sealed envelope as Price Bid must contain the Price Bid document along with quoted rate sheet duly signed on each page.
- (2) Technical bid and Price Bid must be submitted in two different sealed envelopes clearly superscribing on each envelope type of Bid i.e. Technical Bid or Price Bid.
- (3) If Technical Bid & Price Bid is submitted in one single envelope, unless they are in two different sealed envelopes duly super scribed as detailed above, the tender shall be summarily rejected.
- (4) If both the offers i.e. Technical Bid & Price Bid are not submitted simultaneously upto the prescribed time and date of opening, the tender offer shall summarily be rejected.
- (5) The requisite **EMD and cost of tender document** must be submitted along with the Technical Bid Documents in Technical Bid envelope only. Otherwise, the tender shall summarily be rejected.
- (6) No document/reference connected with Price Bid shall be enclosed with Technical Bid documents in Technical bid envelope. Otherwise, the tender will summarily be rejected. The offer of rates and Price Bid document must be submitted in Price Bid envelope only.
- (7) Tenderer(s) must give their complete postal address of correspondence correctly with Pin code in the “TOP SHEET” and “Mandate form” as provided in the technical bid of tender document. Railway shall not be responsible for any failure of despatch of letter by the Postal Department.
- (8) The tenderer or his authorised representatives should attend the opening of Technical Bid and Price Bid on the specified dates & timings and place.
- (9) The copies of the various letters/documentary proofs/statements etc. should be enclosed with Technical Bid and shall be properly indexed.

Signature of Tenderer(s)

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(H) SCOPE OF WORK AND EVALUATION OF TENDER**1 The scope of work of this tender is –**

- (a) Name of work: Construction of Road Over Bridge of Span: 1x24.00m + 1x30.00m complete at Ramgarh including approaches and other miscellaneous works adjacent to existing ROB at Km: 406/11-12 between MAEL - RMT Station of South Eastern Railway.

Main work includes Soil Investigation Work, Design & Drawing Work, Foundation & Substructure Work, Superstructure Work, Tree Cutting & Dismantling Work, Road Work, Metalizing Work, Supply of Reinforcement Steel and Supply of Portland Slag Cement.

- (b) The principal items of works to be executed under this contract are:

Schedule – ‘A’	:	Soil Investigation Work under SERUSSOR - 2010
Schedule – ‘B’	:	Design & Drawing Work under Non SERUSSOR - 2010
Schedule – ‘C’	:	Foundation & Substructure Work under SERUSSOR - 2010
Schedule – ‘D/1’	:	Superstructure Work under SERUSSOR - 2010
Schedule – ‘D/2’	:	Superstructure Work under Non SERUSSOR - 2010
Schedule – ‘E/1’	:	Tree Cutting & Dismantling Work under SERUSSOR - 2010
Schedule – ‘E/2’	:	Road Work under Non SERUSSOR - 2010
Schedule – ‘F’	:	Metalizing Work under SERUSSOR - 2010
Schedule – ‘G’	:	Supply of Reinforcement Steel under SERUSSOR - 2010
Schedule – ‘H/1’	:	Supply of Portland Slag Cement under Non SERUSSOR - 2010
Schedule – ‘H/2’	;	Supply of Ordinary Portland Cement under SERUSSOR - 2010
Schedule – ‘I’	:	Misc. Work under SERUSSOR - 2010

2 EVALUATION OF TENDER :

After scrutinising the Technical Bid and short listing the Tenderers, the Price Bid shall be opened on a subsequent date only for those Tenderers who will be qualifying Technical Bid as per qualifying criteria laid down. The date of opening of Price Bid will be advised to the qualifying Tenderer(s) in due course. Price Bid envelope of those Tenderers who are not found to meet the qualifying criteria will not be opened and will be returned. The Railway's decision in this regard will be final.

Late tender/Delayed Tender/Post Tender offers shall be dealt with as per extant rules of the Railways and the Tenderers shall have no right of consideration of such tenders.

Signature of Tenderer(s)

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(I) GENERAL INSTRUCTIONS FOR SUBMISSION OF TENDER

DOCUMENTS:

1.1. The Tenderer(s) shall quote his / their rates as a percentage above or below the schedule of Rates of the South Eastern Railway as applicable except where he/they are required to quote item rates and must tender for all the items shown in the schedule of approximate quantities attached. The quantities shown in the attached schedule 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 schedule.

1.2. 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.

1.3. 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 no tenderers(s) shall demand neither 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.

1.4. 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.

1.5. If the tenderer(s) expires after the submission of his / their tender or after the acceptance of his their tender, the Railway shall deem such tender cancelled. If a partner of a firm expires after the submission of their tender or after the acceptance of their tender, the Railway shall deem such tender as cancelled, unless the firm retains its character.

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

1.7. Execution of Contract Documents: The successful Tenderer(s) shall be required to execute an agreement with the President of India acting through the CAO(Con)/CE(Con)/Dy CE(con) of South Eastern Railway for carrying out the work according to General conditions of Contract, Special conditions / specifications annexed to the tender and specification for work and materials of Railway as amended/corrected up to correction slip mentioned in tender document.

1.8. **Partnership deeds, Power of Attorney Etc:** - The tenderer shall clearly specify whether the tender is submitted on his own or on behalf of a partnership concern. If the tender is submitted on behalf of a partnership concern, he should submit the certified copy of partnership deed along with the tender and authorization to sign the tender documents on behalf of partnership firm. If these documents are not enclosed along with tender documents, the tender will be treated as having been submitted by individual signing the tender documents. 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..

Signature of Tenderer(s)

Tender Notice No. CE/CON/GRC/2/2016 Dated: 04.04.2016 (Two Packet)-TB

South Eastern Railway

1.9. The tenderer whether sole proprietor, a limited company or a partnership firm if they want to act through agent or individual partner(s) should submit along with the tender or at a later stage, a 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 authorising him/them to submit the tender, sign the agreement, receive money, witness measurements, sign measurement books, compromise, settle, relinquish any claim(s) preferred by the firm and sign "No Claim Certificate" and refer all or any disputes to arbitration.

1.10. Employment/Partnership etc. of Retired Railway Employees:-

(a) Should a tenderer 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 should a tenderer being partnership firm have as one of its partners a retired engineer or retired Gazetted Officer as aforesaid, or should a tenderer being an incorporated company have any such retired engineer or retired officer as one of its Directors, or should a tenderer have in his employment any retired Engineer or retired Gazetted Officer as aforesaid, the full information as to the date of retirement of such Engineer or Gazetted Officer from the said service and in case where such Engineer or Officer had not retired from Government service at least 2 years prior to the date of submission of the tender 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, or to take the employment under the contractor, 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 authorised by him in this behalf, shall be clearly stated in writing at the time of submitting the tender. Tenders without the information above referred to or a statement to the effect that no such retired Engineer or retired Gazetted Officer is so associated with the tenderer, as the case may be, shall be rejected.

(b) Should a tenderer or contractor being an individual on the list of approved Contractors, have a relative(s) or in the case of partnership firm or company of contractors one or more of his shareholder(s) or a relative(s) of the shareholder(s) employed in gazetted capacity in the Engineering or any other department of the South Eastern Railway, the authority inviting tenders shall be informed of the fact at the time of submission of tender, failing which the tender may be disqualified/rejected or if such fact subsequently comes to light, the contract may be rescinded in accordance with the provision in clause 62 of the General Conditions of Contract.

(c) **Modified Clause 59 (10) of GCC: 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 Earnest Money Deposit (EMD), Performance Guarantee (PG) and Security Deposit (SD) of that contract.

Signature of Tenderer(s)

Tender Notice No. CE/CON/GRC/2/2016 Dated: 04.04.2016 (Two Packet)-TB

South Eastern Railway

- 1.11 The bidders are expected to themselves obtain, on their own responsibility and expenses, all information which will be necessary for submitting the bid. Intending bidders may obtain clarification, if any, with regard to the tenders from the office of the Chief Administrative Officer(Con)/GRC/Chief Engineer (Construction-I)/GRC, South Eastern Railway, Garden Reach on any working day during the working hours. For any further information in regard to site conditions, facilities available at the work spot etc., the bidder may contact the office of the Deputy Chief Engineer (Con)/Rourkela, South Eastern Railway, on any working day during the working hours.
- 1.12 In addition to the information given in the prescribed form of the Technical Bid, the tenderer may also submit any additional relevant information connected with this tender on separate sheets if considered necessary, enclosing copies of the documents relied upon.
- 1.13 Submission of Tender does not bind the Railway Authority for any claim of any nature whatsoever. The bid document shall be the property of Railway Authority.
- 1.14 The Railway reserves the right for accepting or rejecting the tender/bid without assigning any reason and no claim shall be entertained.
- 1.15 Tender documents are non-transferable. The cost of the Tender documents is not refundable.

2. SPECIAL CONDITIONS BY TENDERERS:

The tenderers are normally not expected to make any special conditions/stipulations of their own and are expected to submit their tender in accordance with the conditions/stipulations contained in these documents. If, however, the tenderer wishes to make any special conditions/stipulations or wishes to intimate the Railway of any matter of importance, he may do so in a separate sheet, the same should be enclosed with Price Bid document of tender document through covering letter. Conditions/stipulations of general nature having no financial implication may be enclosed through a covering letter in part of the tender documents. Such conditions/stipulations shall be a part of the contract in case of acceptance of the tender, only to the extent explicitly accepted by the Railway Administration. The accepting authority reserve the right not to accept any such special conditions/stipulations made by the tenderer and may reject the tender as unacceptable without any reference to the tenderer or may ask the tenderer to withdraw any or all such conditions/stipulations before awarding the contract and in the event of his refusal to do so may not accept this tender.

3. OMISSIONS AND DISCREPANCIES:

Should a tenderer find discrepancies in the tender document, or omissions from the drawings or any of the Tender Forms, or should he be in doubt with as to their meaning, he should at once notify the authority inviting tenders, who may send a written instruction to all Tenderers. It shall be understood that every endeavour has been made to avoid any error which can materially affect the basis of the tender and the 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.

Signature of Tenderer(s)

Tender Notice No. CE/CON/GRC/2/2016 Dated: 04.04.2016 (Two Packet)-TB



CHAPTER-II

South Eastern Railway

(A) Guidelines Participation of Joint Venture (JV) Firms

Clause 65 to GCC

Clause 65- PARTICIPATION OF JOINT VENTURE (JV) FIRMS

1. Separate identity/name shall be given to the Joint Venture firm.
2. Number of members in a JV Firm 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.
3. A member of JV firm shall not be permitted to participate either in individual capacity or as a member of another JV firm **in the same tender**.
4. The tender form shall be purchased and submitted only in the name of the **JV firm** and not in the name of any constituent member.
5. **The Joint Venture Firm shall be required to submit Earnest Money Deposit (EMD) along with the tender in terms of the provisions contained in Para 5 (Earnest Money) of Part-I of GCC.**
6. One of the members of the JV Firm shall be its Lead Member who shall have a majority (at least 51%) share of interest in the JV Firm and also, must have satisfactorily completed in the last three previous financial years and the current financial year upto the date of opening of the tender, one similar single work for a minimum value of 35% of advertised tender value. The other members shall have a share of not less than 20% each in case of JV Firms with upto three members and not less than 10% each in case of JV Firms with more than three members. In case of JV Firm with foreign member(s), the Lead Member has to be an Indian Firm with a minimum share of 51%.
7. A copy of Memorandum of understanding (MOU) executed by the JV members shall be submitted by the JV firm along with the tender. The complete details of the members of the JV firm, their share and responsibility in the JV firm etc. particularly with reference to financial technical and other obligations shall be furnished in the MOU. (The MOU format is at Appendix-1).
8. Once the tender is submitted, the MOU shall not be modified / altered / terminated during the validity of the tender. In case the tenderer fails to observe/comply with this stipulation, the full Earnest Money Deposit (EMD) shall be liable to be forfeited.
9. Approval for change of constitution of JV firm shall be at the sole discretion of the Employer (Railways). The constitution of the JV firm shall not be allowed to be modified after submission of the tender bid by the JV firm, except when modification becomes inevitable due to succession laws etc. and in any case the minimum eligibility criteria should not get vitiated. However, the Lead Member should continue to be the Lead member of the JV firm. Failure to observe this requirement would render the offer invalid.
10. Similarly, after the contract is awarded, the constitution of JV firm shall not be allowed to be altered during the currency of contract except when modification become inevitable due to succession laws etc and in any case the 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.

Signature of Tenderer(s)

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South Eastern Railway

11. On award of contract to a JV firm, a single performance Guarantee shall be submitted by the JV firm 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 firm and no splitting of guarantees amongst the members of the JV firm shall be permitted.

12. On issue of LOA (Letter of Acceptance), **an agreement among the members of the JV firm (to whom the work has been awarded) shall be executed and got registered before the Registrar of the Companies under Companies Act or before the Registrar / Sub – Registrar under the Registration Act, 1908. This JV agreement shall be submitted by the JV firm to the Railways before signing the contract agreement for the work.** (This agreement format at Appendix-2). In case the tenderer fails to observe/comply with this stipulation, **the full Earnest Money Deposit (EMD) shall be forfeited and other penal actions due shall be taken against partners of the JV and the JV.** This joint venture agreement shall have, inter-alia, following clauses:

12.1 Joint and several liabilities – Members of the JV firm to which the contract is awarded, shall be jointly and severally liable to the Employer (Railways) for execution of the project in accordance with General and Special conditions of the contract. The JV members 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.

12.2 Duration of the Joint Venture Agreement – 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.

12.3 Governing Laws – The joint venture Agreement shall in all respect be governed by and interpreted in accordance with Indian Laws.

13. Authorized Member – Joint Venture members shall authorize one of the members on behalf of the Joint Venture firm to deal with the tender, 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 firm.

14. No member of the Joint Venture firm 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 employer (Railways) in respect of the said tender/contract.

15. Documents to be enclosed by the JV firm along with the tender:

15.1 In case one or more of the members of the JV firm is/are partnership firm(s), following documents shall be submitted:

- (a) **Notary certified copy of the Partnership Deed,**
- (b) **Consent of all the partners to enter into the joint Venture Agreement on a stamp paper of appropriate value (in original).**
- (c) **Power of Attorney (duly registered as per prevailing law) in favour of one of the partners of the partnership firm to sign the JV Agreement on behalf of the partnership firm and create liability against the firm.**

Signature of Tenderer(s)

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15.2 In case one or more members is/are Proprietary Firm or HUF, the following documents shall be enclosed:

Affidavit on Stamp Paper of appropriate value declaring that his/her Concern is a Proprietary Concern and he/she is sole proprietor of the Concern OR he/she is in position of "KARTA" of Hindu Undivided Family (HUF) and he/she has the authority, power and consent given by other partners to act on behalf of HUF.

15.3 In case one or more members is/are limited companies, the following documents shall be submitted.

- (a) **Notary certified copy of resolutions of the Directors of the Company, permitting the company to enter into a JV agreement, authorizing MD or one of the Directors or Managers of the Company to sign JV Agreement, such other documents required to be signed on behalf of the Company and enter into liability against the company and/or do any other act on behalf of the company.**
- (b) **Copy of Memorandum and articles of Association of the Company.**
- (c) **Power of Attorney (duly registered as per prevailing law) by the Company authorizing the person to do/act mentioned in the Para (a) above.**

15.4 All the members of the JV shall certify that they are not black listed or debarred by Railway or any other Ministry/Department of the Govt. of India/State Govt. from participation in tenders/contract on the date of opening of bids either in their individual capacity as members of the JV or the JV firm in which they were/are members.

16. Credentials & Qualifying criteria

Technical and financial eligibility of the JV firm shall be adjudged based on satisfactory fulfilment of the following criteria:

16.1. Technical eligibility criteria : As mentioned in Notice Inviting Tender (NIT) at para 3

16.2 Financial eligibility criteria: As mentioned in Notice Inviting Tender (NIT) at para 3.

Signature of Tenderer(s)

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South Eastern Railway
Appendix-1

**(B) Memorandum of Understanding (MOU) for Joint Venture
Participation**

(To be executed on non-judicial stamp paper of appropriate value in accordance with relevant stamp Act. The stamp paper to be in the name of the company who is issuing the Power of Attorney).

**JOINT VENTURE PARTICIPATION
BETWEEN**

M/s.....having its registered office at (hereafter referred to as.....) acting as the Lead Partner of the first part and

M/s.....having its registered office at(hereafter referred to as ‘.....’) in the capacity of a Joint Partner of the other part.
(If more than two partners include the details accordingly).

Now all the parties i.e. _____ and _____ will be known as M/s _____ (JV).

The expressions ofandshall whatever the context admits, mean and include their respective legal representatives, successors-in-interest and assigns and shall collectively be referred to as “the Parties” and individually as “the Party”

WHEREAS; South Eastern Railway Construction Organisation (hereinafter referred to as “Client”) has invited bids for(insert name of work)
.....

NOW, THEREFORE, THE PARTIES AGREE AS FOLLOWS:

1. The ‘Parties’ have studied the documents and have agreed to submit their bid as Joint Venture (JV).
2. M/s.....shall be the lead member of the JV for all intents and purpose and shall represent the Joint Venture in its dealing with the Client. For the purpose of submission of Tender proposals, the parties agree to nominate M/sas the leader duly authorized to sign and submit all documents and subsequent clarifications, if any, to the Client.
3. The ‘Parties’ have resolved that the distribution of share and responsibilities is as under:
 - a) Lead Partner share%;
 - Responsibilities.
 - i)
 - ii)
 - iii)

(Technical, Financial & other obligations)

Signature of Tenderer(s)

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b) Other Joint Venture Partner's share -----%

Name

Responsibilities. i)

(Technical, Financial & other obligations) ii)

iii)

c) Other Joint Venture Partner's share -----%

Name

Responsibilities. i)

(Technical, Financial & other obligations) ii)

iii)

4. JOINT AND SEVERAL RESPONSIBILITY

The Parties undertake that they shall be jointly and severally liable to the Railways for execution of the Project in accordance with General and Special Conditions of Contract. The JV members 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.

5. ASSIGNMENT AND THIRD PARTIES

No member of the Joint Venture firm 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 employer (Railways) in respect of the said tender/contract.

6. EXECUTIVE AUTHORITY

Joint Venture members shall authorize one of the members on behalf of the Joint Venture Firm to deal with the tender, 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 members of the JV firm.

7. VALIDITY

This MOU shall remain in force till the occurrence of the earliest of the following, unless by mutual consent, the parties agree in writing to extend the validity for a further period.

- a. Tender submitted by the joint venture is declared unsuccessful, or
- b. Cancellation/shelving of the project by the client for any reasons prior to award of work.

In case, the Tender submitted by the joint venture is declared successful; the validity of this MOU shall be extended till the JV agreement is signed and got ratified.

8. This MOU is drawn innumber of copies with equal legal strength and status. One copy is held by M/s..... and the other by M/s. &M/s..... and a copy submitted with the proposal.

Signature of Tenderer(s)

Tender Notice No. CE/CON/GRC/2/2016 Dated: 04.04.2016 (Two Packet)-TB

South Eastern Railway

9. This MOU shall in all respects be governed by and interpreted in accordance with Indian Laws.

10. NOTICES

Notices shall be given in writing by Fax confirmed by registered mail or commercial courier to the following Fax numbers and addresses.

11. JV Agreement.

We are aware, that after issue of LOA by the Railway Administration, an agreement among the members of the JV firm has to be executed and got registered before the Registrar of Companies under the Companies Act or with the Registrar/Sub-Registrar under the Registration Act. This agreement shall be submitted by the JV firm to the Railways as per Railway's standard J.V. Agreement format before signing the contract agreement for the work. In case the JV partners fail to observe/comply with stipulations, the Earnest Money Deposit, deposited with the Railways shall be forfeited and other penal actions due shall be taken against partners of the JV and the JV by the Railways.

12 We shall furnish along with the tender requisite documents as mentioned under para15.1, 15.2, 15.3 (as the case may be) of the guidelines of Railway for participation of J.V. firms in works tender.

Declaration

It is to certify that we have not been black listed or debarred by the Railways or any other ministry/departments of the Govt. of India/State Govt. from participation intenders/contract in the past either in our individual capacity or the J.V. firm or partnership firm in which we were members/partners.

Lead Partner

(Name and Address)
Address)

Other Partner(s).

(Name and

Name and Address of the J.V. firm

IN WITNESS WHEREOF THE PARTIES, have executed this MOU the day, month and year first before written.

M/s.....
M/s.....
.....

(Seal)

(Seal)

Witness:

- 1. (Name & Address)
- 2. (Name & Address)

Signature of Tenderer(s)

South Eastern Railway

Appendix-2

(C) Joint Venture Agreement

(The J.V. Agreement should be made on a Rs.100/- Non-Judicial Stamp paper, purchased in favour of the J.V. firm and there should not be more than six months time, from the date of purchase of those Non-Judicial papers and execution of the J.V. Agreement, on it)

JOINT VENTURE AGREEMENT

BETWEEN

M/s.....having its registered office at (hereafter referred to as) acting as the Lead Partner of the first part.

And

M/s.....having its registered office at(hereafter referred to as ‘.....’) in the capacity of a Joint Partner of the other part.
(If more than two partners include the details accordingly).

Now, the Joint Venture formed by both the parties i.e. _____ and _____ will be known as M/s _____ (JV).

The expressions ofandshall whatever the context admits, mean and include their respective legal representatives, successors-in-interest and assigns and shall collectively be referred to as “the Parties” and individually as “the Party”

1. WHEREAS; South Eastern Railway (hereinafter referred to as South Eastern Railway administration) has invited bids for(insert name of work and Tender Notice No.)

.....”

And Whereas, the above parties to the Joint Venture have submitted the bid in the name of the said JV formed as per the MOU signed on dated..... and where as the said bid has finally been accepted by Railway Administration i.e. the Employer vide LOA No.....dated.....for the work of....., we M/s....., the lead partner and M/s....., the Joint Partner herewith sign the above formal JV agreement for registration of the above joint venture viz M/s..... and for entering into contract Agreement with Railway Administration, the “Employer”.

2. NOW, THEREFORE, THE PARTIES AGREE AS FOLLOWS :

2.1. The ‘Parties’ have studied the documents, JV guidelines and have agreed to participate in submitting the ‘Tender’ jointly; signed the JV MOU and submitted the bid accordingly.

Signature of Tenderer(s)

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South Eastern Railway

2.2. M/s....., the Lead Partner, shall be the lead member of the JV for all intents and purposes and shall represent the Joint Venture in its dealing with the Employer. The lead member shall be authorized to sign and submit all documents and subsequent clarifications, if any, to the Employer. However, he will not submit any such proposals, clarifications or commitments before securing the written clearance of the other partner(s) which shall be expeditiously given by M/s..... to M/s.....

2.3. The lead member shall sign the agreement or enter into contract in respect of the work awarded, to receive payment, to witness joint measurement of work done, to sign measurement books and similar such action in respect of the said contract. All notices/correspondences with respect to the contract would be sent only to the lead member of the JV firm.

3. The 'Parties' have resolved that the distribution of share, responsibilities, profits, losses and remuneration shall be as under:

a) Lead Partner's share :%;

Name

Responsibilities : i)

(Technical, Financial & other obligations) ii)

iii)

b) Other Joint Venture Partner's share -----%

Name

Responsibilities: i)

(Technical, Financial & other obligations) ii)

iii)

c) Other Joint Venture Partner's share -----%

Name

Responsibilities: i)

(Technical, Financial & other obligations) ii)

iii)

4. The constitution of JV firm shall not be altered during the currency of the contract except when modification become inevitable due to succession laws etc. provided that the minimum eligibility criteria are not got vitiated. Failure to observe this stipulation shall be deemed to be breach of contract, which will entitle the employer. the South Esatern Railway Administration to take all consequential action as per contract conditions.

Signature of Tenderer(s)

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South Eastern Railway

5. JOINT AND SEVERAL RESPONSIBILITY

The parties undertake that they shall be jointly and severally liable to the S.E..Railway acting through Chief Administrative Officer (Con), S.E..Railway, Kolkata or his assignees, for satisfactory execution and completion of the Project work in accordance with General and Special conditions of contract. The JV members shall also be liable jointly and severally for the loss, damages that may be caused to the South Eastern Railway Administration, acting through Chief Administrative Officer (Con), S.E.Railway, Kolkata and during the course of execution of the contract or due to non-execution of the contract or part thereof. The parties solemnly affirm and declare that every possible care will be taken by them for ensuring satisfactory execution and completion of the work awarded under the contract.

6. ASSIGNMENT AND THIRD PARTIES

No member of the Joint Venture firm 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 Employer (S.E..Railway) in respect of the said tender/contract.

7. GUARANTEES AND BONDS

The lead partner shall furnish all bonds/guarantees to the South Eastern Railway Administration in the name of J.V. and on behalf of the J.V., which shall be legally binding on all the partners of the J.V.

8. USE OF MACHINERY, INSTRUMENT, LABOUR FORCE etc.

For the execution of the respective portions of works, the parties shall make full arrangements to bring the required finance, plants and equipment, materials, manpower and other resources. However, the parties here to undertake that whatever the machinery, instruments, labour force, (including unskilled, skilled, inspectors, Engineer etc.) they possess at the time of entering into Joint Venture Agreement or which subsequently shall come in their possession and if such machinery, instruments, labour force is required for the speedy and efficient execution of any portion of the work, the party/parties having the control over the said machinery, instruments, labour force etc. without having any regard to their share of profit and loss agreed to between the parties in Joint Venture Agreement shall hand over the same which shall be placed at the disposal of the other party actually executing that portion of the work at mutually agreed terms for the purpose of execution of the contract without any hindrance and obstacle.

9. DURATION OF JOINT VENTURE AGREEMENT

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 and Security Deposit is released.

10. Name and address of the J.V. firm

(indicate Address, Telephone No. and Fax Numbers of the J.V. firm)

11. Governing Laws : The J.V. Agreement shall in all respect be governed by and interpreted in accordance with Indian Laws.

Signature of Tenderer(s)

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Declaration:-

It is to certify that we have not been blacklisted or debarred by the Railways or any other Ministries Departments of the Govt of India/State Govt from participation in tenders/contracts in the past either in our individual capacity or the JV Firm or Partnership Firm in which we were members/partners.

Lead Partner

Other Partner

(s)

(Name & Address)
address)

(Name &

Name & Address of the JV Firm:-

IN WITNESS WHEREOF, THE PARTIES, have executed this J.V. Agreement
_____the day, _____month and _____year.

For M/s.....

For M/s.....

.....
.....

.....
.....

(Seal)

(Seal)

Witness:

1. (Name & Address.....).
2. (Name & Address.....).

Place :

Date :

(The J.V. Agreement should be notarized first and thereafter it has to be got registered before the registrar of Companies under Companies Act or before the Registrar/Sub-registrar under the Registration Act,1908)

Signature of Tenderer(s)

Tender Notice No. CE/CON/GRC/2/2016 Dated: 04.04.2016 (Two Packet)-TB



CHAPTER-III

Signature of Tenderer(s)

Tender Notice No. CE/CON/GRC/2/2016 Dated: 04.04.2016 (Two Packet)-TB

South Eastern Railway

(A) CERTIFICATE OF FAMILIARISATION

I/We hereby solemnly declare that I/We have visited the site of above work and have familiarized myself/ourselves of the local working conditions in all respects and in particular the following:

- Topography of the area and existing road network (highways & village – Pucca & Katcha) and availability of service roads.
- Soil conditions at the site of work.
- Sources and availability of construction materials.
- Rates for construction materials.
- Availability of local labour, both skilled and unskilled and the prevailing labour rates.
- Availability of water & electricity.
- Flooding of area, stagnation of water etc.,
- Availability of space for putting up labour camp, Stores godown, offices etc.
- Industrial Relations & labour problems if any.
- Climate conditions of the area.

Signature of Tenderer(s)

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(B) Self Certificate in support of site visit

I/We have gone through the Note (f) of para 3 of Tender Notice and have visited the site and I/We assured that we will complete the work if it is awarded to us.

Signature of Tenderer(s)

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South Eastern Railway

(C) INSTRUCTIONS TO TENDERERS (S)**2.1 Additional Documents Part of this Tender document (comprising of Technical bid document and Price Bid document)-**

Sl No	Document Name	Published By	Referred in this Documents As
1(a)	South Eastern Railway Unified Standard Schedule of Rates (Works and Materials) -2010 with Correction slips issued up to date of opening of tender.	South Eastern Railway	SERUSSOR
1(b)	South Eastern Railway Schedule of Rates (Works and Materials) -2001 with Correction slips issued up to date of opening of tender.	South Eastern Railway	SOR
2.	Indian Railways Unified Standard Specifications (Works and Materials) -2010 (Volume- I & Volume-II) with Correction slips issued up to date of opening of tender.	Indian Railways	IRUSS
3	Indian Railways Standard 'General Condition of Contract' (GCC)- July, 2014 with all correction slips and the instructions issued by Railway Board upto the date of opening of the tender. The document has been uploaded on Railway Board's website. It may be accessed through the path: "www.indianrailways.gov.in/railwayboard.">>"About Indian Railways">>"Railway Board Directorates">>"Civil Engineering">>"Policy Matters">>"General Conditions of Contract".	Indian Railways	GCC

Note: The terms "Correction slip" as referred to in this tender document includes the following terms also.

- Addendum slip
- Correction slip.
- Addendum slip and corrigendum slip which are issued in consecutive serials.

2.2 Submission:

- 2.2.1 Tender must be submitted as per Method of Submission (Chapter-I/(I)) and as per Notice Inviting Tender (NIT)(Chapter-I(B)) and must be deposited in the Tender box in the Offices of S.E. Railway as mentioned in Tender Notice on or before the specified time. Tenderer(s) are requested to be present at the time of opening of tender.
- 2.2.2 Tenders containing over writing, additions, alterations, erasures, obliteration and other discrepancies are liable to be rejected. The Tenderer(s) should properly attest all corrections made by them.
- 2.2.3 The Tenderer(s) shall sign every page of the tender document and submit all of them.
- 2.2.4 The Tenderer(s) should quote rates both in figures and in words. Wherever there is a difference between the rates quoted in figures and in words, the rate quoted in words will be taken as correct.
- 2.2.5 The tenderers must submit the list of works in hand with the status of progress of these works.
- 2.2.6 The tenderer must submit the documents/certificates in support of fulfilling the eligibility criteria as specified in Tender Notice and its corrigendums, if issued any.

2.3 If the tenderer(s) deliberately gives/give wrong information/tampered tender document 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.

- 2.3.1 An affidavit is required to be submitted by all tenderers (as given in para 2.20). Based on this affidavit, Tender Committee will deliberate and decide eligibility of tenderers for first packet. However, the suitability/eligibility of shortlisted tenderers will be provisional and same shall be subject to verification of their credentials from issuing authority. Second packet (Finance Bid) of only eligible tenderers will be opened and relevant documents of lowest eligible tender will be verified. If contents in documents submitted by tenderers are found to be incorrect/false, action will be taken against such tenderers as per provisions contained in Affidavit submitted by them as para 2.20. In such eventuality, next lowest eligible tenderer/offer will be considered.

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- 2.3.2 **If the Tenderer(s) fails to submit the Affidavit as prescribed in Clause 2.3.1 of Instruction to Tenderer(s) along with the offer, the tender offer shall be considered incomplete and will be rejected summarily.**

2.4 Company Profile:

- 2.4.1 Tenderer(s) should specifically and fully disclose in his/their respective tender, their respective constitutions and submit attested Photostat copies of documents like partnership deed, Articles and Memorandum of Association, Certificate of Incorporation etc. if any in support of such disclosures. If Tenderer(s) is/are a firm i.e. partnership business, it should be stated whether the same is Registered under the Indian Partnership Act, and the name and addresses of all the partners of the firm should be fully disclosed. The Railway Administration shall always have the liberty to demand production of the original of the said documents and also to make such further and other enquiries regarding the constitution of the Tenderer(s) as may be considered necessary.

2.5 Earnest Money:

- 2.5.1 The Tender must be accompanied by a sum, as mentioned in this tender, as Earnest Money. *The tenderer shall be required to deposit earnest money 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 earnest money shall be as follows:*

Value of the work (Tender value)	Earnest Money Deposit (EMD)
For works estimated to cost upto Rs. 1 Crore	2% of the estimated cost of the work
For works estimated to cost more than Rs. 1 Crore	Rs. 2 lakhs plus ½% (half percent) of the excess of estimated cost of work beyond Rs. 1 crore subject to a maximum of Rs. 1 crore

The earnest money shall be rounded to the nearest Rs.10.

- 2.5.2 **The Earnest Money should be in cash or Banker's Cheques / Demand Drafts in favour of FA&CAO/Con/South Eastern Railway, Garden Reach, Kolkata executed by State Bank of India or any of the Nationalized Banks or by a Scheduled Bank.**
- 2.5.3 **Earnest Money in shape of Bank Guarantee bond, Deposit Receipts, Pay Orders etc will not be accepted.**
- 2.5.4 The Tenderer(s) shall keep the offer open for a period of 120 days from the date of opening of the Tender. It is understood that the Tender Documents have been sold/issued to the Tenderer(s) and the Tenderer(s) is/are being permitted to the tender in consideration of the stipulation on his/their part that after submitting his/their tender he/they will not resile from his/their offer or modify the terms and conditions thereof in a manner not acceptable to Chief Engineer (C), S.E. Railway. Should the Tenderer(s) fail to observe or comply with the foregoing stipulations, Railway shall forfeit the Earnest Money deposited with the tender.
- 2.5.5 The Earnest Money of the Unsuccessful Tenderer(s) will be returned back. However Railway shall not be responsible for any loss or depreciation that may happen to Earnest Money while they are in Railways possession, nor be liable to pay interest thereon. The tenderer should give the option of returning the EMD of the unsuccessful tenderer whether to be sent by Regd. Post or to be collected by them personally. Live contact numbers and fax numbers may be given on letter pad.
- 2.5.6 *If the tender is accepted, the amount of Earnest Money will be retained and adjusted as Security Deposit for the due and faithful fulfilment of the Contract. This amount of Security Deposit shall be forfeited without prejudice to any other rights or remedies if the tenderer(s) /contractor(s) fails to—*
- Submit the Performance Guarantee within stipulated period as mentioned in Para 2.7 of Instruction to tenderer(s), or*
 - Execute the contract documents within seven days after receipt of notice issued by Railway that such documents are ready, or*
 - Commence the work within **fifteen** days after receipt of orders to the effect.*

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- 2.6.1 *The Earnest Money deposited by the Contractor with his tender will be retained by the Railways as part of security for the due and faithful fulfilment of the contract by the contractor. The balance to make up the security deposit, the rates for which are given below, may be deposited by the Contractor in cash or may be recovered by percentage deduction from the Contractor's "on account" bills. 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 may not exceed 10% of the total value of the contract.*
- 2.6.2 *Unless otherwise specified in the special conditions, if any, the Security Deposit/rate of recovery/mode of recovery shall be as under:-*
- (a) *Security Deposit for each work should be 5% of the contract value.*
 - (b) *The rate of recovery should be at the rate of 10% of the bill amount till the full security deposit is recovered.*
 - (c) *Security Deposits will be recovered only from the running bills of the contract and no other mode of collecting SD such as SD in the form of instruments like BG, FD etc. shall be accepted towards Security Deposit.*
- 2.6.3 *Security Deposit shall be returned to the contractor after the physical completion of the work and after passing the final bill based on 'No Claim Certificate' as certified by the Competent Authority. The Competent Authority 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 contractors and that there is no due from the contractor to Railways against the contract concerned. Before releasing the SD, an unconditional and unequivocal no claim certificate from the contractor concerned should be obtained.*
- 2.6.4 *After the work is physically completed, security deposit recovered from the running bills of a contractor can be returned to him if he so desires, in lieu of FDR/irrevocable Bank Guarantee for equivalent amount to be submitted by him.*
- 2.6.5 *In case of contracts of value Rs.50 crore and above, irrevocable Bank Guarantee can also be accepted as a mode of obtaining security deposit.*

2.7 Performance Guarantee (P.G):

- 2.7 (a) The successful bidder shall have to submit a Performance Guarantee (PG) within 30 (thirty) days from the date of issue of Letter Of Acceptance (LOA). Extension of time for submission of PG beyond 30 (thirty) 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 15% per annum shall be charged for the delay beyond 30 (thirty) days, i.e. from 31st day after the date of issue of LOA. In case the contractor fails to submit the requisite PG even after 60 days from the date of issue of LOA, the contract shall be terminated duly forfeiting EMD and other dues, if any payable against that contract. The failed contractor shall be debarred from participating in re-tender for that work.
- 2.7 (b) The successful bidder shall submit the Performance Guarantee (PG) in any of the following forms, amounting to 5% of the contract value:
- (i) A deposit of Cash;
 - (ii) Irrevocable Bank Guarantee;
 - (iii) Government Securities including State Loan Bonds at 5% below the market value;
 - (iv) Deposit Receipts, Pay Orders, Demand Drafts and Guarantee Bonds. These forms of Performance Guarantee could be either of the State Bank of India or of any of the Nationalized Banks;
 - (v) Guarantee Bonds executed or Deposits Receipts tendered by all Scheduled Banks;
 - (vi) A Deposit in the Post Office Saving Bank;
 - (vii) A Deposit in the National Savings Certificates;
 - (viii) Twelve years National Defence Certificates;
 - (ix) Ten years Defence Deposits;
 - (x) National Defence Bonds and

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(xi) Unit Trust Certificates at 5% below market value or at the face value whichever is less.

Also, **FDR in favour of FA & CAO/C, S.E. Railway, Garden Reach, Kolkata** (free from any encumbrance) may be accepted.

NOTE : The instruments as listed above will also be acceptable for Guarantees in case of Mobilization Advance.

- 2.7(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.
- 2.7(d) The value of PG to be submitted by the contractor will not change, for variation upto 25% (either increase or decrease). In case during the course of execution, value of the contract increases by more than 25% of the original contract value, an additional Performance Guarantee amounting to 5% (five percent) for the excess value over the original contract value shall be deposited by the contractor.
- 2.7(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. The Security Deposit shall, however, be released only after expiry of the maintenance period and after passing the final bill based on 'No Claim Certificate' from the contractor.
- 2.7(f) Whenever the contract is rescinded, the Security Deposit shall be forfeited and the Performance Guarantee 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.
- 2.7(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 provision of the **GCC**, the Performance Guarantee shall be forfeited in full and shall be absolutely at the disposal of the President of India.

2.8 General:

- 2.8.1 Non-compliance with any of the conditions set forth in this tender document, **GCC** is liable to result in the tender being rejected.
- 2.8.2 The instructions to the Tenderer(s), Special Conditions, SERUSSOR, IRUSS, GCC shall be deemed to form a part of the tender document.
- 2.8.3 SERUSSOR, IRUSS and GCC can be purchased on payment of an amount specified for copy of each volume on any working day during Office hours, subject to availability, from the Office of General Manager (Engineering), S.E. Railway, Garden Reach, Kolkata, 700 043. Standard RDSO drawings can be purchased from RDSO/Lucknow on any working day during Office hours. The drawings can be seen at concerned Dy CE/C's office or CAO/C's office on any working day during Office hours. Detailed drawings shall be issued to the contractor during execution of works.

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- 2.8.4 The Submission of a Tender by a Tenderer(s) shall be deemed to imply that he has read, understood and abide by the conditions stated in tender document, SERUSSOR, IRUSS and GCC.
- 2.8.5 If the Tenderer(s) deliberately give/gives wrong information in his/their Tender or create/creates circumstances for the acceptance of his/their Tender, Railways reserve the right to reject such tender at any stage.
- 2.8.6 The authority for the acceptance of the Tender will rest with the President of India acting through Railway Board (Ministry of Railways), General Manager, S.E. Railway, CAO/C/S.E. Railway and Chief Engineer/c/S.E.Railway, who does not bind himself to accept the lowest or any other Tender nor does he undertake to assign reason for declining to consider the Tender. No correspondence will be entertained with the Tenderer(s) in respect of the rejection of any or all of the Tenders. The Railway reserve the right to accept the Tender either for the full quantity of work or part thereof or divide the works amongst more than one tenderer without assigning any reason for such actions.
- 2.8.7 Should a Tenderer(s) find discrepancies in or omission from the drawings or any of the Tender Forms, or should be in doubt as to their meanings, he/they should at once notify the authority inviting Tender who may send a written instructions to all Tenderer(s). It should be understood that every endeavor has been made to avoid any error which may materially affect the basis of the Tender and the successful Tenderer(s) shall take upon himself/themselves and provide for the risk of any error which may subsequently be discovered and shall make no subsequent claim on account thereof.
- 2.8.8 Tender documents in which Tenderer(s) submits Tender shall become the property of the Railway and the Railway shall have no obligation to return the same to the Tenderer(s).
- 2.8.9 Before submitting a Tender, the Tenderer(s) will be deemed to have satisfied himself/themselves by actual inspection of the site and locality of the work all conditions likely to be encountered during the execution of the works. It is understood that Tenderers have taken into account all factors and rates he/they enters/enter in the Tender forms (Rate sheet) are adequate and all-inclusive, to accord with the provisions in Clause –37 of the **GCC**.
- 2.8.10 The successful Tenderer(s) shall execute an Agreement with the President of India acting through the Chief Administrative Officer (Con), S.E. Railway, Chief Engineer (Con), Dy.CE (con)/Works, S.E. Railway, Garden Reach for carrying out the works according to specifications laid down in the document.
- 2.8.11 The Agreement to be executed shall be on the Agreement Form for the works of the S.E. Railway except as specifically varied by these Tender papers, as well as provisions contained in the Tender Documents shall form part of the contract. All certificates submitted by Tenderer including programme & completion of work shall form the part of the agreement.
- 2.8.12 The Tenderer(s) whose tender is accepted shall appear at the office of the Chief Administrative Officer (Con), Garden Reach, S.E. Railway, in person, in case of a Firm or Corporation, a duly authorized representative there of, to execute the Contract Agreement within seven days from the date of receipt of notice issued by Rly that such documents are ready. Failure to do so shall constitute breach of the Agreement effected by the acceptance of the Tender in which case the earnest money accompanying the Tender and liquidated damages shall be forfeited by the Railway for such fault.
- 2.8.13 In case of non acceptance of a Tender by the Railway Administration for any reason whatsoever, the Tenderer(s) cannot claim for the expenses incurred by him in submitting the Tender for the work or for any other account.

2.9 Death of Tenderer:

- 2.9.1 If a Tenderer(s) expires after the submission of his Tender or after the acceptance of his Tender, the Railway shall deem such Tender as cancelled. If a Partner of a Firm expires after submission of their Tender or after the acceptance of their Tender the Railway shall deem such Tender as cancelled unless the Firm retains its character legally acceptable.

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- 2.10 Notwithstanding the fulfilment of eligibility criteria by the tenderer, Railway reserves the right to reject/accept the tender after considering the various circumstances of the individual case.**
- 2.11 Variation in contract quantities:**
- 2.11.1 Individual NS items in contracts shall be operated with variation of plus or minus 25% and payment would be made as per the agreement rate. For this, no finance concurrence would be required.
- 2.11.2 In case an increase in quantity of an individual item by more than 25% of the agreement quantity is considered unavoidable, the same shall be got executed by floating a fresh tender. If floating a fresh tender for operating that item is considered not practicable, quantity of that item may be operated in excess of 125% of the agreement quantity subject to the following conditions:
- (a) Operation of an item by more than 125% of the agreement quantity needs the approval of an officer of the rank not less than S.A. Grade;
- (i) 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;
- (ii) 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;
- (iii) Variation in quantities of individual items beyond 150% will be prohibited and would be permitted only in exceptional unavoidable circumstances with the concurrence of associate finance and shall be paid at 96% of the rate awarded for that item in that particular tender.
- (b) The variation in quantities as per the above formula will apply only to the Individual items of the contract and not on the overall contract value.
- (c) Execution of quantities beyond 150% of the overall agreemental value should not be permitted and, if found necessary, should be only through fresh tenders or by negotiating with existing contractor, with prior personal concurrence of FA&CAO / FA&CAO(C) and approval of General Manager.
- 2.11.3 In cases where decrease is involved during execution of contract :
- (a) The contract signing authority can decrease the items upto 25% of individual item without finance concurrence.
- (b) For decrease beyond 25% for individual items or 25% of contract agreement value, the approval of an officer not less than rank of S.A. Grade may be taken, after obtaining 'No Claim Certificate' from the contractor and with finance concurrence, giving detailed reasons for each such decrease in the quantities.
- (c) It should be certified that the work proposed to be reduced will not be required in the same work.
- 2.11.4 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 agreement value.
- 2.11.5 No such quantity variation limit shall apply for foundation items.
- 2.11.6 As far as SERUSSOR items are concerned, the limit of 25% would apply to the value of SERUSSOR schedule as a whole and not on individual SERUSSOR items. However, in case of Non schedule (NS) 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).
- 2.11.7 For the tenders accepted at Zonal Railways level, variations in the quantities will be approved by the authority in whose powers revised value of the agreement lies.
- 2.11.8 For tenders accepted by General Manager, variations upto 125% of the original agreement value may be accepted by General Manager.

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- 2.11.9 For tenders accepted by Board Members and Railway Ministers, variations upto 110% of the original agreement value may be accepted by General Manager.
- 2.11.10 The aspect of vitiation of tender with respect to variation in quantities should be checked and avoided. In case of vitiation of the tender (both for increase as well as decrease of value of contract agreement), sanction of the competent authority as per single tender should be obtained.
- 2.12 **Disaster management:**
The Railway administration in case of accidents/natural calamities involving human lives can draw all the required vehicles, plants, machinery tools, and equipment of contractors. For payment purposes thereof the item will be operated as a non-schedule (NS) item as per the existing norms and powers delegated to the Railways.
- 2.13 **Release of Payment through ECS/EFT:**
- 2.13.1 Tenderers are to give mandate form as per the format available in tender document for receipt of payment through ECS/EFT. Also the tenderers are to fill up the said particulars during submission of tenders.
- 2.13.2 Tenderer to provide the details of Bank A/c in line with RBI guidelines for the same. These details will include Bank Name, Branch Name & address, Account type, Bank A/c No. and Bank & Branch Code as appearing on MICR cheque issued by bank.
- 2.13.3 Tenderer to attach certificate from their bank certifying the correctness of all above mentioned information (as mentioned in Para 2.13.2 above).
- 2.13.4 In case of non-payment through ECS/EFT or where ECS/EFT facility is not available, payment will be released through cheque.
- 2.14 **Bank Guarantees (BGs) to be submitted by contractors should be sent directly to the concerned authorities by the issuing Bank under registered Post with A.D.**

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2.15 SPECIMEN FORMAT OF BANK GUARANTEE BOND PERFORMANCE GUARANTEE BOND

In consideration of the President of India (herein after called "**The Government**") acting through the **Financial Adviser and Chief Accounts Officer (Const.), South Eastern Railway, Garden Reach, Kolkata**, having agreed to exempt ----- (hereinafter called "the said Contractor(s)" from the demand, under the terms and conditions of **Letter of Acceptance** No. -----dated: ----- for the work of ----- (hereinafter called "the said **Letter of Acceptance**"), of **PERFORMANCE GUARANTEE** for the due fulfillment by the said Contractor(s) of the terms and conditions contained in the said **Letter of Acceptance**, on production of a bank Guarantee for Rs. ----- - (Rupees _____ only) , we, -----(indicate the name of the bank)----- (hereinafter referred to as "the Bank") at the request of ----- (contractor(s)) do hereby undertake to pay to the **Government** an amount not exceeding **Rs.** ----- against any loss or damage caused to or suffered or would be caused to or suffered by the **Government** by reason of any breach by the said Contractor(s) of any of the terms or conditions contained in the said **Letter of Acceptance/Agreement.**

2. We -----(indicate the name of bank)-----do hereby undertake to pay the amounts due and payable under this guarantee without any demur, merely on a demand from the **Government** stating that the amount/claimed is due by way of loss or damage caused to or would be caused to or suffered by the **Government** by reason of breach by the said contractor(s) of any of the terms or conditions contained in the said **Letter of Acceptance/Agreement** or by reason of the Contractor(s) failure to perform the said **Letter of Acceptance/Agreement**. Any such demand made on the bank shall be conclusive as regards the amount due and payable by the Bank under this guarantee. However, our liability under this guarantee shall be restricted to an amount not exceeding Rs. -----.

3. We undertake to pay to the **Government** any money so demanded notwithstanding any dispute or disputes raised by the Contractor(s)/supplier(s) in any suite or proceeding pending before any court or Tribunal relating thereto our liability under this present being absolute and unequivocal.

The payment so made by us under this bond shall be a valid discharge of our liability for payment thereunder and the contractor(s) /supplier(s) shall have no claim against us for making such payment.

4. We, -----(indicate the name of bank) ----- further agree that the guarantee herein contained shall remain in full force and effect during the period that would be taken for the performance/of the said **Letter of Acceptance/Agreement** and that it shall continue to be enforceable till all the dues of the **Government** under or by virtue of the said **Letter of Acceptance/Agreement** have been fully paid and its claims satisfied or discharged or till **F.A and CAO/C/GRC/ S.E.Railway**, Ministry of **Railway** certifies that the terms and conditions of the said **Letter of Acceptance/Agreement** have been fully and properly carried out by the said Contractor(s) and accordingly discharges this guarantee. Unless a demand or claim under this guarantee is made on us in writing on or before the ----- we shall be discharged from all liability under this guarantee thereafter.

5. We, -----(indicate the name of Bank)----- further agree with the **Government** that the **Government** shall have the fullest liberty without our consent and without affecting in any manner our obligations hereunder to vary any of the terms and conditions of the said **Letter of Acceptance/Agreement** or to extend time of performance by the said Contractor(s) from time to time or to postpone for any time or from time to time any of the powers exercisable by the **Government** against the said Contractor(s) and forbear or enforce any of the terms and conditions relating to the said **Letter of Acceptance/Agreement** and we shall not be relieved from our liability by reason of any such variation, or extension being granted to the said Contractor(s) or for any forbearance, act or omission on the part of the **Government** or any indulgence by the **Government** to the said Contractor(s) or any such matter or thing whatsoever which under the law relating to sureties would, but for this provision, have effect of so relieving us.

6. This guarantee will not be discharged due to the change in the constitution of the Bank or the Contractor(s)/Supplier(s).

7. We, -----(indicate the name of Bank)----- lastly undertake not to revoke this guarantee during its currency except with the previous consent of the **Government** in writing.

Dated the ----- day of -----200---

For -----
(indicate the name of bank)

Note:

The PERFORMANCE GUARANTEE should be on the non judicial stamp paper of the appropriate value in accordance with the stamp Act. The stamp paper to be in the name of the Executive Bank.

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2.16 Programme of works:

- (a) Within 21 days of receipt of Letter of Acceptance, the contractor shall submit the programme of works indicating the order in which the contractor proposes to carry out the works. The work should be started simultaneously at two or more location in sections with two separate set of organisational set up by the Agency for faster progress of work. The programme shall indicate the date of possession of site, submittal dates, forecast dates, critical path(s) and sequence of work activities necessary to achieve the completion date of the work. If any time, it appears that the actual progress of the execution of works does not conform to the programme due to delay in site possession for want of land acquisition, the contractor shall produce revised programme necessary to ensure completion of works by its relevant dates, duly taking into account any extension of time granted on account of delay in land acquisition. The construction programme shall contain as minimum requirement.
- Site possession
 - Mobilization/Demobilization
 - Soil Investigation works
 - Establishment and Preliminary works (i/c Design and drawing)
 - Earth works and Drainage works
 - Track works
 - Structural works (Bridges, subways, Culvert etc.)
 - Buildings (Station, Halts, Yards, Depots, Staff Quarters etc.)
 - Testing and Commissioning
 - Contractual date(s) of finishing Construction
- The contractor will be required to submit monthly progress report by 5th of every month to Dy.CE and CE/C office by updating this progress. In case of non-submission of monthly progress report, a penalty of Rs. 10,000/- per month will be deducted from contractor's payment.
- (b) Tenderer(s) should submit detailed programme for completion of work. They should compute resource requirement on monthly basis and submit to the Railways along with the tender. A statement of resources proposed to the deployed at work site on monthly basis should also be submitted to Railways for the same purpose.
- (c) The contractor shall arrange to take minimum 50 nos of colour photographs every quarter at various stages during execution of the work. The contractor shall supply two colour prints of each of the photographs taken in albums at every quarter of the year. Each photograph in the album shall be suitably captioned. Digital copies of the same should be submitted in two separate CDs. Failure to submit the requirements, as above will attract a penalty of Rs.2000 per quarter will be deducted.
- (d) The contractor will take video films of important activities of the work and should be delivered to the Engineer in charge of minimum 45 minutes at every quarter of a year. Failing which a penalty of Rs.2000 will be charged for every quarter of failure. It shall contain narration of activities in English.
- (e) The contractor shall set up temporary site office for Railway officials of approximately 500 sq.ft area having at least three chambers with toilet, and modular furniture at site. The site office must be equipped with Computer, printer, photocopier, fax along with consumables. Staff conversant with computer working shall be available for day to day working. All relevant codes, manual, railway specifications shall be arranged at the site office by the contractor. This site office should be made available and functional within three months of award of the contract failing which a penalty of Rs.20000/- per month (after three months period) shall be imposed.

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2.17(a) Method Statement for Execution of Works: Method Statement for Execution of Works:

The contractor shall submit, within 21 days of the receipt of the Letter of Acceptance, Method statements as listed below considered as a minimum. The contractor shall submit, in addition, all Method Statements he considers as necessary to explain in sufficient details his approach in executing the contractual works and meeting all deadlines as required in the Government Requirements. The Method Statements shall describe and explain in sufficient detail how the Contractor wants to execute the different parts of the works to meet the contractual requirements. The Agency should adopt all improved mechanisation process in works for speedy progress of work at agency's own interest.

- Soil Investigation
- Site Installation, Mobilization and Demobilization
- Earthworks
- Formwork and Scaffolding
- Concrete Works (Bridges, Culverts, Subways etc.)
- Bridge girder assembly and launching
- Structural Steelworks
- Track Works
- Project Management, Project Organization, Project Control
- Quality Management and Quality Control.

2.17(b) Quality Assurance Plan (QAP): For works costing above 8 Cr., within 21 days of receipt of letter of acceptance, the contractor shall submit the Quality Assurance Plan in sufficient details covering major items of the contract for approval of Engineer.

2.17(c) Establishing Laboratory at Site: In all tenders costing more than 10 Cr. Above contractor shall construct site laboratory with adequate furnishings and fixtures to do various tests on soil, aggregates, concrete, reinforcement, water, cement etc. The site laboratory should have adequate space to accommodate all required equipments for various tests related to the contract. Minimum equipments required for this work are as below:

List of Laboratory Equipment -

Sl. No.	DESCRIPTION OF EQUIPMENT	Unit
A.	<u>EARTH WORK.</u>	
1	IS set of sieves with base & top lid 20mm, 19mm, 10mm, 4.75mm, 2 mm 600 mic, 425 mic., 212 mic., 75 mic.,	2 Sets
2	Hand operated sieve shaker for above sieves	1 No
3	<u>BALANCE</u>	
	a) Pan balance 10 Kg. Capacity (with 1.0 gm Least Count).	1 No.
	b) Electronic balance 500 gm capacity (with 0.1 gm Least Count).	1No.
4	Field density apparatus complete.	
	a) Sand replacement.	2 Sets.
	b) Core cutter with dolly	5 Sets.
5	Modified heavy Proctor density apparatus full unit.	2 Sets
6	Liquid Limit apparatus hand operated with counter & grooving tools.	2 Sets
7	Shrinkage limit apparatus	1 No.
8	Stainless steel spatula - 25cm long	2 Nos.
9	Porcelain bowl for LL - 15cm dia.	3 Nos.
10	Aluminum dish with lid – 5cm dia.	4 Nos.
11	Wash bottle - 1 lit. capacity 500ml capacity	6 Nos.
12	Glass plate 10mm thick 50x50 cm	2 Nos.
13	Ground glass 5mm thick 50x50 cm	2 Nos.
14	a) Enameled trays 45x30cm	3 Nos.
	b) Enameled trays 20x20cm	3 Nos.
15	a) Enameled plates 6 inch dia	10 Nos.
	b) Enameled plates 8 inch dia.	10 Nos.
	c) Enameled plates 10 inch dia.	10 Nos.
16	Frying pans	3 Nos.
17	Stove janta	2 Nos.
18	Straight edge 300mm long	3 Nos.

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19	Grain size analyser of fines a) Hydrometer	2 Nos.
	Grain size analyser of fines b) Thermometer 0 to 50 c	2 Nos.
	Grain size analyser of fines c) Glass cylinder 1000cc capacity with 60mm dia.	5 Nos.
20	Desiccators as IS –6128	2 Nos.
21	Can of 10 litre capacity for distilled water Wooden mortar and pestle.	3 Nos
22	Specific gravity test apparatus.	1 No.
23	Density bottle-50ml capacity Glass cylinder 100 cc capacity (for 1 Free Swell index test)	2 Nos.
24	Oven- thermostatically controlled to maintain a temperature 105-110c	2Nos.
25	Consumable Item - Sieve brush	1 No.
26	Wire brush	
27	Sodium carbonate	
28	Sodium hexa meta phosphate.	
29	Kerosene	
30	Mercury	
31	Additional Equipment - Hand auger 150mm dia with extension rod.	
32	Sampling tube 100mm dia. And 450mm length	
	<u>CONCRETE WORKS</u>	
1	Cube Moulds of adequate numbers & sizes	45
2	Slump Test Apparatus with all accessories.	12
3	Marsh Cone.	1
4	Pycnometer 1 ltr.	3
5	Pycnometer 500 ml.	3
6	Flakiness and Elongation Gauges each one	2
7	Aggregate impact Value Test Apparatus including all accessories.	1
8	Bulk density set.	1
9	Density Basket	1
10	Sieves 450 mm internal dia confirming to IS: 460 of size varying 2.36mm to 80.00mm	0
11	Lid & Pan.	2
12	Brass Sieves 200 mm internal dia confirming to IS: 460 of size varying 45 Microns to 4.75mm	0
13	Lid & Pan	3
14	System for measuring water penetration in six concrete samples. Complete with required compressor, constant pressure arrangement, tubing and leak proof clamping arrangement as per DIN1048 Specifications. Constant pressure to be maintained during the test.	3
15	Crushing Valve.	1
16	Standard Weight Set for calibration of balances.	2
17	Steel Scoop Small	3
18	Oven for moisture content weights as required for various tests including moisture content.	1
19	Permeability test arrangement	Applicable only in case of Major Bridges
20	Compressive strength testing machine	
21	Equipment for detecting density of Bentonite	
22	Equipment for detecting Marsh cone viscosity of Bentonite	
23	Equipment for detecting pH value of Bentonite	
24	Equipment for detecting Sand Content of Bentonite	
25	Equipment for detecting Liquid Limit of Bentonite	
26	Equipment for Load transfer test	
27	Static load test with tendon – anchorage assembly	

Note: The above list of equipments is indicative only. The same may vary as per the actual requirement as decided by the Engineer-in-Charge.

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2.19 SPECIMEN FORMAT OF DETAILS STATEMENT OF WORKS EXECUTED/COMPLETED BY THE CONTRACTORS DURING LAST THREE YEARS (I.E. CURRENT YEAR UPTO THE DATE OF OPENING OF THE TENDER AND PREVIOUS THREE FINANCIAL YEARS)

SI No	Name and Place of Work	Authority/Agency for which work was carried out	Date of Award & Agreement No. & Date
1	2	3	4

Date of Completion (Original/Actual)	Agreemental Cost/Completion Cost	Principal/Technical features work in brief	SI No. at which relevant certificate/documents are attached
5	6	7	8

Signature of Tenderer(s)

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2.20 FORMAT FOR AFFIDAVIT TO BE SUBMITTED BY TENDERER ALONGWITH THE TENDER DOCUMENTS

(To be executed in presence of Public Notary on non-judicial stamp paper of the value of Rs. 100/- . The stamp paper has to be in the name of the tenderer)**

I (Name and designation)** appointed as the attorney/authorized signatory of the tenderer (including its constituents), M/s. (hereinafter called the tenderer) for the purpose of the Tender documents for the work of as per the Tender No. of South Eastern Railway, do hereby solemnly affirm and state on 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 document from South Eastern Railway website www.tenders.gov.in and printed the same. I/We have verified the content of the printed 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.

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 me/us.

- 6. I/We understand that if the certificates regarding eligibility criteria submitted by me/us are found to be forged/false or incorrect at any time during process for evaluation of tenders, it shall lead to forfeiture of the tender EMD besides suspending of business for one year. Further, I/we [insert name of the tenderer]** and all my/our constituents understand that my/our offer shall be summarily rejected.
7. I/We also understand that if the certificates submitted by me/us are found to be false/forged or incorrect at any time after the award of the contract, it will lead to termination of the contract, along with forfeiture of EMD/SD and Performance Guarantee besides any other action provided in the contract.

DEPONENT

SEAL AND SIGNATURE OF THE TENDERER

VERIFICATION

I/We above named tenderer do hereby solemnly affirm and verify that the contents of my/our above affidavit are true and correct. Nothing has been concealed and no part of it is false.

DEPONENT

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.
Attestation before Magistrate/ Notary Public.

Signature of Tenderer(s)

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2.21 SPECIMEN FORMAT FOR COMPLETION CERTIFICATE BY GOVT./SEMI GOVT./ PUBLIC SECTOR UNDERTAKING/ AUTONOMOUS BODIES/ MUNICIPAL BODIES FOR WORK DIRECTLY AWARDED BY THEM

(Completion Certificate by Govt./Semi Govt./ Public Sector Undertaking/ Autonomous bodies/
Municipal bodies for work directly awarded by them)

Name of Organization

Postal address, Phone No., Email ID, Fax No.

Letter No.

Date:

1.	Name of work	
2.	Contract Agreement (C/A) No. and date	
3. (i)	Name of Firm/Organization with address	
(ii)	In case of JV..... Name and % share of individual firms.	
4.	Original value of contract agreement.	
5.	Final value of contract as completed. (if final bill paid)	
6.	Date of award of contract	
7.	Has the work physically been completed in all respect as per contract agreement?	(Yes/No)
8.	If yes, then actual date of physical completion.	
9.	Total payment made in above contract till the date of opening of present tender.	
10.	In case of composite work: Component of payment made in respect of similar nature of work e.g. earthwork /Track/Bridges etc. (as defined in eligibility criteria) out of the total payment made under Sr. No. 9 above.	

I hereby certify that above mentioned work has been physically completed in all respect as per contract agreement. Performance of the contractor while executing the work had been satisfactory.

(Signature)

Name and Designation of officer

Mobile No. of officer

Seal of officer

Note: (i) Submission of false certificates by tenderer shall lead to, forfeiture of EMD and other action including penal action (Para 2.20).

(ii) Copy of certificate duly attested shall be submitted along with tender document.

(iii) Payment made as indicated in above certificate (At Sr. No. 9/ Sr. No. 10) will be considered as value of completed work for the purpose of eligibility under Instructions to tenderers and conditions of tender.

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(D) GENERAL CONDITIONS OF CONTRACT

3.1 General:

3.1.1 The Special Conditions of Contract therein and Instructions to Tenderer(s) and the stipulations made in the Schedules items of quantities and rates shall govern the works under this contract, in addition to and/or in part suppression of the **SERUSSOR,IRUSS** and **GCC**.

3.2 Precedence Order:

3.2.1 When there is a conflict between the Instructions to Tenderers, General Conditions of Contract of tender document, Special Conditions of Contract of tender document, stipulations contained in the Schedules of items, quantities and rate of tender document on the one hand and the **SERUSSOR-2010, IRUSS-2010** and **GCC** with latest correction slips on the other, the former shall prevail.

3.2.2 Provision contained in Instructions to Tenderers, General conditions of contract, Special Conditions of contract therein and Schedule of items quantities and rates get precedence over provisions contained in **IRS Code/IRC code/IS codes/codes** owned by other institution.

3.2.3 In case of conflict between provisions of **IRS/IRC/IS** specification the precedence will be in same order. In case of ambiguity the decision of Chief Engineer (C) shall be final and binding on the contractors.

3.2.4 In case of conflict between Instruction to tenderers and any of the notes in Drawing, Special condition of contract therein and Schedule of items, quantities and rates, the former shall prevail. In case of ambiguity the decision of Chief Engineer (Con) shall be final and binding on the contractor.

3.2.5 The Notes for the Schedule of items will take precedence over Special Conditions of Contract therein and also on SERUSSOR, IRUSS.

3.2.6 Any specifications/conditions stated by the Tenderer(s) in the covering letter submitted by him along with the tender shall be deemed to be a part of the contract only to such an extent as has been expressly accepted by the Railway.

3.2.7 All measurements, methods of measurements, meaning and item of specifications and interpretation of Special Conditions of therein made by the Engineer on behalf of the Railway shall be final and binding on the contractor and shall be considered as "Excepted matters" in terms of conditions No. 63 of **GCC**.

3.3 Agreement

3.3.1 All expenses in drawing up to agreement and cost of stamp duty, if any shall be borne by the contractor.

3.4 Passes:

3.4.1 No railway pass of any kind for self/agent/labourer, for any purpose in connection with this tender/contract will be issued to the contractor.

3.5 Change of address.

3.5.1 Any change in the address of the contractor shall be forthwith intimated in writing to the railways. The Railways will not be responsible for any loss or inconvenience suffered by the contractor on account of his failure to comply with this.

3.6 Cancellation of document:

3.6.1 The cancellation/change of any document such as power of attorney, partnership deed etc. shall forthwith be communicated by the Contractor to the Railway in writing failing which the Railway will have no responsibility or liability for any action on the strength of said document.

3.7 Dissolution of Contractor's Firm:

3.7.1 If the Contractor's firm is dissolved due to death or retirement of any partner or for any reasons whatsoever before fully completing the whole work or any part of it undertaken by the Principal agreement, the partners shall remain jointly, severally and personally liable to complete the whole work to the satisfaction of the Railway and to pay compensation for loss sustained if any, by the Railway due to such dissolution. The General Manager of the Railway shall decide the amount of such compensation and his decision in the matter shall be final and binding on the Contractor(s).

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3.8 Deployment of plant and machinery:

- 3.8.1 The deployment of plant and machinery including moving machines shall be such as not to infringe or cause damage to Railway track or any other Government or private properties. Operations of such equipment involving infringement to moving dimensions prescribed in the Handbook of the Schedule of Dimensions of the Railway shall not be undertaken without the prior approval of the Engineer-in-charge. Contractor/s shall be wholly responsible for any losses or damage resulting from violation of this clause.

3.9 Use of new materials secured with Govt.'s assistance:

- 3.9.1 Where any new materials for the execution of the contract are procured with the assistance of the Railway, either by issue from Railway stocks or purchased under arrangements made or permits or licenses issued by the Government, the contractor shall hold said materials as a trustee for the Railways and use such materials economically and solely for the purpose of the Contract for which they are issued and not dispose them off without the permission of the Railway. He shall also return if required by the Chief Engineer ©/S.E. Railway, Garden Reach to such destination as may be directed, all or part of surplus or unserviceable materials that may be left with him after the completion of the contract or at its termination for any reason whatsoever on payment of such price as Chief Engineer ©/ S.E. Railway, Garden Reach may fix with due regard to the conditions of the materials. In the event of the contract being cancelled for any default on the part of the contractor(s) the freight charges for the return of the materials according to the direction of the Chief Engineer (Con) / S.E. Railway, Garden Reach shall be borne by the Contractor. The decision of the Chief Engineer) Con)/ S. E. Railway, Garden Reach shall be final and conclusive.
- 3.9.2 In the event of any breach of the aforesaid conditions, the Contractor shall in addition to making himself liable for action for contravention of the terms of the license or permit and or for criminal breach of trust be liable to account to the Railway for all moneys, advantages or profits resulting or which in the usual course would have resulted to him by reason of such breach.

3.10 Renewal of Deposits by Contractors:

- 3.10.1 In the case of Tenderer(s)/Contractor(s) depositing performance guarantee/security deposit in the shape of fixed deposit receipt, it shall be with automatic renewal facility only.

3.11 Damages by Accidents/Floods/Rains /Cyclones Etc.:

- 3.11.1 The Contractor(s) shall take all precautions against damages from accidents, floods or tides etc. No compensation shall be allowed to the contractor for his tools, plants, materials, machines and other equipment lost or damaged by any cause whatsoever. The Contractor(s) shall make good the damages to any structure, plant or materials of every description belonging to the Railway Administration lost or damaged by any cause during the course of construction work.
- 3.11.2 The Railway Administration will not be liable to pay the contractor any charges for rectification or repairs that may have occurred from any cause whatsoever, to any part of the new structures during currency of contract. If any damages caused by the contractor the penalty shall be imposed by the Railway Administration as per extent rules.

3.12 Emergency work:

- 3.12.1 In the event of any accident or failure occurring in or about the work or arising out of or in connection with the construction, completion or maintenance of the work in which Administration will not be liable to pay the Contractor any charges for rectification or repairs to any damage which may have occurred from any cause whatsoever, to any part in the opinion of the Engineer requires immediate attention, the Railway may bring its own workmen or other agency to execute or partly execute the necessary work or carry out repairs if the Engineer considers that the Contractor/s is/are not in a position to do so in time and charge the cost thereof, as shall be determined by the Engineer-in-charge of S.E. Railway to the Contractor.

3.13 Night work:

- 3.13.1 Contractor/s attention is drawn to clause 23 of the GCC, which stipulates that no work shall be carried out between sunset and sunrise without previous permission by the Engineer.
- 3.13.2 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 Contractor/s to carry out the works even at night without conferring any right on the Contractor for claiming any extra payment for the same. The Contractor at his own risk and cost shall make all arrangements in this connection for the safety of works and safety of work persons.

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3.14 Service Roads:

- 3.14.1 The Contractor(s) will be permitted to make use of the service roads already existing in the possession of the Railway. All service roads required by the contractor in or outside Railway boundary shall be constructed by the Contractor at his own risk and cost and all these roads shall be maintained by the Contractor at his own cost. The Railway reserves the right to make use of the service roads as and when necessary without any additional payment to the Contractor.

3.15 Water supply:

- 3.15.1 The Contractor/s shall be responsible for the arrangements to obtain potable water supply necessary for the works. No arrangements will be made by the Railway administration for supplying water to the Contractor either for drinking purpose or execution of work. Rates quoted shall include the cost of arranging potable water supply. Only potable water shall be permitted to be used in all types of concrete as well as for curing.

3.16 Electricity:

- 3.16.1 Any electric supply required at site for whatsoever purpose shall be arranged by the Contractor/s. The Contractor/s shall be responsible for the arrangements for obtaining electric supply at his own cost and rates quoted shall include the cost of providing electric supply arrangements required for the work.
- 3.16.2 If required by Contractor/s, the Railway Administration may give required assistance in recommending to State Electricity Board for giving necessary electric connection to the Contractor for execution of works.

3.17 Income Tax Deduction:

- 3.17.1 In respect of works, the contract value of which is more than Rs. 10,000/- each, a deduction of 2% on the gross payment from each of the Contractor's bills shall be made in terms of **section 194(c)** of the Income Tax Act of 1961 and 1991. From time to time surcharge will also be deducted along with I. Tax per extant rules.

3.18 Deployment of Qualified Engineer at work site by the Contractor:

- 3.18.1 Tenderer(s)/Contractors after award of the contract shall be required to employ engineering graduates/diploma holders on monthly salary and for the duration as indicated below:

3.18.2

Contract value	No of Graduate Engineer / Diploma Holders	Engineer	Duration
More than Rs. 200 lakh and above	One	Qualified Graduate Engineer	During currency of Contract.
More than Rs. 25 lakh but less than Rs. 200 lakh	One	Qualified Diploma Holder Engineer	During currency of Contract.

- 3.18.3 In case the contractor fails to employ the Qualified Engineer, as aforesaid in Para 3.18.2 above, he, in terms of provisions of Clause 26A.2 to the General Conditions of Contract, shall be liable to pay an amount of Rs. 40,000 and Rs. 25,000 for each month or part thereof for the default period for the provisions, as contained in Para 3.18.2 above, respectively.

3.19 Procurement of Machinery by Contractor:

- 3.19.1 It should be clearly understood that it is entirely Contractor's responsibility and liability to find and procure all the machinery, tools and plant and their spare parts that are required for the efficient and methodical execution of the work. Delay in procurement of such items due to their non-availability or import difficulties or any other causes, whatsoever, shall not be taken as an excuse for slow progress or non-performance of the work.

3.20 Hire of Railway's Plant and Machinery:

- 3.20.1 The Railway may at their discretion give on hire to the Contractor such plant as compressors, Pneumatic equipment, concrete mixers and light equipment, as considered necessary by the engineer. However it does not guarantee hiring any such machinery and it shall not entertain any claim or compensation due to Railways inability to supply such plant/machinery or the condition of the Railway's plant/machinery supplied on hire be taken as an excuse for slow progress or for non-performance of the work. Recovery of hire charges will be from the day one to the day of return to the Railway store as per direction of Engineer-in-charge.

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3.20.2 Hire charges on Plant and Machinery:

The Railway administration shall charge the contractor for the hire of machinery and plant supplied to him. The rate of hire charge for the plant and machinery given by the railway will be calculated on the basis of the GCC together with correction slips issued up to date of tender notice.

3.20.3 Statutory Certificate Etc.

While the machine(s) is/are in the possession of the Contractor(s) he/they shall be responsible for seeing that any inspection certificate or license required under any Government Act is obtained in due time. The Contractor shall also be responsible for seeing that all required precautions are observed in using the plant as well, and he shall be responsible for any accident that may occur from the use of the plant.

3.20.4 Access to Plant at Hirer's Premises:

The Railway shall be given reasonable access to the plant and such facilities as may be necessary to satisfy itself that the plant is being so used as to avoid any unnecessary wear or less or risk.

3.20.5 Right to Recall:

The Railway shall reserve to itself the right to recall any plant/machinery without assigning any reasons by giving one month's notice or at any time without notice in the event of its being required by the Railway for an unforeseen emergency. In either case, the Railway shall not be liable to pay any compensation to hirer for the loss that may be caused by the withdrawal of the plant.

3.21 Storage of Railway Materials:

The Contractor shall make his own arrangements at the site of work for the safe storage and custody of Railway materials issued to him. Such Railway materials issued to the Contractor and stored at the site of work shall be open for inspection by the Engineer-in-charge or his representative at all times.

3.22 Maintenance Period:

3.22.1 The maintenance period in terms of Clause 47 and 48 of the GCC shall be SIX MONTHS from the date of issue of completion certificate for all works **except earthwork and ballast, for which there shall be no maintenance period.**

3.23 Employment of Railway surplus labour by contractor:

3.23.1 The Tenderer(s) may be required to engage surplus/retrenched casual labour of the S.E.Railway if found suitable up to the extent of twenty persons for each Lakh or part of the value of the contract during the currency of the contract. The terms of the employment between such labour and the Tenderer(s) may be on mutually agreed terms subject to the statutory provisions contained in the labour regulations and enactments. The contractor(s) shall indemnify the Railway against any claim arising out of employment of such labour and the Railway shall not be a party to any disputes etc. arising out of the employment of such labour by the Tenderer(s)/Contractor(s).

3.23.2 The Contractor shall engage local labour for skilled/unskilled work as far as proposed one practicable.

3.24 Anti-larval work:

3.24.1 During execution of the works against this contract the Contractor(s) shall be responsible for anti-larval work at his/their own cost.

3.25 Non-itemized works:

3.25.1 Where item not covered by the schedules are to be executed, the rates for such non-itemized works shall be negotiated before commencement of such work or to be got executed through any other agency by the Railway at the discretion of the Railway Administration.

3.26 Time is the essence of Contract:

3.26.1 Time is the essence of contract. All the works are required to be completed in all respects as stipulated by the Railway within the completion date. Progress shall be maintained strictly in accordance with the programme given by the Contractor and accepted by the Engineer-in-charge from time to time as per the programme chart BAR/CPM/PERT chart.

3.27 Lead and Lift on Railways/Contractor's Materials:

3.27.1 No lead and lift for the Contractors/Railways materials is payable for the works executed under this contract unless otherwise specified.

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3.28 Testing of cement concrete:

- 3.28.1 The rates for concrete works shall be deemed to include all charges for testing of cement aggregates, sand, water and the concrete as required to be done in accordance with specifications, including the cost of labour, materials, equipment, moulds, transport etc. The Contractor shall prepare at his own cost standard cubes of concrete according to the directions of the Engineer-in-charge both for the Preliminary Tests and during Work Tests. The charges of testing shall be borne by the contractor.
- 3.28.2 The Contractor shall follow the Guidelines for Quality Control for Concrete as per Indian Railways Standard Code of practice for Plain, Reinforced and Pre-stressed concrete for Bridge Construction (Concrete Bridge Code) Incorporating Correction slips up to date of tender opening, as well as Specifications and Special Conditions of Contract.
- 3.28.3 The criteria for acceptance of concrete work shall be that the test results carried out at 28 days age should be found satisfactory.

3.29 Cutting/uprooting of trees:

- 3.29.1 No extra rate shall be paid for cutting or uprooting trees of any girth, grubbing root of trees or jungle clearance involved in any work under this contract.

3.30 Explosives:

- 3.30.1 The contractor has to make his own arrangements to get the necessary licenses/permits for storing and use of explosives. The contractor has to make his/their own arrangements for procurement of the explosives and detonators required for the work and their storage as per extant rules and regulations.

3.31 IS Codes/IRS Specifications:

- 3.31.1 Wherever any reference to Code, specification, Act etc. is made in this document, it shall be taken as a reference to the latest version thereof, including all amendments and corrections there to or otherwise specified.
- 3.31.2 The contractor shall not be entitled to any extra payment on any account for compliance with the various provisions of IS specifications/IRS specifications and Special Conditions of contract. The rates indicated in the schedule shall be deemed to include all works required to be done in compliance with the specifications.

3.32 Utilization of Railway Stones:

- 3.32.1 Notwithstanding the inclusion of some of the rates in the schedules with contractor's stones/aggregate, the Contractor(s) shall utilize the Railway's useable surplus stones, if available for use as such or by converting them into aggregate of sizes required. The cost of boulder shall be recovered for one cubic meter net of such stones as per the prevailing rate of the area or @ Rs.100/- per cum or as may be decided by the Railway (after deducting 25% for voids). The Contractor(s) shall collect the boulders from locations within the limit of contract section wherever they are offered to him within the section limits. The rate per cubic meter net includes royalty, collection as required. The rate also includes loading, transportation of cut spoils which has to be done by the Contractors at his/their own risk and cost and the rate is towards the cost of cut stone available on "as is and where is basis". The boulder issued to the Contractor(s) for the above purpose will be used only for the works of the agreement and shall neither be disposed off nor be used for any other agreement.

3.33 Sales Tax, Entry Tax or any other taxes:

- 3.33.1 The Contractor shall bear in full all taxes and royalties levied by the State Government and/or Central Government from time to time. This would be entirely a matter between the contractor and State Government/or Central Government. **The contractor shall expressly indemnify Railways against any such claim by Govt. agency/ local body etc. by submitting an Indemnity Bond within 21 days from the date of issue of Letter of Acceptance.** The Indemnity Bond will be part of agreement. Railway may recover such taxes and royalties etc. as per the provision of relevant rules of the concerned State if the contractor fails to pay the taxes and royalties to the Government.

3.33.2 The Building and other Construction Workers Welfare Cess Act, 1996 is applicable in this contract.

The tenderer for carrying out any construction work in **Jharkhand State** must get themselves registered from the Registering Officer under Section – 7 of the Building and other Construction Workers Act, 1996 and rules made thereto by the **Jharkhand State** Govt and submit certificate of Registration issued from the Registering Officer of the **Jharkhand State** Govt. (Labour Deptt.) . For enactment of this Act, the tenderer shall be required to pay cess @ **1%** of cost of construction work to be deducted from each bill. Cost of material shall be outside the purview of cess, when supplied under a separate schedule item. The tenderer/contractor must submit the certificate of registration issued from Registering Officer duly notarised before execution of agreement.

Signature of Tenderer(s)

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3.34 Tree Cutting:

- 3.34.1 If the section passes through forestland, the contractor or his labour is prohibited to cut the trees for the purpose of firewood or for any other purpose. Cutting of trees as required under the items of works indicated in the tender schedules may be carried out strictly as directed by the Engineer-in-Charge of the work. Unauthorized felling of trees will result in prosecution and imprisonment. It is the contractor's responsibility to cause no damage to the forest growth and any fuel required by the Contractor for his own use or for the use by his labourers or for the work shall be arranged by the Contractor at his own cost. The Contractor shall take this aspect into consideration while quoting the rates against the tender.

3.35 Approval of Samples of Material:

- 3.35.1 All materials to be used in the work by the Contractor shall be subject to the prior approval of the Engineer-in-charge of the work. Contractor shall submit samples of materials to be used for work and arrange for the supplies, only after the samples have been approved by Engineer.

3.36 Blasting:

- 3.36.1 Wherever a cutting passes through or near OHE transmission line only controlled blasting is to be resorted to as per schedule.
- 3.36.2 The guidelines for blasting as provided in GCC should be followed.

3.37 Place of issue of Railway materials:

- 3.37.1 The materials required to be supplied by the Railway for the items where specified will be issued from any of the Railway store depots, and the transportation of the materials to sites of work and surplus materials from the sites of work to Railway store Depot specified by the Engineer-in-charge will be at contractor's cost.

3.38 Isolated Safety Precautions:

- The contractor will take special precautions and make all arrangements of his own cost of labour, material etc. including all expenses as directed/approved by Engineer-in-charge wherever they are arriving at the situations to provide the arrangement as listed below:
- 3.38.1 Approach ramps should have easy gradients and should meet formation in smooth curve to facilitate easy manoeuvring of vehicles from ramp to formation.
- 3.38.2 A gate/barrier should be provided across entry points for vehicles/machinery coming close to track. Such gates should be kept locked and entry of vehicles should be regulated by the representative of contractor authorised by the Engineer-in-Charge of Railway at work site.
- 3.38.3 Duly designed semi-permanent fencing should be provided along running line, at a distance of 3.5m from the centre line of the track, at work sites. The fencing should remain in position till vehicles/machinery are required to work adjacent to running line.

- 3.39 (a) **Extension of Time 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 17 and 17-A of GCC -2014, 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 Annexure-VII of GCC-2014) 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 a sum equivalent to ½ of 1% of the 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 the under noted percentage 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.

- (i) For contract value upto Rs. 2 lakh - 10% of total value of the contract.
- (ii) For contract valued above Rs. 2 lakh -10% of first Rs.2 lakh and 5% of balance.

Further, 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.

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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 62 of these Conditions, whether or not actual damage is caused by such default.
(This is as per GCC -2014 Clause 17 B)

(b) Transparency Boards at Site: Name of work, Specifications of 5 major items and contact number of Dy. CE/Con and CE/Con to be displayed. These Boards be installed at all work sites, but contact numbers to be given in Boards installed in the areas where there is no problem anticipated from miscreants, and be decided by Dy. CE/C in consultation with concerned CE/C, and CAO/C kept informed.

Minimum important 5 milestones and their completion dates are required to be displayed.

3.40 Certificate of completion of works:

3.40.1 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 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.

3.41 Provision of Efficient And Competent Staff At Work Sites By The Contractor:

3.41.1 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.

3.41.2 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.

3.41.3 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 62 of these conditions.

3.42 Deployment Of Qualified Engineers At Work Sites By The Contractor:

3.42.1 The contractor shall also employ Qualified Graduate Engineer or Qualified Diploma Holder Engineer, based on value of contract, as may be prescribed by the Ministry of Railways through separate instructions from time to time.

3.42.2 In case the contractor fails to employ the Engineer, as aforesaid in Para 3.42.1, he shall be liable to pay penalty at the rates, as may be prescribed by the Ministry of Railways through separate instructions from time to time for the default period for the provisions, as contained in Para 3.42.1.

3.42.3 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' by the tender inviting authority.

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3.43 Price variation clause as per clause 46A of General Conditions of Contract.

CLAUSE 46A- PRICE VARIATION CLAUSE

(Price Variation Clause (PVC) shall be applicable only for contracts of value (Contract Agreement Value) Rs. 50 Lakh and more, irrespective of the contract completion period)

Clause 46A. - Price Variation Clause:

46A.1 Price Variation Clause (PVC) shall be applicable only for contracts of value as prescribed by the Ministry of Railways through instructions/circulars issued from time to time and irrespective of the contract completion period. Variation in quantities shall not be taken into account for applicability of PVC in the contract.

Materials supplied free of cost by Railway to the contractors shall fall outside the purview of Price Variation Clause. If, in any case, accepted offer includes some specific payment to be made to consultants or some materials supplied by Railway free or at fixed rate, such payments shall be excluded from the gross value of the work for the purpose of payment/recovery of price variation.

1.1 Applicability of PVC based on original contract value is illustrated as under:-

“If estimated value of a tender (N. I. T. value) is Rs. 55 lakh; but value of the contract as per Contract Agreement is Rs. 45 lakh, then PVC shall not apply, even if the actual final value is Rs. 50 lakh or more due to variation in quantities during execution of the contract. Thus, variation in quantities after signing of Contract Agreement is not relevant for deciding whether PVC is applicable to a contract or not.”

46A.2 The Base Month for 'Price Variation Clause' shall be taken as month of opening of tender including extensions, if any, unless otherwise stated elsewhere. The quarter for applicability of PVC shall commence from the month following the month of opening of tender. The Price Variation shall be based on the average Price Index of the quarter under consideration

46A.3 Rates accepted by Railway Administration shall hold good till completion of work and no additional individual claim shall be admissible on account of fluctuations in market rates, increase in taxes/any other levies/tolls etc. except that payment/recovery for overall market situation shall be made as per Price Variation Clause given hereunder.

46A.4 Adjustment for variation in prices of material, labour, fuel, explosives, detonators, steel, concreting, ferrous, non-ferrous, insulators, zinc and cement shall be determined in the manner prescribed.

46A.5 Components of various items in a contract on which variation in prices be admissible, shall be Material, Labour, Fuel, Explosives, Detonators, Steel, Cement & Lime, Concreting, Ferrous, Nonferrous, Insulator, Zinc, Erection etc. However, for fixed components, no price variation shall be admissible.

46A.6 The percentages of labour component, material component, fuel component etc. in various types of Engineering Works shall be as under:

Component	Percentage	Component	Percentage
(A) Earthwork Contracts :			
Labour Component	50%	Other Material Components	15%
Fuel Component	20%	Fixed Component *	15%
(B) Ballast and Quarry Products Contracts:			
Labour Component	55%	Other Material Components	15%
Fuel Component	15%	Fixed Component *	15%
(C) Tunnelling Contracts :			
Labour Component	45%	Detonators Components	5%
Fuel Component	15%	Other Material Components	5%
Explosive Component	15%	Fixed Component *	15%
(D) Other Works Contracts:			
Labour Component	30%	Fuel Component	15%
Material Component	40%	Fixed Component *	15%

* It shall not be considered for any price variation.

Note: For this contract, payment under PVC will be made as per para- 'D' above i.e, Other Works Contracts.

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46A.7 The Amount of variation in prices in several components (labour, material etc.) shall be worked out by the following formulae:

- (i) $L = \frac{W \times (L_Q - L_B) \times L_C}{L_B \times 100}$
- (ii) $M = \frac{W \times (M_Q - M_B) \times M_C}{M_B \times 100}$
- (iii) $F = \frac{W \times (F_Q - F_B) \times F_C}{F_B \times 100}$
- (iv) $E = \frac{W \times (E_Q - E_B) \times E_C}{E_B \times 100}$
- (v) $D = \frac{W \times (D_Q - D_B) \times D_C}{D_B \times 100}$
- (vi) $S = S_W \times (S_Q - S_B)$
- (vii) $C = C_V \times (C_Q - C_B) / C_B$

For Railway Electrification Works :

- (viii) $T = [(C_S - C_O) / C_O \times 0.4136] \times T_C$
- (ix) $R = [(R_T - R_O) / R_O + (Z_T - Z_O) / Z_O \times 0.06] \times R_C$
- (x) $N = [(P_T - P_O) / P_O] \times N_C$
- (xi) $Z = [(Z_T - Z_O) / Z_O] \times Z_C$
- (xii) $I = [(I_T - I_O) / I_T] \times 85$

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
D Amount of price variation in Detonators
S Amount of price variation in Steel
C Amount of price variation in Cement
T Amount of price variation in Concreting
R Amount of price variation in Ferrous Items
N Amount of price variation in Non- Ferrous Items
Z Amount of price variation in Zinc
I Amount of price variation in Insulator
L_C % of Labour Component
M_C % of Material Component
F_C % of Fuel Component
E_C % of Explosives Component
D_C % of Detonators Component
T_C % of Concreting Component
R_C % of Ferrous Component
N_C % of Non- Ferrous Component
Z_C % of Zinc Component
W Gross value of work done by contractor as per on-account bill(s), excluding cost of materials supplied by Railway at fixed price, **minus the price values of cement & steel**. This will also exclude specific payment, if any, to be made to the consultants engaged by contractors (such payment shall be indicated in the contractor's offer)
L_B Consumer Price Index Number for Industrial Workers- All India: Published in R. B. I. Bulletin for the base period

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L _Q	Consumer Price Index Number 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 _B	Index Number of Wholesale Prices – By Groups and Sub – Groups: All commodities – as published in the R. B. I. Bulletin for the base period
M _Q	Index Number of Wholesale Prices – By Groups and Sub – Groups: 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 _B	Index Number of Wholesale Prices – By Groups and Sub – Groups for Fuel and Power as published in the R. B. I. Bulletin for the base period
F _Q	Index Number of Wholesale Prices – By Groups and Sub – Groups for Fuel and Power as published in the R. B. I. Bulletin for the average price index of the 3 months of the quarter under consideration
E _B	Cost of explosives, as fixed by DGS & D in the relevant rate contract of the firm from whom purchases of explosives are made by the contractor for the base period
E _Q	Cost of explosives, as fixed by DGS & D in the relevant rate contract of the firm from whom purchases of explosives are made by the contractor for the average price index of the 3 months of the quarter under consideration
D _B	Cost of detonators, as fixed by DGS & D in the relevant rate contract of the firm from whom purchases of detonators are made by the contractor for the base period
D _Q	Cost of detonators, as fixed by DGS & D in the relevant rate contract of the firm from whom purchases of detonators are made by the contractor for the average price index of the 3 months of the quarter under consideration
S _W	Weight of steel in tone, supplied by the contractor as per the ‘on-account’ bill for the month under consideration
S _Q	SAIL’s (Steel Authority of India Limited) ex-works price plus Excise Duty thereof (in rupees per tonne) for the relevant category of steel supplied by the contractor, as prevailing on the first day of the month in which the steel was purchased by the contractor (or) as prevailing on the first day of the month in which steel was brought to the site by the contractor, whichever is lower In case, there is no notification by SAIL for the month under consideration, the price of steel, as notified in the last available month shall be taken
S _B	SAIL’s ex-works price plus Excise Duty thereof (in Rs. Per tone) for the relevant category of steel supplied by the contractor as prevailing on the first day of the month in which the tender was opened In case, there is no notification by SAIL for the month under consideration, the price of steel, as notified in the last available month shall be taken
C _V	Value of Cement supplied by Contractor as per on account bill in the quarter under consideration
C _B	Index No. of Wholesale Price of sub-group (of Cement & Lime) as published in RBI Bulletin for the base period
C _Q	Index No. of Wholesale Price of sub-group (of Cement & Lime) as published in RBI Bulletin for the average price index of the 3 months of the quarter under consideration
C _S	RBI wholesale price index for cement & lime for the month which is six months prior to date of casting of foundation
C _O	RBI wholesale price index for cement & lime for the month which is one month prior to date of opening tender
RT	IEEMA price index for Iron & Steel for the month which is two months prior to date of inspection of materials
R _O	IEEMA price index for Iron & Steel for the month which is one month prior to date of opening tender
P _T	IEEMA price for Copper wire bar for the month which is two months prior to date of inspection of materials
P _O	IEEMA price for Copper wire bar for the month which is one month prior to date of opening tender
Z _T	IEEMA price for Zinc for the month which is two months prior to date of inspection of materials
Z _O	IEEMA price for Zinc for the month which is one month prior to date of opening tender
I _T	RBI wholesale price index for Structural Clay Products for the month which is two months prior to date of inspection materials
I _O	RBI wholesale price index for Structural Clay Products for the month which is one month prior to date of opening tender.

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46A.8 The demands for escalation of cost shall be allowed on the basis of provisional indices made available by Reserve Bank of India. Any adjustment needed to be done based on the finally published indices shall be made as and when they become available.

46A.9 Relevant categories of steel for the purpose of operating Price Variation formula, as mentioned in this Clause, based on SAIL's ex-works price plus Excise Duty thereof, shall be as under:

SL	Category Of Steel Supplied In Railway Work	Category Of Steel Produced By SAIL Whose Ex- Works Price Plus Excise Duty Would Be Adopted To Determine Price Variation
1	Reinforcement bars and other rounds	TMT 8mm IS 1786 Fe 415/Fe 500
2	All types and sizes of angles	Angle 65 x 65 x 6 mm IS 2062 E250A SK
3	All types and sizes of plates	PM Plates above 10-20 mm IS 2062 E250A SK
4	All types and Sizes of channels and joists	Channels 200 x 75 mm IS 2062 E250A SK
5	Any other section of steel not covered in the above categories and excluding HTS	Average of price for the 3 categories covered under SL 1, 2 & 3 above

46A.10 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 17-A of the Standard General Conditions of Contract. However, where extension of time has been granted due to contractor's failure under Clause 17-B 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 17-A, the price adjustment for the period of extension granted under Clause 17-B 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 17-A 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 17-A, as the case may be; then the lower indices shall be adopted for the price adjustment for the period of extension under Clause 17-B of the Standard General Conditions of Contract.

3.44 **Determination of Contract:**

Modified Clause 62 (1) (xiii) (A) of GCC: At any time after the tender relating to the contract, has been signed and submitted by the Contractor, being a partnership firm admit as one of its partners or employee under it or being an incorporated company elect or nominate or allow to act as one of its directors or employee under it in any capacity whatsoever any retired engineer of the gazetted rank or any other retired gazetted officer working before his retirement, whether in the executive or administrative capacity, or whether holding any pensionable post or not, in the Railways for the time being owned and administered by the President of India before the expiry of one year from the date of retirement from the said service of such Engineer or Officer unless such Engineer or Officer has obtained permission from the President of India or any officer duly authorized by him in this behalf to become a partner or a director or to take employment under the contract as the case may be, or,

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(E) General Clause:

**E (1)- Stage Payment on supply of steel in the Works Contract
(Cost more than Rs. 15 Crore).**

NOT APPLICABLE



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E (2)- Mobilization Advance Clause and Interest Rate for Mobilization Advance (Work costing Rs.25 crore and above)

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CHAPTER-IV

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(A) General Technical Requirement:**SPECIAL CONDITIONS & SPECIFICATIONS OF CONTRACT FOR STRUCTURAL STEEL (F&ESS)****1.0 GENERAL**

This chapter covers the fabrication of through type steel truss superstructure.

1.1 SITE INSPECTION

Tenderers are requested to inspect the site and carry out careful examination to satisfy themselves as to the nature of work involved and facilities available at the site. They should note carefully all the existing structures and those under construction through other agencies. They should also study the suitability of utilizing the different equipments and the machinery that they intend to use for the execution of the work. The tenderers should also inspect sites for the purpose of locating their workshop, store yard, laboratory, staff quarters etc., and satisfy themselves with regard to the feasibility of transporting the trusses from the fabrication place to the final site of placement etc.

1.2 CODES AND SPECIFICATION: The materials as well as execution of works shall be to the following specifications and codes of practice. (Latest version of the specifications / codes are to be used).

I. INDIAN RAILWAY STANDARD CODES AND SPECIFICATIONS:

- i. IRS : Bridge Rules, 1964 viii. Indian Railways Bridge Manual-1998
- ii. IRS : Welded Bridge Code, 1972
- iii. IRS : Steel Bridge Code, 1962
- iv. IRS : Concrete Bridge Code, 1962
- v. IRS : Schedule of Dimensions for B.G., 1973
- vi. IRS : Specification for Steel Girder Bridges (B1 – 1979)
- vii. IRS : Specification for Erection and Rivetting of Bridges Girders (B2-1979).

II. INDIAN STANDARD CODES AND SPECIFICATION :

- i. IS :226-1975: Specifications for structural steel (Standard quality),
- ii. IS :961-1975: Specifications for structural steel (High tensile) ,
- iii. IS :2062-1984:Specifications for weldable structural steel.
- iv. IS:1786-1985: Specifications for High Strength deformed steel bars and wires for concrete reinforcement.
- v. IS :1148-1982: Specifications for Hot rolled Steel rivet bars for structural purpose.
- iv. IS :1149-1982: Specifications for High tensile Steel rivet bars for structural purpose.
- vii. IS : 1363-1984: Specification for Hexagon head bolts, screws and nuts of product grade –G (Part-I,II & III).
- viii. IS : 1929-1982: specification for Hit forged steel rivets for hot closing.
- ix. IS : 57-1965: specification for paints and jointing purpose.
- x. IS : 75-1973: Specification for linseed oil, raw and refined.,
- xi. IS : 77-1976: Specification for linseed oil, boiled, for paints.
- xii. IS : 102-1962:Specification for ready mixed paint lead, non setting priming.
- xiii. IS : 123-1962:Specification for ready mixed red oxide paint, brushing/ finishing, semi gloss for general purpose to Indian Standard colours.
- xiv. IS : 2339-1963: Specification for Aluminium paint for general purpose in steel container.
- xv. Any other relevant IS code.

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2.0 FABRICATION

2.1 General

- (i) The fabrication of the girders and its accessories shall be carried out by the contractor in his factory premises or in a well-established fabrication workshop to be set up by the contractor at the bridge site.
- (ii) The workshop staff shall have requisite experience, proven skill and experience in the technique of fabricating large components. Accuracy of fabrication shall be realized and ensured through controlled high precision jigs, fixtures and templates, which shall be inspected and passed by R.D.S.O/Engineer/Any other inspection agency/officer (herein after called I.O) as nominated by the Railway.
- (iii) The fabrication shall be preceded by following:
 - (a) Process Document Verification.

SI No.	Process Document	Details
1	Approval of Quality Assurance Plans (QAP)	Stage-wise manufacturing process from raw material indicating various steps, tests, checks & their frequency, test equipment used, their calibration status, sampling plan, authority for grant of clearance.
2	Scrutiny & approval of welding procedure specification sheet (WPSS)	Process sheet indicating plate/section used, welding process, type of joint, welding consumables quality, welding parameters to be employed, acceptance standards and tests applicable etc.
3	Welders' certification and Qualification records (WPQR)	Name of the welder, qualification, experience, qualification tests and records for each welding process and joint, welding parameter etc.

Abovementioned Quality Assurance Plans etc are to be submitted by the contractor. The officials responsible for monitoring these identified quality parameters shall also be specified in these Quality Assurance Plans etc. The contractor shall get above Documents, quality assurance plans etc. approved from RDSO/Engineer/I.O before start of fabrication work.

- (a) Raw Material and Gauge Certification

SI No.	ITEM	Details
1	Inspection of Raw Materials	Source of purchase, Material TCs Quantity, Size, Visual examination, mechanical properties, chemical composition, ultrasonic examination, Charpy Impact Test, Lab test reports etc.
2	Certification of raw materials	Verification of mill test certificates with test results obtained, cast wise identification of raw materials and ensuring their tractability clearance etc.
3	Inspection of Layout on template floor	Layout plan for manufacture of girders, detailed planning of components sequence of fabrication etc.
4	Inspection of Jigs, Fixtures and Master Plates	Dimensional inspection of Jigs, fixtures, master plates used in manufacture of girder to ensure accuracy.
5	Certification of Jigs, Fixtures and Master Plates	Stamping of Jigs, fixtures, master plates to certify their use during fabrication by the inspection officials.

Abovementioned Inspections, tests and certifications etc shall be done by RDSO/Engineer/I.O before start of and/or during fabrication works.

- (iv) The RDSO/Engineer/I.O shall be empowered to check the manufacturing process from time to time to ensure that the work is being executed as per approved quality assurance plans etc. The quality records shall be submitted to Engineer for record, after completion of fabrication work.

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- (v) The work of fabrication in contractor's fabrication shop will, at all times, be open for inspection by RDSO/Engineer/I.O. Before dispatch of fabricated steel work from the shops, the same will be inspected in the contractor's fabrication workshop by RDSO/Engineer/I.O who will thereafter issue inspection certificate.
- (vi) The details of inspection items during and after fabrication are as under:

(a) Inspections during fabrication

Sl No.	Item of Inspection	Details
1	Ensuring use of approved Raw Materials	Raw materials originally cleared only to be used during fabrication.
2	Ensuring use of approved Welding Consumables.	Types of consumables, source, quality, approval status, grade, suitability for fabrication as per WPSS.
3	Ensuring use of approved Welders.	Checking of welders' certificates, records, skill and procedure adopted for welding as per WPSS etc.
4	Ensuring use of approved WPSS and Welding parameters.	Checking welding parameters employed, equipments used correctness of joint preparation.
5	Radiographic examination of butt welds joints.	Radiographic examination method, type of film employed, sensitivity, defect interpretation and acceptance decision based on criteria.
6	Ensuring use of approved sets of Jigs, Fixtures and Master Plates	To ensure interchangeability of components and pre-stressing (camber) in open web girders and to avoid distortion.

(b) Inspections after fabrication

Sl No.	Item of Inspection	Details
1	Visual examination of welds	Quality of welds, uniformity of weld bead, size of the weld, weld defects e.g under cut, blow hole, porosity, spatter, cracks etc.
2	Matellographic and NDT examination of Fillet welds.	For ensuring proper weld quality. Dye penetration examination.
3	Structural and dimensional inspection	Dimensional checks to ensure conformance to drawing dimensions.
4	Trial Assembly.	Camber on Jacks, dead Load Camber, Dimentions, Fairness of holes, Temporary Fasteners, Infringements, if any, Butting of compression flanges.
5	Anti Corrosive treatment	Surface preparation, metallising and or painting as per applicable painting schedule.
6	Component Inspection	Detailed inspection of dismantled components of trial erected span and inspection of different components of second span onwards.

- (vii) Any defect noticed during inspection in the execution of work shall be rectified or replaced by the contractor at his own cost. The decision of RDSO/Engineer/I.O as to the existence of the defect and the manner in which the defective work has to be rectified or replaced, shall be final, binding and conclusive.
- (viii) During fabrication of the girder, necessary arrangement and provision shall be kept for inspection facilities underneath the girder and also for carriage of service cables, pipe lines etc as per approved plans.

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2.2 Fabrication Drawings

- (i) The contractor shall prepare detailed shop drawings including drawing office dispatch lists (DODL's) on the basis of design drawings supplied by Engineer, in such size and in such details as may be specified/approved by Engineer. The shop drawings shall be submitted to Engineer in triplicate, one copy of which will be returned after scrutiny and approval. The fabrication drawings shall indicate member sizes prior to and after flame cutting and or machining to obtain correct length and shape, tolerance provisions, welding sequence, type and size of welding. No work of fabrication will be started without such approval being obtained. Fabrication/Shop drawings shall be got checked/proof approved from RDSO/LKO.
- (ii) Engineer will make all efforts to approve the drawings submitted by the contractor within reasonable time but no claim for any delay on this account shall be entertained by Engineer.
- (iii) For Engineer's use and record, the contractor shall supply free of charge, four sets of prints on strong paper and one set of neatly executed tracings of all approved detailed drawings and fabrication drawings, soon after communication of approval, for use at site.

2.3 Maintenance of records by Fabricators

The records of fabrication shall be maintained in the registers as per the formats given in Appendix-I of IRS B1-2001.

2.4 Tolerances in Fabrication

Fabrication tolerance for girders shall be as stipulated in Appendix II of IrS-B1-2001.

3.0 BRIEF DESIGN DATA

- (i) The through type steel girders have been designed for single track Heavy Mineral Loading (HML) as per Indian Railway Bridge Rules and Standard Specifications. All panel joints are designed for vertical and transverse forces including secondary moments.
- (ii) The structure shall be fabricated to camber as per IrS steel bridge code and or as provided in the approved drawings. The deflection of the girder is expected not to exceed the values as given in the approved drawings.
- (iii) All members of the girder and joints are to be either riveted or welded as shown in the approved structural drawings. **No welding, except where approved by the Engineer is to be carried out at site.** All welding and riveting are to be carried out as per relevant IRS Specification and as approved by the Railway.

4.0 MATERIALS

4.1 STRUCTURAL STEEL, RIVETS AND WELDING MATERIALS ETC.

- (i) The steel shall comply in all respects with the requirements of approved drawings and relevant codes and specifications and shall be procured from approved manufacturers only. It may be noted that quality of steel used for fabrication shall be the essence of the contract & shall be rigidly followed. Entire Steel sections (100%) to be supplied by the manufacturers shall be ultrasonically tested as per codal provisions at the manufacturer's premises before dispatch. Only tested steel shall be used for fabrication. In rare cases, that too only for case of sections other than plates, ultrasonic testing may be dispensed with after prior approval of Chief Engineer/Con. This approval may be given only on production of certificate to the effect of non-requirement of testing of such sections by producers like SAIL/TISCO/RINL.

Further the contractor has to arrange Charpy V-notch Impact test of the structural steel supplied by the contractor in terms of relevant IS code stipulations.

All rolled sections shall bear cast mark and shall be of such length as to avoid butt welded joints in components of truss. Such rolled sections shall be within rolling tolerances stipulated as per IS: 1852 and shall be defects free.

- (ii) The tenderer(s) shall supply information in the tender regarding source/manufacturers from where procurement of steel is proposed by him/them. However, the usage of type and grade of steel may vary during the execution of the work depending upon the design requirement and market availability. No claim shall be entertained from the contractor on this account and payment shall be as per relevant items in the schedule of items, quantities and rates.

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- (iii) Steel for rivets shall conform to IS: 1148 for M.S. and IS: 1149 for H.T.S. All field rivets shall conform to IS:1149 or as approved by Engineer.
- (iv) Welding consumables for Manual Metal Arc Welding (MMAW) shall conform to IRS-M-28.
- (v) Wire and flux combination for submerged arc welding shall conform to IRS M-39. (or as stipulated/approved by Engineer).
- (vi) Filler wires for CO2 welding shall conform to RDSO/M&C/Specification used vide letter No. M&C/W/111/24 dated 1.1.1994/7.2.1994. (or as stipulated/approved by Engineer).
- (vii) All welding consumables (electrodes, wire, flux etc.) shall be procured only from the manufacturers approved by RDSO subject to final approval by Engineer.

4.2 Test Certificates

- (i) All materials for the work shall pass tests and/or analysis prescribed by the relevant IS specifications or such other equivalent specifications.
- (ii) For all materials including rivets and bolts, the contractor shall furnish copies of test certificates from the manufacturers including proof sheets, mill sheets etc. showing that the materials have been tested in accordance with the requirements of various specifications and codal provisions.
- (iii) If any further testing of materials is required by the Engineer in respect of these and other items, the same shall be arranged by the contractor at a reputed laboratory/National test house/workshop Laboratory as directed/approved by Engineer. For this, nothing extra shall be payable and accepted rates in the schedule of items, quantities and rates shall be deemed to include this.
- (iv) Even satisfactory outcome of such tests or analysis shall in no way limit, dilute or interfere with the absolute right of the Engineer to reject the whole or part of such materials supplied, which in the judgment of the inspecting authority/Engineer does not comply with the conditions of the contract. The decision of the Engineer in this regard shall be final, binding and conclusive for all purposes.

4.3 Handling and Storing of Steel Sections

- i) All projecting plates or bars shall be kept in shape by timber or angle bars spiked or bolted to them and the ends of chord lengths. End posts etc at their shipping joints shall be protected and stiffened so as to prevent damage or distortion in transit as the Engineer may direct/approve.
- ii) All threaded ends and machined surfaces are to be efficiently protected and against damage in transit. The parts shall be transported in convenient lengths.
- iii) All straight bars and plates, except small pieces are to be transported in convenient bundles temporarily riveted or bolted together or bound with wrought iron or suitable wire as the Engineer may direct/approve. All rivets, bolts, nuts, washers, plates under 300 mm square and small articles are to be packed separately for each span in cases each weighing, when full, not more than 350 kg in strong petroleum casks, or barrels as approved by Engineer. If not entirely filled by the contents the space left shall be closely packed with wood shaving or other suitable material. Bolts and rivets of different sizes shall be separately packed in bags, each bag having a label indicating its contents. A list of contents shall be placed on top of each case or cask.
- iv) All rolled steel received from supplier shall be carefully unloaded to avoid twisting, bending and damage to mill scale. Stacking area shall be covered and the materials placed on a raised platform above ground level. Every care shall be taken to avoid contact with water/moisture or any other harmful substance in order to prevent rusting and pitting.
- v) All sections damaged during transit or handling shall be stacked separately and damaged portions shall be indicated by paint of distinct colour. Such materials shall be dealt with as per instructions of the Engineer. Badly damaged portions may require replacement. Slightly distorted parts or broken parts must be dealt with as the case demands and as directed/approved by Engineer. The rectified sections shall be used for fabrication only after approval of Engineer.
- vi) Where the work has been passed in the manufacturer's factory premises as strictly interchangeable, all members bearing the same marks can be stacked together without reference to any particular position. Care must be taken by the contractor that the parts at site are available in proper sequence. Every portion of work shall be distinctly stenciled with paint and marked with the punch not less than 15 mm dia for guidance in erection in the field, and stamped with the letters specified in the drawings. In the case of non-interchangeable work, the system of marking shall be as shown in drawing.
- vii) All field rivets for site riveting, service bolts and drift for assembly of girder, shall be stored under cover.

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- viii) The contractor shall supply without any charge, six complete lists of the rivets, bolts, service bolts, washers and drifts required for erecting the work at site, showing the parts of the work to which the various rivets and bolts belong and having each item marked so as to indicate the particular case in which it will be found. List of total rivets required for one girder/stating length, numbers, and wastage allowance of 12.5% shall be prepared and supplied along with the span components. The requirements for service bolts is @ 45% and that of drifts @ 15%, covering 60% of field holes in one span plus wastage allowance of 12.5%. Engineer reserves the right to increase the above proportion of service bolts and drifts without any extra cost. Actual requirement for the work shall be assessed by the contractor who shall arrange accordingly.

4.4 Steel Tape

- (i) Contractor shall use steel tape conforming to IS: 1270 duly tested and issued with certificate of accuracy by an accredited National testing house for templating, fabrication of drilling jig etc. The tape shall be calibrated under a tension of 1.8 kg at 16.7 degree C.
- (ii) All marking and checking of master gussets, camber layout, etc shall preferably be at the mean temperature of the fabrication zone.

4.5 Straightening

- (i) All rolled sections and plates shall be straight and free from defects like twists and bends before they are used for marking and cutting.
- (ii) If any rolled section of plate has minor defects, it shall with the approval of the Engineer, be cold straightened by pressure with the help of plate and section straightening machine. Pressure applied for straightening shall be such as not to damage the surface or microstructure of grains in the steel member.
- (iii) Flattening, straightening and bending in hot condition shall not be carried out unless specified on drawings and or approved by Engineer.

4.6 Cutting of Material

- (i) All edges shall be machined mechanically (by a sawing machine) or controlled torch oxy-acetylene flame cut. All flame cut edges shall be ground to secure claimant contractor clean and square edges. **No shearing of section or plates is permitted.**
- (ii) When flame cutting is deployed on a plate of long length, flame cutting shall be done by multi-torch mechanically controlled equipment to ensure a straight clean cut and prevent lateral distortion due to heat application. All flame cut edges shall be ground or machined to obtain reasonably clean square and true edges. Drag lines formed during flame cutting shall be removed.
- (iii) While chalk marking for flame cutting, following cutting allowance shall be added to the prescribed dimensions:

<u>Thickness</u>	<u>Cutting allowance</u>
Up to 12 mm	+ 3mm
Above 12 and up to 25 mm	+ 5mm
Above 25 mm	+ 7,,

- (iv) Templates made from 3 to 4 mm thick steel plate shall be used for cutting Gussets. Long length cutting by marking with white chalk and string may be followed.
- (v) Minimum edge distance while preparing profile for gussets, cleats and edges of components from center of rivet hole to a flame cut edge shall be 1.75 times the diameter of hole, and for machined edge or rolled edge shall be 1.5 times the diameter of rivet holes, (machined edge means first edge distance kept 1.75 times diameter of hole for flame cutting and reduced to 1.5 times diameter of hole by removal of material by machining).

5.0 METHOD OF FABRICATION

- (i) Considering the length and height of span, jigs and fixtures shall be used to guide and support drilling of holes and fixtures during entire fabrication work, assembly of components, before riveting / welding of components.

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- (ii) Drilling jigs shall be fabricated with the help of Master gussets fabricated as templates for all panel joints of truss. Jigs after manufacture shall be checked and approved by Engineer or any other Inspecting agency as nominated by Chief Engineer/Con. Only approved and stamped jigs shall be used for fabrication. First component after drilling of holes through approved jig for each specific component of truss, shall be checked with the help of Master gusset by the Inspecting Officer before further fabrication.

5.1 Tack Assembly

- (i) For fabrication of riveted construction, top and bottom chords of members shall be tack assembled for drilling of holes through jig. Tack assembly of members shall be done by stitch rivets after positioning the drilling jig in true position.
- (ii) Drilling jig and tacked members shall be clamped to a fixture to avoid shifting of jig during handling and drilling.
- (iii) Tack welding may be permitted only at the ends and the locations which will eventually be cut and removed. No active part of the component shall be tack welded as this would initiate crack formation in service.

5.2 Template

The contractor shall supply and provide required templates at his own cost. **No separate payment shall be made for this and accepted rates shall be deemed to include this aspect.** The templates used for the work shall be of steel of similar category as the member and shall be of tested quality.

5.3 Template Shop

- (i) Fully covered template shop consisting of uninterrupted steel or concrete floor as approved having true and correct level covering adequate area shall be provided by the contractor.
- (ii) Camber layout shall be drawn to full scale from end of girder to half span. This camber layout once approved shall be used for fabrication of master gusset profiles and end profile of each member. It shall be used for working out the actual lengths of each member and checked to conform to the calculated length.
- (iii) Master gussets at every panel joint of top chord, bottom chord and middle web panel shall be marked accurately on chamber layout drawn on template floor.
- (iv) All precautions shall be taken while drawing camber layout for correct setting of angle of intersection of chord and web member and great accuracy shall be ensured while transferring the same on master gusset. While marking centre point of field rivet holes on master gusset, if there is symmetry of holes on vertical axis, marking shall be made only on half the master gusset across vertical axis, and holes drilled by inscribing each hole. Subsequently remaining half portion shall be drilled through gusset using the same half portion master gusset. This will help realize symmetry of holes in gusset and fairing of field rivet hole during girder assembly.
- (v) Camber layout and fabrication of Master gusset at every panel joint requires highly skilled and trained staff experienced in accurate fabrication of large girders, drilling jigs and fixtures. At least one jig shall be required for each component. Each jig shall be numbered and a record kept in register for identification.

5.4 Drilling of Holes

- (i) Holes for riveting in members shall be carried out by drilling through jig only. No punching or hand drilling of holes is permitted. Sub-punching to a diameter 6mm less than that of finished holes may be permitted by Inspecting Officer/Engineer except in the main truss members of open web girders.
- (ii) When the holes are to be sub-punched they shall be marked off with a centre punch and made and made with a nipple punch or preferably, shall be punched in a machine in which the position of the hole is automatically regulated. The punching shall be so accurate that when the work has been put together before drilling, a gauge 1.5 mm less in diameter than the size of the punched holes can be passed easily through all the holes.
- (iii) Drilling jig should be provided with an internal turned and case hardened bush at all holes in jig, for retaining accuracy of all similar units fabricated. Bushes will have a tolerance of $-0.0/+0.1$ mm for shop riveting. The tolerance shall be periodically checked & replaced when the tolerance exceeds $-0.00/+0.4$ mm (for hardening). Before fixing to jig, bushes shall be checked with a approved plug gauge to ensure these tolerances.

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- (iv) Drilling of all holes through jig by radial drilling machine for fabrication of top and bottom chords of all members will be allowed. Web members and floor system having welded construction, field holes for riveting shall be drilled through jig.
- (v) Holes for countersunk heads of rivets, bolts or screws shall be drilled to the correct profile so as to keep the heads flush with the surface.
- (vi) Holes for rivets shall be 1.5 mm greater than the diameter of rivet bars used. Holes for turned bolts, for field connection, where specified on drawing shall be drilled in the shop 1 mm less than diameter of holes shown on the drawing and should be **reamed** at site to suit diameter of turned bolt.
- (vii) **Drilling to enlarge unfaired holes is prohibited.** The holes required to be enlarged shall be inaccuracy and the effect of reaming on the soundness of the structure. The Engineer reserves the right to reject all steel work if the holes are not properly matched
- (viii) On completion of drilling of holes in each component and before shifting the jig, it shall be ensured that all the holes are drilled to their correct diameter to reconfirm the quality of work.

5.5. Rivets & Riveting of Components

- (i) The work shall include supply of all rivets, bolts, nuts, washers etc required for complete erection at site with allowance for wastage. The contractor shall be responsible for supplying site rivets of correct length. The length of such rivets shall be verified in the presence of Engineer's representative by snapping a few rivets of each length to check whether the holes have been completely filled in by rivet material. Particularly in case of rivets with long grips (with grip exceeding 6 times the diameter), specimen rivets shall be cut to see if the holes are totally filled even though the rivets are tight under the usual hammer tests.
- (ii) All rivets to be used shall be checked with profile gauge for its true shape, contours of head concentricity of head, diameter as well as correct length to match the thickness of joint. Calibrated gauges for rivet dimensions and contours shall be provided by the contractor for use of the Inspecting Officer and the Engineer
- (iii) Service bolts and nuts, ordinary plates, washers and drifts for use in the erection of the work shall also be supplied by the contractor at his own cost. On completion of the work these materials may be taken back by the contractor.
- (iv) The dimension on the drawings refer to the diameters of the rivet holes as finished rivets. The rivets shall be made to relevant IS specification. The clearance i.e. the difference in diameter of rivet measured under head (before heating) and rivet hole shall not be less than 0.75 mm. The shanks shall be made of length sufficient to fill the holes thoroughly and to form the head.
- (v) Riveting shall not be started until such time as Engineer or his authorized representative has personally satisfied himself that the alignment of the girders is correct, the vertical members plumb correctly, the camber is according to that shown on the camber diagram with camber jacks screwed tight, all the mating surfaces are sure and in full contact with service bolts and field rivet holes in alignment.
- (vi) All rivets shall be properly heated to straw heat for the full length of the shank, firmly backed and closed. The head of the rivet, particularly in long rivets, shall be heated more than the point and in no case shall the point be heated more than the head. Before placing the rivet in drilled holes the rivets shall be smartly jerked to shake off oxide scale. Where it is impossible to back up by normal method of holding up, double gunning may be resorted to. Alternately pneumatic holding device may be used.
- (vii) Unless permitted by Engineer, all riveting shall be done by machine riveting using hydraulic rivets for sound & perfect riveting. Fabrication workshop should have Hydraulic Riveting facilities for fabrication of heavy duty bridge girders as per IRS specifications. Pneumatic rivets may be used subject to approval of Inspecting Officer/Engineer. The working pressure to be employed when using pneumatic or hydraulic tools shall be as per manufacturer's specifications and approved by the Engineer. Hand riveting shall only be done when specifically allowed by the Engineer. In such cases means shall be adopted to ensure the rivets are used for their entire length and fill rivet holes completely, the snap being used only to give the correct form of head.
- (viii) All rivets when driven shall completely fill the holes, have the heads concentric with the shanks and shall be in full contact with the surface. Driven rivets when struck sharply on the dolly side head with a 110 gm rivet-testing hammer shall be free from movement and vibration. While riveting built up members, great care shall be exercised to ensure that the set of holes for field rivets in each flange of the built up member is aligned, dead square in relation to that in the other flange and not aborted. Use of special jigs shall be made to ensure this fit.

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- (ix) All sparking, loose and burnt rivets, and rivets with crack,s badly formed eccentric or deficient heads shall be cut out/ taken out and replaced by others. Permissible deviation of driven rivets shall be as per IRS B1-2001. Rivets shall also be cut out when required for the examination of the work. The Engineer shall approve actual method of cutting out. Recupping and caulking shall in no circumstances be resorted.
- (x) Service bolts shall be frequently retightened as the riveting proceeds, the number and position of the difts used in the joints permitting this. All field rivets shall be tested as directed by the Engineer.
- (xi) Care must be taken to use rivets of correct dimensions but burrs or lips around the rivet heads shall not be removed.
- (xii) Rivets less than 10 mm diameter may be driven cold subject to approval of Engineer. Flattened rivet head may be used in certain places where clearance demands so.
- (xiii) When all the rivets at a joint have been finally passed they shall be painted as per specification.

5.6 Welding Components.

- (i) All welding work shall be as per IRS Standard and by such process that the workmanship is flawless. Allwelding shall be by automatic and semi-automatic submerged arc welding process, except where inaccessible. Site welding shall be avoided, but if necessary, shall be carried out only on secondary members having low stresses to transmit across the joint for which approval of the Engineer shall be required.
- (ii) Welded construction shall be carried out generally in accordance with provisions of the IRS Welding Bridge Code and IS: 9595 (Metal Arc Welding) and further subject to specifications as under:
 - (i) Welding shall be done only qualified and approved welding operators, whose competency has been verified and certified by RDSO/Engineer/I.(O. Routine re-testing of welding operators may be required every six months if deemed necessary by the Engineer who also reserves the right to retest any welding operator at any time during the contract.
 - (ii) All long and continuous welds shall be carried out by automatic Submerged Arc Welding (SAW) process only, in order to obtain sound and uniform shape and cross section. CO2 or manual metal arc welding (MMAW) may be done for short lengths or for secondary connections where access to the location of the weld does not permit Submerged Arc Welding (SAW), subject to approval of Engineer.
 - (iii) Except for special types of edge preparation, such as single & double U and double J, the fusion edges of all the plates which are to be joined by welding may be prepared by using mechanically controlled automatic flame cutting equipment and then ground to smooth finish. Special edge preparation should be made by machining or gouging.
 - (iv) The contractor shall appoint welding supervisors whose competence and qualification shall be subject to approval of RDSO/Engineer/I.O. All welds shall be carried out satirically under their direction & supervision.
 - (v) Welding position for fabrication of components shall be Flat or Horizontal position for SAW (flat position preferred) and Flat or Horizontal position for CO2 or manual metal arc welding.
 - (vi) To ensure above position for welding, component shall be placed in a manipulator, tack assembled and rotated in the manipulator to assist welding sequence and prevent distortion of member. In absence of manipulator, special jig and fixtures shall be provided for positioning and careful handling by crane, subject to approval of Engineer.

5.6.1 Welding Procedure

The welding procedure shall be such as to avoid distortion and minimize residual shrinkage stresses. Properly designed jigs should be use for assembly. The welding techniques and sequences, quality, size of electrodes, voltage and current required shall be as prescribed by manufacturers of the material and welding equipment. The contractor should submit full details of welding procedure in pro-forma given at Appendix-V of IRS B1 – 2001.

5.6.2 Sequence of welding and welding pass

The sequence of welding and welding pass shall be done as per IRS B1-2001.

5.6.3 Welding of stud shear connectors.

The stud shear connectors shall be welded in accordance with the manufacturer's instructions including preheating. Welding shall be done using only the stud guns made for the purpose of the fixing/welding. The stud and the surface to which studs are welded shall be free from scale, moisture, rust and other foreign material. The stud bas shall not be painted, galvanized or cadmium plated prior to welding.

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Welding shall not be carried out when temperature is below 10 degrees Celsius or surface is wet or during periods of strong wind unless the work and the welder is adequately protected.

The welds shall be visually free from cracks and shall be capable of developing at least the nominal ultimate strength of studs.

The procedural trial for welding the stud shall be carried out when specified by the Engineer.

5.6.4 Weld Quality Tests

A. Procedure Trials.

Welding and flame cutting trials as per following shall be carried out and completed before fabrication on representative samples of materials to be used in the work;

- i) The samples of material shall be selected and marked by the Engineer when the materials for the work are inspected in contractor's fabrication/storage.
- ii) The trials of flame cutting shall be carried out in material representative of all thicknesses to be used in the work.
- iii) Trials on material 19 mm thick may be taken to include all material under 19mm thick and on material 38 mm thick to include material between 19 mm and 38 mm thick. Over 38 mm thickness material shall be tested for every thickness increment of 6 mm. The trials of flame cutting shall be carried out in material representative of all thicknesses to be used in the work.
- iv) The welding & flame cutting trials shall be commensurate to the satisfaction of Engineer/Inspecting Officer and the procedures to be adopted in the fabrication of work which shall include:
 - a) Welding procedure in accordance with relevant specification.
 - b) Heat control techniques required to ensure that the flame cut surface of steel are suitable for inclusion in welds.
- v) The trials shall include specimen weld details from the actual construction which shall be welded in a manner simulating the most unfavourable instances of fit-up and preparation. After welding the specimens shall be held as long as possible at room temperature but in any case not less than 72 hours, and then shall be sectioned and examined for cracking. Six representative prepared by qualified and certified welding operators.
- vi) Following groups of tests shall be carried out:
 - a) Butt welds: Transverse tensile test, transverse & longitudinal bend test with the root of weld in tension and compression respectively, Charpy V-notch impact test.
 - b) Fillet welds: Fillet weld fracture test.
 - c) Tack welds: Inspection for cracking.
 - d) All welds: Macro examination.

B. Additional tests as under shall also be carried out for approval and during contract executions stage, as per requirement and instructions of RDSO/Engineer/I.O., the cost of which shall be borne by the contractor. Following tests are normally performed on welds;

(a) None Destructive Tests(NDT):

- Visual inspection/profile gauge for dimensional check of size and throat thickness of weld.
- Etching test for penetration of joint.
- Magnetic particle or Ultra Sonic Pulse Velocity (USPV)
- Gamma Radiography & X-ray (only for butt welds)
- Dye penetration of all weld joints.

(b) Destructive Test:

- Tensile test.
- Bend test
- Impact test
- Load test.

Once samples representing the weld joint used in fabrication of all components are tested and test results are found satisfactory, then approval shall be taken from the Engineer/Inspecting Officer for the welding of built up components by approved welding operators. Welding Procedure Qualification Records (WPQR's) shall be prepared which shall include joint details, welding consumables (i.e. electrode/wire & flux combination), weld parameters (i.e. welding current, wire feed speed), welding position, welding equipment carriage speed (for SAW process), arch Length, arc voltage etc.

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C. Qualification and Testing of welders:

- (i) No welding operator shall be employed on the work until he has, in the presence of the RDSO/Engineer/I.O, passed the appropriate tests laid down in relevant specification.
- (ii) Where plates of 12 mm thick and over are to be butt welded the tests set out in relevant specification is to be followed.
- (iii) Routine re-testing of welding operators may be required every six months if deemed necessary by the RDSO/Engineer/I.O.
- (iv) The RDSO/Engineer/I.O reserves the right to require any welding operator to be retested at any time during the contract.

5.6.5 Precautions during welding.

- (i) The Contractor shall submit list of weld joints of different combined thickness for approval of welding procedure for all members.
- (ii) The welding of built up component shall be carried out only by approved welding operators and in accordance with Welding Procedure Qualification Records. WPQR's shall be prepared in advance and approved by the Engineer. Proper welding sequence shall be followed to avoid distortion and minimize residual shrinkage stresses, and surface defects, within acceptable tolerance limits.
- (iii) To ensure sound and defect free welding of built up members, record of welding adopted as per approved qualifying procedure shall be maintained in Performa prescribed in guidelines for welded fabrication issued by RDSO or as stipulated in IRS-B1-2001.
- (iv) Any change during welding for fabrication of built up member, such as welding sequence, welding process, positioning, wire and flux combination, joint details, increase or decrease in combined thickness of joint by 5 mm etc. shall be carried out only after representative samples test and procedure qualification, is accepted. In no case any deviation from WPQR's without approval of Engineer shall be permitted.

5.7 Preparation of Faces.

- (i) preparation of joint face: Except for special types of edge preparation such as single or double 'U' & 'J' joints, the fusion edges of all plates which are to be joined by welding shall be prepared by using mechanically controlled automatic flame cutting equipment with the cutting allowance as per clause 4.7 and the extra length machined to obtain correct length.
- (ii) It shall be ensured by Non-destructive tests that the fusion face and adjacent surface are free from cracks, notches or other irregularities that are likely to cause defects during service or interfere with deposition of the weld.
- (iii) Fusion faces and the surrounding surface upto 50 mm shall be free from mill scale, moisture, oil, paint dirt or any other substance which may affect the quality of the weld, and same shall be removed by grinding or flame cleaning/grit blasting.
- (iv) Details of joint, fusion faces, root face and gap shall be as per details given in fabrication drawing or as stipulated in IS:9595.

5.8 Welding Operation

- (i) Parts to be welded shall be assembled such that the joints to be welded are accessible and visible to the operator. Assembly jig and fixture shall be used for accuracy.
- (ii) Manipulators should preferably be used to execute the sequence of welding without disturbance, in the most suitable position. Fixtures shall maintain the alignment with minimum restraint in order to reduce the possibility of locked up stresses.
- (iii) Run in and run out plates shall be provided for fabrication of built up members or truss to ensure that weld will start on run in plate and weld will stop on run out plate and thus avoid crater defects on the components.
- (iv) The size and length of weld shall not be less than those specified in the drawing nor shall they be in excess of the requirement without prior approval of the Inspecting Officer. The location of weld shall not be changed without prior approval of the Engineer.
- (v) During design and detailing of component lengths, care is to be taken to avoid butt weld in built up members of truss. Therefore, it is essential to use only nearest size and length of rolled sections that have been procured to schedule sizes and lengths by proper planning. No butt weld shall be carried out without approval of Engineer.
- (vi) Fabrication of components subject to dynamic loading in the structure need careful inspection during fabrication by qualified, experienced and certified Engineer from contractor's side and final approval of RDSO/Engineer/I.O. This inspection shall be carried out as stipulated in Indian Railway Welded Bridge Code before, during and after welding.

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5.9 Additional Precautions during Welding.

Following precautions shall further be observed during fabrication.

- (i) All equipments shall be provided with calibrated gauges to observe limits of variation for parameters prescribed in WPQR's for welding current, arc voltage, speed of travel of equipment etc.
- (ii) Covered shed for environmental control (particularly against dust, moisture and water) shall be provided to avoid entrapment of hydrogen, which is likely to cause crack initiation in weld or under bed of weld (i.e. Heat Affected Zone HAZ). Also baking of flux used for submerged arc welding in oven for an hour at 200 degree C shall be carried out to ensure that no moisture is contained I flux during welding.
- (iii) All tack welds shall be carried out by qualified and approved welder only. As tack weld will become part of the final weld, it shall be free cracks and other welding defects.
- (iv) If multiple runs are used for fabrication of built up member, inter run cleaning shall be carried out and subsequent weld bed made only after approval of inspecting officer or his authorized representative. This is to check free defects in the weld. Also visible defects such as cracks, cavities, if any, shall be removed by grinding. It shall be ensured during welding that craters are avoided.
- (v) Stray arcing of components, which cause local hard spots or cracking of parent metal, shall be avoided.
- (vi) Flux of approved qualify will be permitted for use.
- (vii) The Auto melt grade wire spools of wires for Submerged Arc Welding and Carbon Dioxide (CO₂) consumables of only the approved qualify will be permitted.
- (viii) Pre Heat Treatment will be given to the consumables to remove the moisture if any
- (ix) No violation of welding procedure will be permitted on any account.

5.10 General: Riveting & Welding

Qualified, trained, and experienced supervision is essential at all times during fabrication/erection and for maintenance of records.

After riveting of riveted components or welding of welded components, they shall be finished finally by grinding or matching with the help of a profile template. All the butting ends of components shall be faced in milling machine after members have been completely fabricated.

In the case of compression members, the face shall be machined so that the faces are of proper angle as shown in drawing and the joint when made will be in close contact throughout within a gap tolerance of less than 0.15 mm. The Inspecting Officer may permit a tolerance of (-) 0.4 mm at isolated points in butting line.

5.11 Full penetration butt welding with radiography testing:

6.0 PAINTING

Specifications for metallising and painting of bridge girders shall be as per IRS: B1-2001.

6.1 SURFACE PREPARATION (FOR ALL TYPES OF PAINTING AND METALLIZING)

Surface of all components/members of the superstructure shall be prepared as per following provisions before application of first coat of paint/primer or before Metallizing.

- (i) The surface should be clear, dry and free from contaminants and it should be rough enough to ensure adhesion of the paint film. However, it should not be so rough that the film cannot cover the surface peaks.
- (ii) The clearing of the surface shall be done initially with the use of emery paper, wire brushes, scrapers etc. for spot cleaning to remove rust, scale etc. Subsequently, sand blasting of the surface shall be done to remove rust, mill scale along with some of the base metal. This will be achieved by high velocity impact of abrasive material against the surface in accordance with the provisions of IS: 6586, which will also create a base for good adhesion. The abrasive material once used for cleaning heavily contaminated surface should not be reused even though re-screened. Washed salt free angular silica sand of mesh size 12 to 30 with a minimum of 40% retained on a 20 mesh screen shall be used for blasting. The material specifications and other requirements shall be as provided in Indian Railways Bridge Manual, 1998.
- (iii) All site rivets, bolts, nuts and washers shall be thoroughly cleaned and dipped in boiled linseed oil. All machined surfaces are to be well coated with a mixture of white lead conforming to IS:34 and Mutton tallow conforming to IS:887 as per specifications before dispatch to site. Nothing extra shall be payable to contractor on this account.

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6.2 Metallizing and Painting of steel structure of the Bridge:-

- (i) All the components in the open web girders of this rail bridge shall be metalized as per IRS specifications. Components to be metalized in rail deck are cross girders, stringers and connecting gussets.
- (ii) The sprayed coating shall be applied as soon as possible after surface preparation.
- (iii) The wire method shall be used for the purpose of metallizing, the diameter of the wire being 3mm or 5mm as per approved by Engineer. Specified thickness of coating shall be applied in multiple layers and in no case less than 2 passes of the metal spraying unit shall be made over every part of the surface. The surface after spraying shall be free from uncoated parts of lumps of loosely spattered metal.
- (iv) The composition of the aluminium to be sprayed shall be in accordance with BS:1475, material 1-B (99.5%) aluminium otherwise as per IS: 739 and IS:2590. However, the selection of metal for spraying, i.e. Zinc or Aluminium shall be subject to final approval by the Engineer.
- (v) At least one layer of the coating must be applied within four hours of blasting and the surface must be completely coated to the specified thickness within 8 hours of blasting.
- (vi) Minimum thickness of metal coating applied shall be 115 microns and average thickness shall be 150 microns. The metal coating shall be checked for thickness by approved magnetic thickness measuring gauge. At least one reading for each sqm of area painted shall be taken. The calibration of the gauge shall be checked against a standard of similar thickness within an accuracy of 10%.
- (vii) For measurementn of dry film thickness, following instruments may be used by the contractor. Dry film thickness is to be measured as described in Appendix-VII of IRS BI-2001.
 - (a) Electronic coating thickness gauge.
 - (b) Elcometer (magnetic thickness gauge) Dial type.
 - (c) Surface profile gauge.

Two measurement kit shall be supplied to Railways free of cost for the purpose of inspection.

- (viii) Any oil, grease or other contamination should be removed by thorough washing with a suitable thinner until no visible traces exist and the surfaces should be allowed to dry thoroughly before application of paint. The coatings may be applied by brush or spray. If sprayed, pressure type spray guns must be used. One coat of wash primer to IS: 5666 shall be applied first. After 4 to 6 house or the application of the wash primer, one coat of Sinc chrome primer to IS: 104 with the additional proviso that sinc chrome to be used in the manufacture of primer shall conform to type 2 of IS:51 shall be applied.
- (ix) The third coat shall be Aluminium paint conforming to IS: 2339. The girder parts shall be dispatched to site after the third coat (I.e. first finishing coat or cover coat).
- (x) After assembling and launching at site, second finshing coat of Aluminium paint conforming to IS:2339 shall be applied after touching up the primer and first finishing coat.

6.3 Miscellaneous

- (i) Final dry film thickness in case of metallizing shall be average 150 microns and shall be measured before application of final finishing two coats.
- (ii) Surface preparation shall not be done unless approved paints of sufficient quantity(both primer and finsihgin) are available in stock.
- (iii) Special care should be taken in preparing corners, junctions of members, head and nuts of bolts, rivets, holes areas less accessible, hidden pockets etc. Surface preparation at such locations shall not be inferior to that attained over the rest of the area.
- (iv) Surface preparation shall not be carried out in the following conditions:
 - In rainy season from June to September and from December to January.
 - In extremely windy/misty/dust blowing conditions.
 - At night
 - In winter before 8 A.M.
 - In summer between 11 and 15 hrs, in areas, which are likely to be exposed to direct sunlight.
 - Engineer reserves the right to change the above timings.

6.5 Inspection

- 6.5.1 Adhesion: the sprayed metal coating shall be subjected to an adhesion test using the method described in IRS BI-2001. If any part of the coating between the lines breaks away from the base metal, it shall be deemed to have failed the test.

Articles that have been rejected, shall have the defective sections blasted to clean off all sprayed material prior to re-spraying. Where the rejection has been solely due to too thin a coating, sprayed metal of the same quality may be added provided that the surface has been kept dry and is free from visible contamination.

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- 6.6 Paints for painting of steel works: Source, Quality & testing.
- (i) Paint and other accessories including those for metallising work will be supplied by the contractor. Paints manufactured only by the following firms may be used subject to their being in the approved list of RDSO and final approval by the Engineer.
 - M/s. Jenson Nicholson paints.
 - M/s British/Burger paints.
 - M/s Shalimar Paints
 - M/s I.C.I. paints.
 - M/s Nerolac, Paints.
 - (ii) In case above brands are not on approved list of RDSO, the contractor shall submit proposal of alternate brands borne on approved list of RDSO.
 - (iii) Railway may involve them in testing of paints at manufacturer's premises. Final approval of paint, however, will be given by Railway at work site after paints are brought at site and inspected and tested for quality, which arwe possible at site. Sample at the discretion of Railway, however, may be sent for testing in reputed labs to verify the Manufacturer's test reports.
 - (iv) The contractor shall furnish to the Engineer, the date of manufacture of paint as certified by the manufacturers with the necessary container marking and test certificate for paint conforming to relevant IS code. In addition to this, he shall also submit the necessary vouchers in respect of paint purchased by him.
 - (v) The Engineer reserves the right to get the paint tested at contractor's expenses as considered necessary by the Engineer. If the test results do not conform to relevant IS specifications fully, then the lot of paint shall be rejected and got removed from the contractor(s) storage. If the paint has already been applied it shall be removed.
 - (vi) In addition to above, the following tests are required to be carried out in the field.
 - Weight per litre.
 - Consistency test
 - Scratch test
 - Flexibility and adhesive test.
 - (vii) The Engineer reserves the right to reject the lot of paint even on the basis of field results.
 - (viii) Self life of the paints shall be as per provisions in the IRS-B1-2001/Indian Railway Bridge Manual 1998 as approved/directed by the Engineer.

6.7 Painting – General Instructions

- (i) Painting shall not be commenced till the surface preparation has been approved by the Engineer or his representative or inspecting officer.
- (ii) Sealed containers of paint of approved brand shall be used. The paint drums must be rolled, turned upside down and shaken before opening. The paint must be stirred well before use. Over stirring which results in invisible air bubbles etc, shall be avoided.
- (iii) Where brush painting is accepted, the paint must be applied by means of flat brushes not more than 75mm in width having soft flexible bristles conforming to IS:384.
- (iv) Round and oval brushes of approved quality conforming to IS:487 may also be used as per the instructions of the Engineer or his representative or inspecting officer.
- (v) All new brushes should be soaked in raw linseed oil conforming to IS: 77 for at least 24 hours before use.
- (vi) A little blue paint shall be added, in the first coat of aluminium paint to distinguish it from second coat. For paints of other colours for final and finishing two coats, suitable pigment shall be used as per instruction of the Engineer, to distinguish the first coat from the second coat.
- (vii) The date of painting shall be marked with paint on the member.

6.8 Care during Painting

Paint should be mixed in small quantities sufficient to be consumed within one hour in the case of red lead paint.

The applied coat of paint shall be uniform, and free from brush marks, sack marks, blemishes, scratching, non-uniform thickness, holes, log marks, fuel staining, cracking, scaling, and other defects.

Paint shall be applied only on dry and clean surface free from moisture or dust (including scrapping dust).

Paint should be used within the prescribed shelf life from the date of manufacture.

- 6.9 Each coat of paint shall be left dry till it sufficiently hardens before the subsequent coat is applied. Each coat of paint shall be inspected by the Engineer or inspecting officer and certified as satisfactory before applying subsequent coat.

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6.10 Payment

The payment for complete painting of all components of girders including all accessories, painting of contact surface etc including all labour and material, is included in the accepted rates for item (B.O.Q) in the schedule of items, rates and quantities and nothing extra shall be paid.

7.0 ASSEMBLY

7.1 Procedure for Assembly in Workshop & Site.

The contractor is required to undertake test assembly of one girder of each type of span in his fabrication workshop to prove accuracy of templates and jigs. This assembly can be done in horizontal position. In case the fabrication workshop is set up by the contractor at bridge site itself the test assembly may be done at assembly platform and after testing of accuracy of jigs, fixtures & templates and the camber, the same assembly can be launched after riveting.

The test assembly shall be certified by RDSO/Engineer/I.O.

Following procedure may be used by contractor subject to checking of design by contractor's consultant and final approval by the RDSO/Engineer/I.O.

- (i) The joints at the end of each top & bottom chord shall be drifted, bolted and preferably stitch riveted to their Geometrical outline.
- (ii) The procedure during assembly shall consist of placing camber jacks in position to support the structure. The camber jacks shall be set such that they provide sufficient height to allow for lowering of panel points to obtain and maintain the required camber. Throughout the process of assembly, tilt, shift, twisting etc. shall be repeatedly checked. The jacks shall be spaced so that they will support the ends of the main girders and the panel points.
- (iii) The bottom chord members shall then be placed on the camber jacks, carefully leveled and checked for straightness and the joints completed by riveting.
- (iv) The vertical and diagonal web members, except the end verticals shall then be erected with gusset connection outward from centre in their proper position on the bottom chords. Temporary gussets with correct hole position as on master gusset shall be fixed to connect the top end of diagonals. Strainers shall be used to realize matching of holes in the gussets at top & bottom joints as given by the nominal outline of the girders. The verticals and diagonals shall then be riveted to the lower chord.
- (v) All panel points, except the central one shall now be lowered by an amount sufficient to produce the correct camber on the main girders as shown on the camber diagram.
- (vi) The top chord shall thereafter be erected piece by piece, working symmetrically outwards from the centre without loss of camber profile.
- (vii) Temporary top gussets, if used, shall be replaced by permanent gussets outwards from the centre.
- (viii) The ends posts shall be erected last. The upper end connection should preferably be made first and if there is no splicing in the end vertical, the final closure be made at the bottom connection. If there is splicing, it shall be made at the splicing.
- (ix) Frequent checks shall be made of the camber of girders during erection and care taken that the correct camber is obtained when the girder is completely assembled.

7.2 Care during Assembly at Workshop.

7.2.1 Drilling & Drifting of Holes

Drilling of joints shall be avoided as far as possible and when necessary should be done with great care and under expert supervision. Hammers not exceeding 1 kg (2 lb) in weight may be used with turned barrel drifts and a number of holes drifted simultaneously, the effect of drifting shall be checked by observation of adjacent unfilled hole.

Any apparent error in shop work which prevents the assembling and fitting of the mating parts by the proper use of drifts shall be investigated immediately.

As all work is rigidly inspected at the fabrication shop before dispatch, these difficulties should not arise and the cause could possibly be due to the use of incorrect components. It is usually important that parts be correctly handed. Should errors still persist, the matter shall be immediately reported to the Engineer who will decide what action is to be taken.

7.2.2 Reaming

No reaming shall be undertaken without the written authority of Engineer or his authorized representative or Inspecting Officer except for under drilled holes meant for turned bolts. If approved by Engineer, the contractor shall supply at his own expense, special rivets as may be required. Records of all actions relative to the recourse to reaming and the use of over size rivets shall be reported to the Engineer.

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7.2.3 Service Bolts & Drifts

Joints shall normally be made by filling not less than 60 percent of the holes with service bolts and barrel drifts in the ratio of three to one. The service bolts are to be fully tightened up as soon as the joint is assembled to secure full contact of the mating parts.

7.3 Inspection, Testing & Marking

All components shall be offered for inspection prior to painting. All approved components shall be stamped defect free, painted as per specifications prior to dispatch to bridge site.

On final finishing of each component, it shall be marked distinctly with pain with shipping mark for guidance, during assembly of component.

Stud shear connectors shall be subjected to the following tests:

- a) The fixing of studs after being welded in position shall be tested by striking the side of the head of the stud with a 2 kg hammer to the satisfaction of the Engineer.
- b) The selected stud head stroked with 6 kg hammer shall be capable of lateral displacement of approximately 0.25 times the height of the stud from its original position. The stud weld shall not show any sign of crack or lack of fusion.

The studs whose welds have failed the tests given in (a) and (b) shall be replaced.

All other aspects not stated above shall comply with IRS- B1 – 2001 and Welded Bridge Code.

7.4 Transports from Workshop & Stacking at Site.

All items fabricated in the workshop shall be marked and packaged with accompanying package list. The items after fabrication shall be transported by contractor to site by Road in a manner as to cause no damage to the components. Contractor shall be liable for all losses and damages in transit for the materials consigned by him till materials are erected and work completed and taken over by the Engineer. Insurance against loss or damage in transit, if any, shall be the responsibility of the contractor. After identification & correct marking, all components of each girder shall be dismantled & similar components shall be grouped together & labeled; rivets bolts and plates of each size shall be packed separately in the manner described elsewhere in this tender document, after approval by the inspecting authority.

The packages shall be of such size by length & weight that they are safely transportable by Road. The components shall be provided with necessary packing to avoid damage to painting & members in transit.

Dimensions for transport shall be as per standard schedules.

7.5 Assembly at Site.

7.6.1 Holes

After drilling holes in temporary tack assembled components, the components shall be taken apart after match marking and all burrs left by drill and sharp edges of all holes shall be removed by spot grinding to ensure full contact when assembled.

Assembly fixture shall be used to build components for turned bolt connection. These connections will help realize correct position of member and matching of coaxial holes in opposite members besides true alignment and level.

After assembly, all blank holes shall be checked with plug gauge of diameter 0.8 mm less than hole diameter, to check fair matching of holes before riveting.

7.6.2 Drifts

Drifts as per IRS specifications may be used for drawing light members into position, but their use on heavy members should be restricted. In no case shall the drifting be allowed to such an extent that holes are distorted. Drifting to enlarge the unfaired holes is prohibited.

7.6.3 Reaming

the holes that will have to be enlarged to admit rivets should be reamed subject to approval of Engineer/Inspecting Officer who will satisfy himself about the extent of inaccuracy and the effect of reaming on the soundness of the structure. The Contractor shall supply special rivets to fill reamed holes, where reaming is approved. Record of all such variations shall be maintained. However, these provisions should not apply for under drilled holes meant for turned bolts. Copies of all correspondence pertaining to the recourse of reaming and the use of over size rivets shall be sent by the contractor for information to Engineer.

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7.6.4 Making of joints

Care shall be taken to see that all burrs are removed and no surface defects exist before the parts are assembled. The mating surfaces shall establish full contact when assembled. In cases where the joints have to withstand stresses arising from special methods of erection, provision is to be made to take the whole stress that will or may occur. Cylindrical drifts and turned bolts shall be used to withstand such stresses and no reliance is to be placed on service bolts for this purpose. Up to a maximum of 40 percent of the holes of each member of the joint are to be filled with drifts and balance of strength required is to be attained with turned bolts. The position and number of the drifts and bolts will be decided/approved by Engineer.

7.6.5 Painting of Joints

- (i) All surfaces, which are in permanent contact, shall be thoroughly cleaned down to the bare metal, to remove mill scale and grease etc. They shall be painted immediately before assembly with one coat of red lead conforming to IS:102 and raw linseed oil freshly ground and the surface prepared for painting as per painting specification at Clause 6.0

8.0 Methods of Measurement and stage payment in respect of fabrication of structural steel work & erection and other items of the contract.

8.1 Measurement

- (i) For the purpose of payment, quoted rates apply to the weights of steel work calculated from final working drawings based on nominal weights given in the producer's hand bookds and using minimum square overall dimensions, no deductions being made for skew cuts, holes or notches. Each gusset shall be measured as equivalent to the dimension of the smallest enclosing rectangle. The wastage of steel in the form of skew cuts etc shall be the property of the contractor.
- (ii) An addition of 1.5% shall be made to the member quantities as arrive above, to account for the weight of rivets and welds.
- (iii) The drawing office dispatch lists (D.O.D. Ls) when prepared according to above procedure (i.e. (i) and (ii) as above) shall be submitted by the contractor to the Engineer for approval.
- (iv) Any steel work the weight of which differs by more than 2.5% from the calculated weight determined from the nominal weight of the sections shall be liable for rejection.
- (v) Should the actual weight fall short of the calculated weight by more then 2.5%, the material if accepted, will be paid for the actual weight only. Should the actual weight exceed the actual calculated weight, payment will be made for calculated weight only.
- (vi) In the even of a dispute arising as to the weight of a portion of steel work, a weighment shall be made in the presence of the inspecting officer/Engineer.

9.0 DEVIATION FROM SPECIFICATIONS

The contractor may extend suggestions for member substitution, fabrication method, launching procedure and the like; provided the fundamental character such as area & stiffness of the member and the connections are not adversely affected and preferably remain unchanged. The decision of Engineer shall be final and binding on all such proposals may be the contractor. Nothing extra will be paid to the contractor for such deviations. The contractor shall document all such deviations for the Engineer's record. Entire cost of structural analysis shall be borne by the contractor.

10.0 CONTRACTOR'(S) LIABILITY

Any fitting, accessory or apparatus which may not have been mentioned in this specification or the drawings, but which are usual or necessary in the execution of such work, are to be provided by the Contractor without extra payment. The whole work must be completed in all details, whether mentioned in this specification or not, with the exception of such work as has been specified in the schedule of items to be separately provided for in the Contract.

Notwithstanding the specifications and conditions stated in the contract, the contractor shall keep the Engineer/Employer authority fully indemnified and free from all liabilities and risks consequential to any lapse on his part in respect of material quality, standard of workmanship, accuracy of fabrication and the like. He shall provide all labour and material required for execution of the work as per listed standards and in absence of any IRS & IS specifications, to the relevant British standards.

11.0 Rivets and Bolts Lists:

The contractor shall also supply, without charge, six complete lists of the rivets, bolts, service bolts, washers and drifts required for erecting the work at site, showing the parts of the work to which the various rivets and bolts belong and having each item marked so as to indicate the particular case in which it will be found.

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11.1 Photographs:

The contractor shall also supply without charge, two sets of large well-executed, unmounted photographs of the first span of each description of truss bridge when erected, taken from two points of view and showing the erection marking as clearly as possible.

11.2 Attestation of Tracings etc.

The tracings, photographs and lists shall be examined and signed by the Inspecting Officer/Engineer. They shall be supplied with the first installment of the work delivered.

12.1 Testing:

The inspecting officer/Engineer shall be empowered, at his/her discretion to make or have made under the supervision, any of the tests specified in the specifications mentioned herein in addition to such other tests as he/she may consider necessary, at any time up to the completion of the contract and to such an extent as he/she may think necessary to determine the quality of all materials used therein. In doing so, he/she shall be at liberty under any reasonable procedure, he/she may think fit to select, identify, have cut-off and take possession of test pieces from the material either before, during or after its being worked up to the finished product.

12.2 He shall also be empowered to call for a duly authenticated series of mechanical tests to be obtained from the manufacturer of the materials used in the work and to accept the same in lieu of other tests to the extent he/she deems fit. The contractor shall supply the material required for the test pieces and shall also prepare the test pieces necessary.

12.3 The test shall be carried out by the contractor, for which contractor shall provide all facilities including supply of labour and plant. Inspecting officer may at his/her discretion direct the contractor to dispatch such test pieces as he/she may require to the National Test House or elsewhere as he/she may think fit for such testing purposes.

12.4 Check on Tests made at Contractor's work

12.4.1 The Inspecting Officer/Engineer, may at his/her discretion, check test results obtained at Contractor's work by independent tests at National Test House/or any other recognized laboratories, as nominated by the Inspecting Officer.

12.4.2 The Inspecting Officer/Engineer shall at all times be empowered to examine and check the working of the contractor's plant before and after using it. Should the contractor's plant be found, in the Inspecting Officer's opinion, unreliable, he/she is empowered to cancel any tests already carried out in this contract and have these tests carried out any National Test House or elsewhere, as he/she may think fit.

12.5 Analysis.

The contractor shall supply authenticated copies of analysis of any materials used in the work when required to do so by the Inspecting Officer/Engineer who shall be empowered to accept them to the extent he/she thinks fit. In addition to the above samples may, at the Inspecting Officer's/Engineer's discretion be subjected to complete analysis at the National Test House or elsewhere as the Inspecting Officer may determine, the cost the same is to be borne by the purchaser.

13. Inspection (General):

The Inspection Officer/Engineer shall have free access to the works of the Contractor at all reasonable times and shall be at liberty to inspect the process of manufacture at any such time and to reject in whole or part, any work or material that does not conform to the provisions of this specification and may order the same to be removed, replaced or altered at the expense of the contractor. All gauges and templates necessary to satisfy the Inspecting Officer of the complete interchangeability of parts must be supplied by the contractor free of cost.

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**SPECIAL CONDITIONS OF CONTRACT ASSEMBLY, ERECTION AND
LAUNCHING OF GIRDERS (SAE&LG)**

The rates quoted by contractor in the relevant schedule includes:-

1. The cost of all labours and materials construction plants tools, equipments, steel rivets, shuttering, shoring, staging, centering, boxing, scaffolding, dewatering and other temporary works or whatsoever arrangements required for the satisfactory completion of the work.
- 1.2 The cost of safety precautions for labour, vehicles, construction plant and equipment while working. This also includes extra safety precaution required due to working on a girder bridge on shore spans as well as on spans having flow of water.
- 1.3 The cost of all wastage and wash away whether due to rains or storm or flood, or other causes whatsoever.
- 1.4 The cost of launching arrangements, including temporary strengthening of girder to take care of erection stresses. The contractor have to make all arrangements for transportation of above materials including all lead, lift, descent, ascent, loading, unloading, handling, rehandling to site of actual utilisation of the materials.
- 1.5 The cost of all taxes, direct or indirect leviable under central/state or local bodies by acts of rules of Octroi, Royalties, seigniorage, cess, sales tax and similar imposition prevailing from time to time.
- 1.6 The cost of all paints, brushes, linseed oil, labour etc. required for painting of all steel works and dipping of rivets before rivetting.
- 1.7 The cost of fuel, equipment, compressed air and associated items needed for rivetting, removal of rivets and re-rivetting.
- 1.8 The cost of construction, repair, widening of approach roads, waterway crossing, detour etc. for reaching site of work or for leading of plat & machinery and girder components to site. Any rent or hire charge for private/ Govt. land shall also be to contractor's account.
- 1.9 The contractor shall make his own arrangement for safe custody of the Railway materials issued to him and transported to the site of work. No extra payment shall be made on this account.
- 1.10 The contractor shall maintain proper ledger for accounting the materials received at site and taken out from there for utilisation in the work. The record shall be kept in a manner as directed the Engineer-in-charge.
- 1.11 The Railway shall not at any time be liable for the loss or injury to any of the said Construction plant, temporary works or materials save as otherwise provided in these documents.

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- 1.12 ERECTION SCHEME :** The Contractor shall submit in triplicate detailed design calculations of the erection scheme proposed to be adopted with such plans, sketches and other details as may be necessary in order to determine the soundness of the methods proposed in General and the erection stages in particular. The methods adopted shall not under any circumstances, subject the materials of the girder spans to any greater stresses than those specified in the Indian Railways Standard specifications, codes and Rules. One copy of these documents will be returned after approval or with instructions for modifications as may be considered necessary. Any approval given by the Railway for this purpose shall in no way absolve the Contractor from full responsibility for the soundness and the safety of the erection methods that may be finally adopted by him, as well as for delivering the finished structure in accordance with the approved drawings and specifications. In this regard, the sole responsibility rests with the contractors for the execution of the contract in all respects.
- 1.13 INSPECTION AND PROGRESS REPORTS :** Any defects noticed during inspection in the execution of the work shall be rectified or replaced by the contractor at his own cost. The decision of the Railway or its inspecting agency as to the existence of the defect, the manner in which the defective work has to be rectified or replaced shall be final and conclusive.
- 1.14 TESTING OF STEEL WORK DURING AND AFTER ERECTION :** During erection of the girder spans, the contractor shall afford all facilities and permit the Railway or its agent to concurrently inspect the field assembly, site rivetting and erection of the spans. All defects revealed during such inspection shall be rectified immediately at contractors own cost.
- 1.15** The contractor shall if required by the Engineer-in-charge in writing, search for the cause of any defect, imperfection or fault under the directions of the Engineer. Unless such defects, imperfections or faults shall be one for which the contractor is liable under the contract, the cost of the work carried out by the contractor in searching as aforesaid shall be borne by the contractor and he shall in such case, repair, rectify and make good such defects, imperfection or fault at his own expense.
- 1.16 CODES AND SPECIFICATION :** The materials as well as execution of works shall be to the following specifications and codes of practice. (Latest version of the specifications / codes are to be used).

I. INDIAN RAILWAY STANDARD CODES AND SPECIFICATIONS:

- i. IRS : Bridge Rules, 1964
- ii. IRS : Welded Bridge Code, 1972
- iii. IRS : Steel Bridge Code, 1962
- iv. IRS : Concrete Bridge Code, 1962
- v. IRS : Schedule of Dimensions for B.G., 1973
- vi. IRS : Specification for Steel Girder Bridges (B1 – 1979)
- vii. IRS : Specification for Erection and Riveting of Bridges Girders (B2-1979).
- viii. Indian Railways Bridge Manual-1998

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II. INDIAN STANDARD CODES AND SPECIFICATION :

- i. IS :226-1975: Specifications for structural steel (Standard quality),
- ii. IS :961-1975: Specifications for structural steel (High tensile) ,
- iii. IS :2062-1984:Specifications for weldable structural steel.
- v. IS:1786-1985: Specifications for High Strength deformed steel bars and wires for concrete reinforcement.
- v. IS :1148-1982: Specifications for Hot rolled Steel rivet bars for structural purpose.
- vi. IS :1149-1982: Specifications for High tensile Steel rivet bars for structural purpose.
- vii. IS : 1363-1984: Specification for Hexagon head bolts, screws and nuts of product grade –G (Part-I,II & III).
- viii. IS : 1929-1982: specification for Hit forged steel rivets for hot closing.
- ix. IS : 57-1965: specification for paints and jointing purpose.
- x. IS : 75-1973: Specification for linseed oil, raw and refined.,
- xi. IS : 77-1976: Specification for linseed oil, boiled, for paints.
- xii. IS : 102-1962:Specification for ready mixed paint lead, non setting priming.
- xiii. IS : 123-1962:Specification for ready mixed red oxide paint, brushing/ finishing, semi gloss for general purpose to Indian Standard colours.
- xiv. IS : 2339-1963: Specification for Aluminium paint for general purpose in duel container.

1.17 FIELD RIVETS, BOLTS, NUTS AND SERVICE ACCESSORIES, INSPECTION ARRANGEMENT EXPANSION JOINT SHEAR CONNECTOR.

- 1.17.1 The work is to include supply of all rivets, bolts, nuts, washers etc., required to complete erection at site with allowance for wastage. The contractor shall be responsible for supplying site rivets of correct length. The length of such rivets shall be verified by snapping a few rivets of each length in the presence of the Inspecting Officers for examining whether the holes have been completely filled in by rivet materials. **No extra payment shall be made for such rivets**
- 1.17.2 No Structural steel for the manufacture of rivets, bolts etc, will be supplied by the Railway and no extra payment will be made to the contractor for supply of bolts, rivets etc.,
- 1.17.3 Service bolts and nuts, ordinary plates, washers and drifts for use in the erection of the work shall also be arranged by the contractor at his own cost. On completion of the erection work, these would remain the property of the contractor.
- 1.17.4 In the fabrication of Girder necessary arrangements and provision shall be kept for inspection facilities underneath the girder.

1.18 MANUFACTURE AND ERECTION :

- 1.18.1 The contractor shall observe sufficient accuracy in the assembling and erection of every part of the work to ensure that all parts fit accurately together on erection so as to get the designed camber.
- 1.18.2 The contractor shall maintain a master steel tape of approved make for which he has to obtain a certificate of accuracy from the National Test House calibrated under a tension of 1.8 Kg. At 16.7°C.

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1.19 TEMPLATES : The contractor shall make his own arrangement at his cost for the templates. No steel in this connection will be supplied by the Railway. The templates used throughout the work shall be of steel of similar category as for the member and of tested approved quality.

1.20 TEMPORARY STRENGTHENING :

1.20.1 The launching arrangement will include not only the supply and fabrication of launching arrangements, but also the supply and fixing of temporary strengthening of Girder members to take care of erection stresses and strains. Erection stresses must be kept within allowable limits at every stage of erection & also **to ensure proper camber after erection.**

1.20.2 The Contractor has to make arrangements at his own cost for the steel for launching arrangements, and temporary strengthening of girders, if required, during launching will be done by contractor at his own cost. The rate quoted should take into account these aspects. The components needing temporary strengthening shall be restored to original state at contractor's own expense.

1.21 **PARTS IN CONTACT :** All steel elements intended to be riveted or bolted together shall be in contact over the whole surface.

1.22 **PAINTING RIVETS, BOLTS ETC :** All rivets, bolts, nuts, washers will have to be thoroughly cleaned and dipped in boiling linseed-oil to be arranged by the contractor at his own costs, before using. No extra payment will be made on this account.

1.23 **DEFECTIVE RIVETS :** All loose and burnt rivets and rivets with cracked, badly formed eccentric or deficient & defective heads, shall be cut out. The actual method of cutting out shall be approved by the Engineer-in-charge. Recouping and caulking shall in no circumstances be resorted to. Such defective rivets/bolts shall be replaced by contractor at his own cost. **No extra payment shall be made on this account.**

1.24 TEST CERTIFICATIONS :

1.24.1 All materials for the work should pass tests or an analysis prescribed by the specification mentioned above or to such other recommended specifications as the Railway shall have authorised as equivalent there to or in the absence of such authorised specifications such tests and analysis as Railway shall specify.

1.24.2 For raw materials like rivets and paints the contractor shall furnish copies of test certificates from the manufacturers. If any further resting of materials is required by the Railway in respect of this and other items, the same shall be arranged for by the Contractor at his own cost.

1.24.3 Any approval given by the Railway in consequence of such tests or analysis shall in no way limit or interfere with the absolute right of the Railway to reject the whole or portion of such materials supplied, which in the judgement of the Railway do not comply with the conditions of the contract. The decision of the Railway in this regard shall be final and conclusive for all purpose.

1.25 METHOD OF MEASUREMENTS :

1.25.1 For the purpose of payment quoted rates apply to the weights of steel work calculated from final working drawings based on theoretical weights given in the producer's hand books and using minimum square overall dimensions. The final payable weight shall however will not be more than the nominal weight laid down in the Bridge drawings.

1.25.2 The drawing office Despatch Lists (D.O.D.Ls) when prepared according to the procedure, enumerated in para 23.01 above, are to be submitted by the contractor to the railways for approval, payment towards erection is to be made only on the quantities indicated in the approved D.O.D.Ls.

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1.26 **INSURANCE** : The contractor shall be responsible for all damages and injury caused by their work or workmen to persons, animals or things or to the work of other trades and he shall effect at his own cost any insurance necessary and hold the Railways free from all responsibilities in this respect. The insurance must be jointly in the name of the contractors and South Eastern Railway and the policy kept with the Engineer.

1.27 **RIVETS AND RIVETTING** :

1.27.1 The dimensions on the drawings refer to the diameters of the rivet holes and their finished rivets. Rivets shall completely fill the hole and shall be machine driven whenever possible by means of pressure or percussion riveters of approved design. The rivets shall be made to relevant IS specification. The rivet holes shall be 1.5 mm,(1/16 in.) greater than the diameter of the rivet bars used. The clearance i.e., the difference in diameter between the rivet measured under head before being heated and rivet hole shall not be less than 0.75 mm (1/32 in.)The shanks shall be made of a length sufficient to fill the holes thoroughly and to form the head.

1.27.2 The rivets shall be at the proper heat and in no case shall be hotter than the head. Rivets less than 10 mm (3/8 in.) diameter may be driven cold. Flattened rivet heads may be used in certain places where clearance require them.

1.27.3 Gauges for rivet dimensions and contours shall be provided by the contractor for the use of the inspecting Officer.

1.27.4 Before riveting is commenced, all works shall be properly bolted up so that the sections riveted are in close contact throughout. Driven rivets, when struck sharply on the head, with 110 grams riveting test hammer shall be free from movement and vibration.

1.28 **DRILLING AND SUB-PUNCHING** :

1.28.1 All holes shall be drilled but the Contractor may, if he so prefers sub-punch them to a diameter 6 mm. less than that of finished holes, eg. A punched hole width shall not exceed 19 mm. in diameter at the dia end for a 25 mm. dia finished drilled hole. When the rivet holes are to be sub-punched they shall be marked with a centre punch and made with a nipple punch or preferably, shall be punched in machine in which the position of the hole is automatically regulated. The punching shall be so accurate that when the work has been put together before drilling, a gauge 1.5 mm less in diameter than the size of the punched holes can be passed easily through all the holes. Holes for countersunk heads of rivets, bolts or screws shall be drilled to the correct profile so as to keep the heads flush with the surface.

1.28.2 Non sub-punching shall be allowed in the main truss members of open web girders.

1.29 **DRIFTS** :

1.29.1 Drifts as per IR specification no.B1-1979 may be used for drawing light members into position but their use on heavy members should be restricted to securing them in their correct positions. In no case shall drifting be allowed to such an extent that holes get distorted.

1.29.2 **Drifting to enlarge unmatched holes is prohibited.** The holes that will have to be enlarged to admit rivets should be reamed provided the Engineer permits such reaming after satisfying himself about the extent of inaccuracy and the effect of reaming on the soundness of the structure. The purchaser retains the right to reject all steel work if the holes are not properly matched.

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South Eastern Railway**1.30 MAKING OF JOINTS :**

- 1.30.1 Cleaning : All surface which will be in permanent contact after assembly shall be thoroughly cleaned to remove all paint and mill scale down to the bare metal, and shall be painted immediately before being assembled one coat of red lead IS specification No. 102; Red-lead non-setting to IS-57 and raw linseed to IS :75 with 99.5% oxides of lead according to Tup 'C' may be freshly ground and used in lieu of red lead paint to IS:102. Care shall be taken to see that all burrs are removed and no surface defects exists, before the parts are assembled.
- 1.30.2 All parts shall be thoroughly cleaned and dried before they are painted. Sand blasting or other methods of cleaning shall be done when so specified by the Engineer.
- 1.30.3 Bolting and Drifting : Only barrel drifts, as per IR specification of fabrication and Erection of steel girder bridges and Locomotive turntable Serial No. B1-1979, shall be used in erection. They may be used for drawing light members into position; but their use in heavy members shall be restricted to securing them in their correct position. Any apparent error in shop work which prevents the assembling and fitting up of the parts by the proper use of these drifts shall be investigated immediately. As all work is rigidly inspected in the manufacturer work before despatch, these difficulties should not arise and the cause should be sought in the use of incorrect components or the transposition of a correct part. It is usually important that parts be correctly 'handled' at all stages. Should error still persist, the matter shall be immediately reported to the Engineer who will decide what action is to be taken. No reaming shall be undertaken without the written authority of the Engineer, except for under-drilled holes meant for turned bolts. If approved, the contractor shall supply at his own expense, any special rivets that may be required. Copies of all correspondence relating to the recourse to reaming and the use of over size rivets shall invariably be sent to the Engineer for information of the inspectorate concerned.
- 1.30.4 Joints shall normally be made by filling not less than 50% of the holes with service bolts and barrel drifts in the ratio of four to one. The service bolts are to be fully tightened up as soon as the joint is assembled.
- 1.30.5 Special methods of erection other than those described in Appendix VII and IRS for fabrication of erection of steel girder B1-1979 & in case where the joints have to withstand stresses arising from special methods of erection, provision is to be made to keep the whole stress that will or may occur within permissible limit. Cylindrical drifts and turned bolts shall be used to withstand such stresses and no reliance is to be placed on service bolts, for this purpose. Up to maximum of 40% of the service bolts, of each member of the joint, are to be filled with drifts and balance or strength required is to be attained with turned bolts. The position and number of the drift bolts will be intimated by the Engineer. Then conditions of Clause 22.2 of IRS-B1-1979 , must be observed and the bolts fully tightened as soon as the Joint is made.
- 1.30.6 Where the manufacturing of girders has been done in accordance with Clause 36 of IRS-B1-79 relating to steel-girder bridges, the erection shall be done in accordance with Appendix-VII of IRS. However, if the Contractor desires to adopt any other method of erection he shall submit the scheme and obtain the approval of the Engineer. It shall be ensured that when in position the girder has the requisite camber.
- 1.31 EMERGENCY JOINTING:** In the event of an emergency arising, such as, the staging is in danger of being carried away by floods before the rivetting can be completed the joints shall be made secure by filling 40% of the holes with cylindrical drifts and an equal number with service bolts fully tightened.

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1.32 ERECTION AND EQUIPMENT :

- 1.32.1 The Contractor shall provide at his own cost all tools machinery, equipment and erection material necessary for the expeditious execution of the work and shall erect the structural steel and iron work, in every respect as covered by the contract and in accordance with the drawings and specifications.
- 1.32.2 Before starting the work the Contractor shall advise the Engineer fully as to the method he proposes to follow and about the type of equipment he proposes to use which shall be subject to the approval of the Engineer. The approval of the Engineer shall not be considered as relieving the contractor of the responsibility for the safety of his method or equipment or from carrying out the work in full accord with the Drawings and specifications.
- 1.32.3 All temporary works shall be properly designed and subsequently constructed for the loads which it will be called upon to support. Adequate allowance and provision of lateral forces and wind loads shall be made according to local conditions.
- 1.32.4 Careful and periodical inspection of plant shall be made by the contractor to ensure that all tackle, ropes, chains and other important lifting gear and machinery are in good order and fit for service and well up to the capacity for which they are required.
- 1.32.5 When chains are used for lashing, care must be taken to protect the edges of members to avoid the marking and distortion otherwise caused.
- 1.32.6 Temporary bracing shall be provided to take care of stress from erection equipment or other loads carried during erection.

1.33 BEARINGS AND ANCHORAGES :

- 1.33.1 Bed plates shall be set to required level and fixed accurately in position by giving full and even bearing by setting them on a layer of cement sand material as approved and directed by the Engineer.
- 1.33.2 The contractor shall drill the holes where necessary and set the anchor bolts. The bolts shall be set accurately & fixed with cement grout or any other grouting material as approved by the Engineer, completely filling the holes.

1.34 RIVETS AND RIVETTING :

- 1.34.1 The dimension on the drawings refer to the diameters of the rivet holes and their finished rivets.
- a. The rivet holes shall be 1.5 mm greater than the diameter of the rivet bars used. The rivets shall be made to specification IS :1929.
 - b. The shanks of the undriven rivets shall be made of a length sufficient to fill the holes thoroughly and to form head.
 - c. The clearance i.e., the difference in diameters between the rivet measured under head before being heated and the rivet hole shall not be less than 0.75 mm.
 - d. Before riveting is commenced, all works shall be properly bolted up so that the sections being riveted are in close contact throughout.
 - e. Rivets shall completely fill the holes and shall be properly bolted by means of pressure or percussion riveters of approved design.
- 1.34.2 All rivets shall be properly heated to straw heat for the full length of the shank, firmly backed and closed. The head of the rivet, particularly in long rivets, shall be heated more than the point and in NO case shall the point be heated, more than the head. Sparking or burnt rivets shall not be used. Where it is impossible to back up by normal method of holding up, 'double gunning' may be resorted.

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- 1.34.3 Gauges for rivet dimensions and contours shall be provided by the Contractor for the use of the Inspecting officer. Rivets when driven shall completely fill the holes, have the heads concentric with the shanks and shall be in full contact with the surface. Driven rivets when struck sharply on the head with the 110 gm. Riveting testing hammer, shall be free from movement and vibration.

While riveting built up members, great care should be exercised to ensure that the set of holes for field rivets in each flange of the built up member is aligned and not 'aborted'. Use of special jigs shall be made to ensure this.

- 1.34.4 All loose and burnt rivets and rivets with cracks, badly formed eccentric or deficient heads shall be cut out and replaced free of cost by good rivets. Permissible deviation of driven rivets shall be as per Appendix-VI of IRS B1 1979. Rivets shall also be cut out when required for the examination of the work. Actual method of cutting out shall be approved by the Engineer. Recouping and caulking shall in no circumstances be resorted to.
- 1.34.5 Riveting shall not be started until such time as the Engineer has personally satisfied himself that the alignment of the girders is correct, laterally and in verticals plump, the camber is according to that shown on the camber diagrams with camber jacks screwed tight, all the joints and cover, mate up well, service bolts are tight and field rivet holes coinciding.
- 1.34.6 Surfaces which are inaccessible after riveting during erection shall be given two coats of red lead paint to IS: 102. The work shall be kept tightly bolted together while it is being riveted. Special care should be taken that service bolt are frequently retightened as the riveting proceeds, the no. and position of the drifts used in the joints shall not be more than the permissible at any stage. All field rivets shall be tested as directed by the Engineer.
- 1.34.7 Wherever practically possible all riveting shall be done by pneumatic or hydraulic riveters. The working pressure to be employed when using pneumatic or hydraulic tools shall be approved by the Engineer. Hand riveting shall only be done when sanctioned by the Engineer. In such cases means shall be adopted to ensure the rivets being used in their entire length so as to fill the rivet holes completely, the snap being used only to give the correct form of head.
- 1.34.8 When all the rivets of joints have been finally passed they shall be painted with 1 coat of red lead to IS : 102 or 1 coat of ready mixed zinc chrome priming to IS : 104 followed by one coat of ready mixed paint red oxide zinc chrome priming to IS:2074 or two coats of Zinc chromate red oxide primer based on S.S.N.L resin. medium developed by RDSO.
- 1.35 PAINTING :** The contractor shall give 1st primer coat of Zinc chrome, 2nd primer coat of Red oxide Zinc chrome and 1st finishing coat of Aluminium paint (as per paint schedule) after doing necessary surface preparation, just after assembly of the Girder on the formation itself. 2nd finishing coat of Aluminium paint shall however be given after launching and erection of Girder. The steel structure fabrication vide Item NoA-.4 of Schedule shall be given one Primer coat of zinc chromate to IS. Specification 104 (20mm. thickness) and secondary primary coat of Red oxide zinc Chrome to IS 2074 just after fabrication and after doing the necessary surface preparation.

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- 1.36 **PAINING SCHEDULE** : Painting should be done on all steel works as per the schedule after doing necessary surface preparation.

Sl. No.	Description of paints	Dry film thickness in microns
1	Ist Primer coat Red lead (IS : 102)	20
2	Ist Finishing coat Aluminium paint (IS: 2339 latest revision)	15
3	IInd Finishing coat Aluminium paint (IS: 2339 latest revision)	15

**** This is for general guidance to the contractor. The contractor shall have no claim whatsoever if the area covered is less than the mentioned above.**

- 1.36.1 Painting shall not be commenced till the surface preparation has been approved by the Engineer or his authorised representative.
- 1.36.2 Paint shall be applied only on dry and clean surfaces free from moisture or dust (including scrapping dust).
- 1.36.3 The paint drums must be rolled, turned up side down & shaken before opening. Sealed containers of paint of approved brand will be opened in the presence of Engineer's representative. The paint must be stirred well before use. Over stirring which results invisible air bubbles or foam formation should be avoided.
- 1.36.4 The paint must be applied by means of flat brushes not more than 75 mm size in which having soft flexible bristles and confirming to IS: 384 Round and oval brushes of approved quantity to IS: 487 may also be used as per the instructions of the Engineer or his representative. The new brush should be soaked in raw linseed oil to IS: 77 for at least 24 hours before use.
- 1.36.5 Paint should not be applied on wet surface.
- 1.36.6 Paints manufactured by the following firms of repute are only to be used :
- M/s. Asian Paints, or,
 - M/s. Jenson & Nicholson, or,
 - M/s. Goodlas Nerolac, or,
 - M/s. Shalimar paints, or
 - M/s. Berger paints, or,
 - M/s. Garware paints.
- 1.36.7 The contractor shall furnish with the Railway the date of manufacture of paint as certified by the manufacturer with necessary container marking. In addition to this he shall also submit the necessary vouchers in respect of paints purchased by him. The manufacturer's test certificate for paint conforming to relevant IS specification shall also be submitted.

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- 1.36.8 The Railway reserve the right to get the paint tested at contractor's expenses for each 200 litres of paint at the Chief Chemist and meteorologist / S.E.Railway, Kharagpur or the National Test House, Alipore / Calcutta as found convenient by the Railway. If the test result do no conform to the relevant IS specification fully, the lot of paint shall be rejected and got removed. If the paint has already been applied the same shall be removed & redone. In addition to above the following tests are required to be carried out in the field.
- (a) Weight per litre Cap : 100 ml. Capacity (Stainless steel)
 - (b) Consistency test by Ford Cap. Viscometer No.4
 - (c) Scratch hardness test (hand operated).
 - (d) Flexibility and adhesive test with 0.25 mm. red.

The Railway reserves the right to reject the lot of paint on the basis of field result itself.

- 1.36.9 The date of painting shall be marked with paint on each span.
- 1.36.10 The date of painting shall be marked, in the first coat of Aluminium paint to distinguish it from the second coat.
- 1.37 **SURFACE PREPARATION** : Surface preparation classification 'A' or 'B' shall be done prior to starting of painting work. The decision of site in charge of Railways regarding whether surface preparation shall be done to classification 'A' or 'B' shall be final and binding on the contractor.
- 1.37.1 **CLASSIFICATION 'A'** : The surface to be painted, shall be made free from oil, grease and dirt. The firmly adhering existing primary coat of paint shall not be removed. The surface shall be rubbed with soft wire brushes and sand / emery paper in an approved manner. This is only for obtaining a rough uniform surface and not removing the paint.
- 1.37.2 **CLASSIFICATION 'B'** : The surface to be painted shall be exposed to bare metal. Scrappers, crippling hammers, wire brushes, emery/ Sand papers, pumice store etc. may be used in an approved manner. Wire brushing shall invariably be done at the end, so as to obtain a uniform rough surface.
- 1.37.3 Surface preparation shall not be done unless the approved paints in sufficient quantity (both primer and finishing coat of paints) are available in stock at site.
- 1.37.4 Special care should be taken in preparing corners, Junctions of members, heads and nuts of bolts, rivets, holes, areas less accessible, hidden pockets etc. Surface preparation at such locations shall not be inferior to that attained over the rest of the area.
- 1.37.5 Surface preparation shall not be carried out in the following conditions :
- (a) In rainy season.
 - (b) In extremely windy / misty / dust blowing conditions.
 - (c) In night.
 - (d) In winter before 8 A.M
 - (e) In summer between 11 and 15 hrs. (11.00 AM to 3.00 PM) on areas which are likely to be exposed to direct sun light.

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- 1.38.1 coat of paint applied shall be such that the prescribed dry film thickness is achieved by actual trial for the particular brand of paint. The applied coat of paint shall be uniform and free from brush marks, sags, blemishes, scattering, crumbling, unlevel, etc.. Thickness if found to be less than that specified , additional coat of paint has to be applied to bring it to the required thickness. The thickness shall be measured by an approved type of gauge.
- 1.38.2 Paints should be used within the prescribed shelf-life from the date of manufacture.

SHELF LIFE OF PAINTS :

- (a) Paint Zinc Chromate to IS : 104 - 12 Months
- (b) Paint Red Oxide Zinc Chromate to IS : 2074 - 12 Months
- (c) Paint Red Oxide ready mixed to IS : 123 - 12 Months
- (d) Paint Aluminium to IS :2339 - 12 Months
- 1.38.3 Each coat of paint shall be left dry till it sufficiently hardens before the subsequent coat is applied. Each coat of paint shall be inspected by Engineer in charge at site and certified as satisfactory before applying subsequent coat.
- 1.38.4 The time lag between the successive operations shall under no circumstances exceed those specified below.
- (a) Between surface preparation to classification 'A'
- (b) Between surface preparation to classification 'B' and the first primer coat – 24 hrs.
- (c) Between the Primer coat and the first finishing coat 7 days.
- (d) Between the first finishing coat and the second finishing coat 7 days.
- 1.39 Contractor shall be equipped with FIRST AID BOX and persons fully trained to give 'FIRST AID' in times of need.

1.40 PROCEDURE FOR ASSEMBLY & ERECTION OF OPEN WEB GIRDER :

- 1.40.1 The joint of the chords shall be drifted, bolts and preferably rivetted to their Geometric outline.
- 1.40.2 All other members are to be elastically strained into position by external forces, so that as many holes as possible are fair when filled with rivets.
- 1.40.3 Drilling of joints shall be avoided as far as possible and when necessary should be done with greater care and under close expert supervision. Hammers not exceeding 1 KG(2 1 b) in weight should be used with turned barrel drifts and all the holes drifted simultaneously. The effect of the drifting shall be checked by observation of adjacent unfilled holes.
- 1.40.4 The first procedure during erection consists of placing camber jack in position on which to support the structure. The camber jack should be set with their top level with sufficient run out to allow for lowering of panel points & desired camber is accurately maintained through out the process of erection and tilt should be constantly checked. The jacks shall be spaced so that they will support the ends of the main girders and the panel points. The bottom chord members shall then be placed on the camber jacks, carefully leveled and checked for straight ness and the joints made and rivetted up.

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- 1.40.5 The vertical and diagonal web members, except the end posts shall then be erected in their proper position to the bottom chords. Temporary top gussets shall be held in correct position so as to achieve desired camber for the length of member. This will ensure that the angles between the members at the bottom joints are as given by the nominal outline of the girders. The verticals and diagonals shall than be rivetted to the lower chords.
- 1.40.6 All panel points, except the centre, shall now be lowered by just sufficient amounts to produce the correct camber in the main girders as shown in the camber diagram.
- 1.40.7 The top chord shall be erected piece by piece working symmetrically starting from the centre outwards, each piece being cambered in turn.
- 1.40.8 The temporary top gussets, if used, shall be replaced by the permanent gussets in the same sequence as each piece being cambered in turn.
- 1.40.9 The ends posts shall be erected last. The upper end connection should preferably made first and if there is no splice in the end raker, the final closure made at the bottom connection. If there is a splice, the final closure should be made at the splice.
- 1.40.10 When cantilever method of erection is used the above procedure does not apply.

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SPECIAL CONDITION OF CONTRACT FOR DESIGN & DRAWING

1) Scope of work:

1.1 Deleted

1.2 Design of Abutments and its foundation: -

Details structural design and working drawing are to be made for the RCC/MCC (with skin Reinforcement) abutment, foundation, Bed block, Wing and Return wall, approach-slab etc. complete. The foundation may be pile foundation or open foundation depending upon site condition. Depending upon GAD and site condition it will be decided either both abutment will be similar and one design and drawing will hold good or otherwise design and drawing are to be done for both the abutment.

1.3 Deleted -

1.4 Design of super structure: -

The consultant shall do the detailed structural design and prepare working drawing for suitable girder for the span decided by Railway. This shall also include the design and drawing of bearings and other misc. component like path way, ladder, railing,, expansion joint etc. complete.

1.5 The tenderer to consider the design by IRC loading standard for all design purpose. The consultant is expected to carry out the structural design in most professional manner and should workout a viable and economical design. The consultant shall ensure that all latest relevant Indian Railways standard codes, IS codes and IRC codes are followed in preparation of safe, modern and economical design.

2. Preparation of Design & working drawings shall be carried out following various codes as under: -

2.1 Codes and specification:

The design shall be carried out in turns of specification of latest edition of IRS, IRC, BIS.

- i) Where there is conflict between IRS, IRC and BIS specification, the precedence shall be in the same order.
- ii) Where there is no provision of specification in IRS, the IRC condition shall be referred to and followed.
- iii) The decision of CAO (CON)/SE Railway shall be final and binding in the interpretation of the clause of the codes of practice and specification under the special condition. CAO (CON)/SE Railway is competent to make any change in specification at any stage.

2.2 Apart from the basic data, specification etc. all design shall be governed by the IRC Code, IR Bridge Rules/IRS/IS codes as revised/corrected/amended upto date.

- (i) Indian Railway code of practice for plain/reinforced and pre-stressed concrete for general bridge construction (concrete bridge code adopted 1936, Revised 1997 with latest correction slips)
- (ii) India Railway Bridge Rule specifying the loads for design of super structure and substructure of bridge including chapter-VII for the rule for the opening of Railway adopted in 1941, revised August '1964 incorporating up to date correction slip, herein referred as Bridge Rules.

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- (iii) IRS Bridge sub-structure and foundation code-code of practice for the design of sub-structure and foundation of bridges adopted 1936. Revised 1985 (Here in after referred to as sub-structure code) with up to date correction slips.
- (iv) S.E. Railway Engg. Dept. General conditions of contract and standard specification -2001 with up to date correction slips.
- (v) Indian Railway schedule of dimensions for B.G. Revised on 2004.
- (vi) I.S. code of practice for plain and reinforced concrete for general building construction IS 456-2000.
- (vii) I.S. Code of practice for general construction in steel (IS 800-1984)
- (viii) IRS code of practice for plain concrete construction.
- (ix) IRS code of practice of electric welding of mild steel structure.
- (x) IS - 2062 - 1984 specification for weld able structural steel?
- (xi) IS -875 - 1987 code of practice for structural safety of building and loading.
- (xii) IRC code to be used for items not specifically covered by any code of provision mentioned in these documents.
- (xiii) Design loads for OHE masts.
- (xiv) IRS steel bridge code: code of practice for design of Railway steel bridges.
- (xv) IS specification for fine and coarse aggregate from natural source for concrete IS 383 and IS-516 to be used latest with up to date correction slips.
- (xvi) IS methods on testing of soil, IS 2720 (all parts) latest revision with up to date correction slips.
- (xvii) SP-33 of BIS
- (xviii) SP -36 (Pt.I & II of BIS)
- (xix) IS-2911 (all parts) code of practice for design and construction of piles.
- (xx) UIC -772, IRC -83 (all parts) - Bearing for bridges.
- (xxi) IS-1893 -1984 criteria for Earth quack resistance design of structure.

- Note:**
- i) Latest edition including upto date correction slips shall govern.
 - ii) The list given above is by no means exhaustive. All IRS/IRC/IS codes pertaining to the works shall be applicable

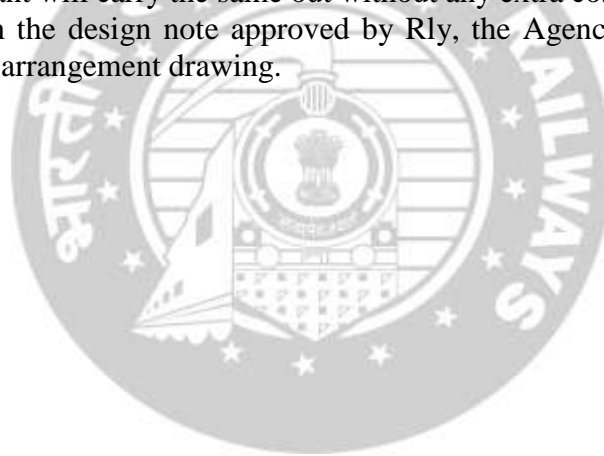
3.0 Additional special conditions of contract:

- a) The Agency will carry out Value Engineering for viable economical design of the various components of the bridge, which will be in sufficient detail to the specification of Railways/proof consultants. The Agency will get the design checked from proof consultants. For this purpose Agency will ensure the presence of his representative in the offices of these authorities whenever required. Nothing extra will be payable for the above and the rate is inclusive of above.
- b) After proof checking from the Consultant, the Agency will have to submit three copies of initial design calculations with (3 ferro copies of drawing)s to Railway for approval. Design calculation should be clearly written and bound in book form.
On clearance of design criteria from Railway for any modification, agency will carry out detailed design again as required and submit the same for checking by proof consultant etc.

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- c) Without any loss of time after clearance of design parameters, he will also be prompt in clarifying the observations/doubts of the proof consultant/Railways.
- d) Final copy of all drawing will be submitted on reproducible tracing film (3 copies) & soft copy of Floppy/CD on completion of all design and drawings. In addition to this 3 sets of drawings in ferro copies and three sets of design. Calculation neatly typed and bound (final copy) will also be submitted.
- e) Design and drawing after approval shall be property of SE Railway who shall have exclusive right to use or reuse it elsewhere. The consultant shall have no claim whatsoever in this regards.
- f) In case any minor modification in design is required during the progress of work due to change of soil strata from that observed during sub-soil investigation or due to any difficulty encountered during execution, the consultant will carry the same out without any extra cost to Railways.
- g) Base on the design note approved by Rly, the Agency will prepare final general arrangement drawing.



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SPECIAL CONDITIONS FOR EPOXY PHENOLIC IPN COATING

1	Epoxy-Phenolic Coating
1.1	Central Building Research Institute (CBRI), Roorkee has developed an “interpenetrating Polymer Network System” (IPN Polymer) as coating for concrete for the protection of concrete structures exposed to aggressive environments. The corrosion protection efficiency for protection of concrete of concrete is the hall mark of this two component coating.
1.2	Preparation of IPN polymers: Two different resins a medium-viscosity epoxy resin based on epichlorohydrin and bisphenol as base and an aromatic amine adduct as the cross linker and a phenolic resin obtained from an indigenous phenol with its cross linker were mixed in different ratios and cross linked simultaneously by a separate non-interfering mechanism. The IPN polymeric system thus obtained where evaluation for various physicomaterial properties using standard methods of testing. It was found that elongation on IPN polymer (epoxy in combination with phenolic resin) film increase to 17.5% as against 5% in case of neat epoxy system. This is the most important property which could enable the coating to retain the adhesion even at higher fatigue limits.
1.3	The vicat softening point, the indicator of the thermal stability of the polymer system is much higher in IPN polymer system. It has low moisture vapour transmission and excellent adhesion with substrate. The coefficient of thermal expansion of the IPN polymer film is nearly equal to that of concrete signifying non development of thermal stresses in concrete and coating.
1.4	Coupled with excellent thermal resistant along with above mentioned properties, IPN polymers is an excellent protective coating for concrete structures and can be used for the protection of various structures. This system has been used on Vasai Creek bridge in Mumbai.
1.5	Integrated four coat system developed by CECRI, Karaikudi.
	<ul style="list-style-type: none"> (i) Consists of epoxy polyamide iron oxide, epoxy polyamide MiO undercoat, epoxy polyamide TiO₂ top coat and aliphatic. It has high alkali resistance and good adhesive. (ii) The second coat consists of MiO which is porous material and is therefore very good. The final coat i.e., aliphatic is a tough polymer which can stand ultraviolet rays. (iii) The cost treatment is about Rs 320/Sqm.
1.6	Epoxy coating: They are well proven for concrete surfaces. When formulated with liquid epoxy resin, liquid curing agents and highly penetrating solvents, they give good performance. They are classified as under : <ul style="list-style-type: none"> i. Solvent base epoxy with relatively high molecular weight. ii. Thin thixotropic liquid epoxy based primer. iii. Thick epoxy coating applied by trowel or by spray.
1.7	Epoxy coating is cured either by amines or by polyamides. The thickness of coating ranges between 8 to 15 microns.

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(B) Technical Specifications-

Following table gives the few relevant references of Indian Railway Unified Standards Specification 2010 (IRUSS- 2010), towards technical specifications:

Sl. No.	Reference Chapter of IRUSS 2010	Item of Chapter
1	1	Earthwork
2	3	Plain Concrete
3	4	Reinforced Cement Concrete
4	18	Dismantling and Demolishing
5	19	Bridge Works: Substructure
6	20	Bridge Works : Superstructure - R.C. C.
7	21	Bridge Works: Superstructure - Steel
8	22	Bridge Works- Miscellaneous
9	23	Roads And Platform works
10	25	Supply of Materials

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(C) SAFETY RULES

- 1.0 **Within 21 days of receipt of acceptance letter, the contractor shall submit a safety assurance plan in sufficient details for approval of the Engineer.**
- 1.1 Suitable scaffolds should be provided for workmen for all works that cannot be safely done from the ground or from solid construction except for such short periods work as can be done safely from ladders. When a ladder is used an extra labour shall be engaged for holding the ladder and if the ladder is used for carrying materials as well, suitable foot holds and handholds shall be given an inclination not steeper than 1 to 4 (1 Horizontal to 4 Vertical).
- 1.2 Scaffolding or staging more than 3.5 metres above the ground or floor, swung or suspended from an overhead support or erected with stationery support shall have a guard rail properly attached, bolted, bracketed and otherwise secured at least 1 metre high above the floor or platform of such scaffolding or staging and extending along the entire length thereof with only such opening as may be necessary for the delivery of materials. Such scaffolding or staging shall be fastened as to prevent it from swaying from the building or structure.
- 1.3 Working platform gangways and stairways should be so constructed that they should not sway unduly or unequally and where the height of the platform or the gangway or the stairway is more than 3.5 metres above ground level or floor level they should be closely boarded, should have adequate width and should be suitably fastened as described in the para above.
- 1.4 Safe means of access shall be provided to all working platform and other working places. Every ladder shall be securely fixed. No portable single ladder shall be over 10 metres in length while the width between side rails in swung ladder shall in no case be less than 300 mm. for ladder upto and including 3.5 metres in length.
- 1.4.1 For longer ladders this width should be increased by at least 20 mm. each additional metre of length. Uniform steps spacing shall not exceed 300 mm. Adequate precautions shall be taken to prevent danger from electrical equipment. No materials on any of the sites of work shall be so stacked or placed so as to cause danger or inconvenience to any persons or the public. The Contractor shall provide all necessary fencing and lights to protect the public from accident and shall be bound to bear the expenses of defenses of every suit, action or other proceedings at law that may be brought by any persons for injury sustained owing to neglect of the above precautions and to pay any damages and cost which may be awarded in any such suit, action or proceedings to any such person shall be paid by the Contractor to compromise any claim by any such person. In case the Contractor fails to settle such problems, the Railway Administration will make payments arising on account of the conditions given above to the concerned parties and recover the same from Contractor's dues without any delay. Contractor will not have any claim on this account at any stage.
- 1.5 **Demolition:** Before any demolition work is commenced and also during the process of work
- A) All roads and open area adjacent to the work site shall either be closed or suitably protected.
- B) **NO ELECTRIC CABLE OR APPARATUS WHICH IS LIABLE TO BE A SOURCE OF DANGER OVER A CABLE OR APPARATUS USED BY THE OPERATOR SHALL REMAIN ELECTRICALLY CHARGED.**
- C) All practical steps shall be taken to prevent danger to persons employed from risk of fire or explosives or flooding. No floor, roof or other part of the building shall be so over loaded with debris or materials as to render it unsafe.
- 1.6 All necessary personal safety equipment as considered adequate by the Engineer-in-charge should be kept available for the use of the persons employed in the site and maintained in a condition suitable for immediate use and the contractor should take adequate steps to ensure proper use of equipment by these concerned.
- a) Workers employed on mixing asphaltic materials cement and mortar shall be provided with protective goggles.
- b) Those engaged in white washing and mixing or stacking of cement bags or any materials which are injurious to the eye shall be provided with protective goggles.
- c) Those engaged in welding works shall be provided with welder's protective eye sight lids.
- d) Stone breakers shall be provided with protective goggles and protective clothing and seated at sufficiently safe intervals.
- 1.7 When the work is done near any place where there is risk of drowning, all necessary equipment should be provided and kept ready for use and all necessary steps taken for prompt rescue of any persons in danger and adequate provision should be made for prompt first aid treatment of all injuries like to be sustained during the course of the work.

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- 1.8 Use of hoisting machines and tackles including their attachment anchorage and supports shall confirm to the following standards of condition.
- a) (i) These shall be of good mechanical construction, sound materials and adequate strength and free from patent defects and shall be kept in good repair and in good working order.
 - (ii) Every rope used in hoisting or lowering materials or as a means of suspension shall be of durable quality and adequate strength and free from patent defects.
 - b) Every crane driver or hoisting appliances operator shall be properly qualified and no person under the age of 21 years should be in-charge of any hoisting machine including any scaffolding.
 - c) In case of every hoisting machine and every cable ring, hook, shackle, swivel and pulley block used in hoisting or as means of suspension safe working load shall be ascertained by adequate means. Every hoisting machine and all gear referred to above shall be plainly marked with the safe working load. In case of hoisting machine having a variable safe working load of the conditions under which it is applicable shall be clearly indicated. No part of any machinery or any gear referred to above in this paragraph shall be loaded beyond the safe working load except for the purpose of testing.
 - d) In case of departmental machine, the safe working load shall be notified by the Technological Engineer-in-Charge. As regards Contractor's machines, the contractors shall notify the safe working load of machine to the Engineer-in-charge whenever he brings any machinery to site of work, get it verified by the Engineer concerned.
- 1.9 Motors, gearing, transmission, electric wiring and other dangerous parts of hoisting appliances should be provided with efficient safe guards. Hoisting appliances should be provided with such means as will reduce to the minimum the risk of accidental descent of the load; adequate precautions should be taken to reduce the minimum the risk of any part of a suspended load becoming accidentally displaced. When workers are employed on Electrical installations which are already energized, insulating mats wearing apparel, such as gloves, sleeves and both as may be necessary should be provided. The workers should not wear any rings, watches and carry keys or other materials, which are good conductors of electricity.
- 2.0 All scaffolds, ladders and other safety devices mentioned or described herein shall be maintained in safe condition and no scaffold, ladder or equipment shall be altered or removed while it is in use. Adequate warning facilities should be provided at or near places of work.
- 2.1 These safety provisions should be brought to the notice of all concerned by display on a notice board, at a prominent place at the work spot. The persons responsible for compliance of the safety code shall be named therein by the Contractor.
- 2.2 To ensure effective endorsement of the rules and regulations relating to safety precautions, the arrangements made by the contractor shall be open to inspection by the Labour Officer, Engineer-in-charge of the Department or their representative.
- 2.3 Notwithstanding the above clause from 1.1 to 1.12, there is nothing in these to exempt the contractor from the operations of any other act or rule in force in the Republic of India.
- 2.4 **PRECAUTIONS TO BE TAKEN WHILE PLYING OF VEHICLES ADJACENT TO RUNNING LINES**
- 2.4.1 Whenever a lorry or any other from a road transport is required to ply along or in the vicinity of a running line or any other railway track while Railway Engines or trains are liable to move, the contractor shall inform the Engineer in Writing, of such requirements specifying the locations and duration of time over which such specified road vehicles have to operate in the area (for loading/leading/unloading or earth, ballast or any other materials or plant or equipment) without any obstructions or dislocation to the running of trains. The Contractor shall also furnish the particulars of vehicles and the name and photographs of drivers with copy of the licensee and attendant retain for each vehicle to enable the engineer to issue necessary permits (after counseling the driver and attendant) allowing the holder to operate the vehicles, with such restrictions regarding the duration and/or location as are considered necessary. Such permit shall be returned to the engineer, as soon as the work for which it is issued is over.
- 2.4.2 The Engineer-In-Charge or his Authorized Representative will personally counsel, examine and certify the road Vehicle Drivers, Contractor's Flag Man and Supervisor and will give written permission giving names of Road Vehicle Drivers, Contractor's Flag Man and Supervisor to be deployed on the work, location, period and timing of the work. This permission will be subject to the following obligatory conditions:
- (a). The Road Vehicles will ply only between sunrise and sunset.
 - (b). Nominated Vehicles and Drivers will be utilized for the work in presence of at least one Flag Man and on Supervisor certified for such work.

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(c). The Vehicle shall ply 6 mtr. Clear of track. Any movement / work at less than 6 mtr. and up to minimum 3.5 mtrs. clear of track centre, shall be done only in presence of Rly. Employee authorized by the Engineer-in-charge. No part of the Road Vehicle will be allowed at less than 3.5 mtrs. from track centre.

(d). The Contractor shall remain fully responsible for ensuring safety and in case of any accident shall bear the cost of all damages to this equipment and crew and also damages to Rly. And its Passengers. Engineer-In-Charge may impose any other condition necessary for a particular work of site. Such permit shall be returned to the Engineer, as soon as the work for which it is issued is over.

- 2.4.3 The Contractor shall execute a bond undertaking to ply the road vehicles in a safe and satisfactory manner and strictly in accordance with the stipulations and other conditions specified by the Engineer and to engage and retain only the permit holder to be Contractor's agent in charge of the vehicles and the attendants shall, at all times, be vigilant and on the look out for signals from the lookout men, flag men or other personnel available at site with a view to stop or regulate road movement so as to ensure adequate margin of safety for the timely passage of an approaching train or a railway engine, without any delay or detention. The Contractor shall also be bound by the provisions of this agreement to ply the road vehicles only with adequate margin of safety, well clear of the fixed structure profile of infringements as stipulated in the rules made under the Indian Railway Act and to seek and be guided by the signals and other directions of any look out men or other personnel retained for the purpose of ensuring safety and to ensure extra care and vigilance while turning, reversing or moving the road vehicles in any other manner at an inclination to the running railway track or the siding as the case may be. The Contractor shall employ necessary lookout men also at his own cost, irrespective of any arrangement that Railway may make in this regard.
- 2.4.4 The Contractor also undertake to make good at his cost any inconvenience, loss, damage of other expenses cause to or incurred by the Railway Administration to pay such amounts as are determined by the Engineer to be recoverable from the contractor as penalty or damages for any omission, negligence, carelessness, oversight or accident on the part of any of the contractor's agent, drivers or attendants or any other person to whom the services of the holder of the permit (issued by the Engineer) has been lent or otherwise made accessible or available.
- 2.4.5 Suitable gates/barriers should be installed across the new embankment, preferably adjoining the manned/unmanned level crossings. The entry for the vehicles shall be regulated by an authorized representative of the Engineer- in -charge during the working hours.
- 2.4.6 Any breach of these conditions by the contractor and/or his agents affecting the safety of movement of train, engines, or other rolling stock of the railway shall constitute a breach of contract by the contractor entailing liability for termination of contract for default on the part of the Contractor.
- 2.4.7 In Exceptionally vulnerable location, the contractor shall provide physical barrier in the form of barricades so as the indicate the limit up to which the vehicles can approach the running line. The location or circumstances under which such barriers have to put will be decided personally by the Engineer-in-charge. Payment to the contractor shall be made as per relevant SOR items.
- 2.4.8 The permission will be given to the vehicles to ply in the vicinity of railway line only between sunrise and sunset.
- 2.4.9 The vehicle shall ply 6m. clear from the centreline of track. Any work movement at less than 6.0m and up to minimum 3.5m clear of track center shall be done only in the presence of railway employee authorized by the Engineer-in-charge. No part of the road vehicle will be allowed at less than 3.5m from track center.
- 2.4.10 The Contractor shall remain fully responsible for ensuring safety and in case of any accident, shall bear cost of all damages to the equipment, men, machinery and also damage to railway property and its passengers.
- 2.4.11 Turning point for the road vehicles should be in such a manner that there is no danger to running track and should be sufficiently away from the running line.
- 2.4.12 Reversing of road vehicles should be done in such a manner that all time the driver invariably faces the running line and should be sufficiently away from the running line.
- 2.4.13 The Contractor will have to depute their flagmen and supervisors who also will be counselled by the Engineer-in-charge or his representative.
- 2.4.14 Engineer-in-charge may impose any other conditions necessary for a particular work or site from time to time.

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