

**SOUTH WESTERN RAILWAY**

**STANDARD TENDER DOCUMENT  
FOR OPEN LINE**

**Part-II**

**VERSION 6.0**

**(2022)**

## SOUTH WESTERN RAILWAY

### REGULATIONS AND INSTRUCTIONS TO TENDERERS

#### (For the Guidance of Engineers and Contractors FOR Engineering Works UNDER WORKS CONTRACTS)

##### Meaning of Terms

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

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

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

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

**1.2. Definition:** In these Instruction to Tenderers, the following terms shall have the meanings assigned hereunder except where the context otherwise requires:

- (a) "Railway" shall mean the President of the Republic of India or the administrative officers of the Railway or Successor Railway authorized to deal with any matter, which these presents are concerned on his behalf.
- (b) "General Manager" shall mean the Officer-in-Charge of the general superintendence and control of the Zonal Railway/Production Unit and shall also include Addl. General Manager, General Manager (Construction) and shall mean and include their successors of the Successor Railway.
- (c) "Chief Engineer" shall mean the Officer-in-Charge of the Engineering Department of Railway and shall also include Chief Engineer (Construction), Chief Electrical Engineer, Chief Electrical Engineer (Construction), Chief Signal & Telecom Engineer, Chief Signal & Telecom Engineer (Construction), Chief Mechanical Engineer and shall mean and include their successors of the Successor Railway.

- (d) “Divisional Railway Manager” shall mean the Officer-in-Charge of a Division of Zonal Railway and shall mean and include Divisional Railway Manager of the Successor Railway.
- (e) “Engineer” shall mean the Divisional Engineer or Executive Engineer, Divisional Signal & Telecom Engineer, Divisional Electrical Engineer, Divisional Mechanical Engineer in executive charge of the works and shall include the superior officers, both Open Line and Construction Organisations, of Engineering, Signal & Telecom, Mechanical and Electrical Departments, i.e. the Senior Divisional Engineer/Deputy Chief Engineer, Senior Divisional Signal & Telecom Engineer / Dy. Chief Signal & Telecom Engineer, Senior Divisional Electrical Engineer / Deputy Chief Electrical Engineer, Senior Divisional Mechanical Engineer and shall mean & include the Engineers of the Successor Railway.
- (f) “Tenderer” shall mean the person / firm / co-operative or company whether incorporated or not who tenders for the works with a view to execute the works on contract with the Railway and shall include their representatives, successors and permitted assigns.
- (g) “Limited Tenders” shall mean tenders invited from all or some contractors on the approved or select list of contractors with the Railway.
- (h) “Open Tenders” shall mean the tenders invited in open and public manner and with adequate notice.
- (i) “Works” shall mean the works contemplated in the drawings and Bill(s) of Quantities set forth in the tender forms and required to be executed according to the specifications.
- (j) “Specifications” shall mean the Specifications for Materials and Works of the Railway as specified under the authority of the Ministry of Railways or Chief Engineer or as amplified, added to or superseded by special specifications if any, appended to the Tender Forms.
- (k) Standard Schedule of Rates (SSOR) shall mean the schedule of Rates adopted by the Railway, which includes-
  1. “Unified Standard Schedule of Rates of the Railway (USSOR)” i.e. the Standard Schedule of Rates of the Railway issued under the authority of the Chief Engineer from time to time, updated with correction slips issued up to date of inviting tender or as otherwise specified in the tender documents;\
  2. “Delhi Schedule Of Rates (DSR)” i.e. the Standard Schedule of Rates published by Director General/ Central Public Works Department, Government of India, New Delhi, as adopted and modified by the Railway under the authority of the Chief Engineer from time to time, updated with correction slips issued up to date of inviting tender or as otherwise specified in the tender documents.
- (l) “Drawings” shall mean the maps, drawings, plans and tracings, or prints thereof annexed to the Tender Forms.
- (m) “Contractor’s authorized Engineer” shall mean a graduate engineer or equivalent, having more than 3 years experience in the relevant field of construction work involved in the contract, duly approved by the Engineer.
- (n) Date of inviting tender shall be the date of publishing tender notice on IREPS website if tender is published on website or the date of publication in newspaper in case tender is not published on website.
- (o) “Bill of Quantities” shall mean Schedule of Item(s) included in the tender document along with respective quantities.

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

**2.0 Omissions and Discrepancies:** Should a Tenderer find discrepancies in, or omissions from the drawings or any of the Tender Forms or other Contract Documents or should he be in doubt 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 errors, omissions and discrepancies which may subsequently be discovered and shall make no subsequent claim on account thereof.

**3.0 Right of Railway to deal with Tenders: As per IRGCC item 7 part -I :**

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

#### **4.0 Employment/Partnership etc. of Retired Railway Employees:**

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

AND

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

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

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

**Note:-**If information as required as per 16.a), b), c) above has not been furnished, contract is liable to be dealt in accordance with provision of clause 62 of Standard General Condition of contract.

## **Contract Documents**

### **1.0 Execution of Contract Documents: As per IRGCC para 8 of Part-I:**

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

- 2.0 If any partner(s) of a partnership firm expires after the submission of its tender or after the acceptance of its tender, the Railway shall deem such tender as cancelled/contract as terminated under clause 61 of the Standard General Conditions of Contract, unless the firm retains its character as per partnership agreement. If a sole proprietor expires after the submission of tender or after the acceptance of tender, the Railway shall deem such tender as cancelled / contract as terminated under clause 61 of the Standard General Conditions of Contract.
- 3.0 If the tenderer's firm is dissolved on account of death, retirement of any partners or for any reason whatsoever, before fully completing the whole work or any part of it, undertaken by the principal agreement, the surviving 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 amount of such compensation shall be decided by the administration and this shall be final and binding on the contractor.

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

## CONDITIONS OF CONTRACT

### 1.0 VARIATION IN QUANTITIES:

- 1.1. **Modification to Contract to be in Writing:** In the event of any of the provisions of the contract required to be modified after the contract documents have been signed, the modifications shall be made in writing and signed by the Railway and the Contractor and no work shall proceed under such modifications until this has been done. Any verbal or written arrangement abandoning, modifying, extending, reducing or supplementing the contract or any of the terms thereof shall be deemed conditional and shall not be binding on the Railway unless and until the same is incorporated in a formal instrument and signed by the Railway and the Contractor, and till then the Railway shall have the right to repudiate such arrangements.
- 2.1. **Powers of Modification to Contract:** The Engineer on behalf of the Railway shall be entitled by order in writing to enlarge or extend, diminish or reduce the works or make any alterations in their design, character position, site, quantities, dimensions or in the method of their execution or in the combination and use of materials for the execution thereof or to order any additional work to be done or any works not to be done and the Contractor will not be entitled, to any compensation for any increase/reduction in the quantities of work but will be paid only for the actual amount of work done and for approved materials supplied against a specific order.
- 2.2.1 Unless otherwise specified in the special conditions of the contract, the accepted variation in quantity of each individual item of the contract would be upto 25% of the quantity originally contracted, except in case of foundation work (in which no variation limit shall apply). However, the rates for the increased quantities shall be as per sub-para 2.2.3 below.
- 2.2.2 The Contractor shall be bound to carry out the work at the agreed rates and shall not be entitled to any claim or any compensation whatsoever upto the limit of 25% variation in quantity of individual item of works.
- 2.2.3 In case an increase in quantity of an individual item by more than 25% of the agreement quantity is considered unavoidable, then same shall be executed at following rates
- (a) Quantities operated in excess of 125% but upto 140% of the agreement quantity of the concerned item, shall be paid at 98% of the rate awarded for that item in that particular tender;
  - (b) Quantities operated in excess of 140% but upto 150% of the agreement quantity of the concerned item shall be paid at 96% of the rate awarded for that item in that particular tender;
  - (c) Variation in quantities of individual items beyond 150% will be avoided and would be permitted only in exceptional unavoidable circumstances and shall be paid at 96% of the rate awarded for that item in that particular tender.
  - (d) Variation to quantities of Minor Value Item: The limit for varying quantities for minor value items shall be 100% (as against 25% prescribed for other items). A minor value item for this purpose is defined as an item whose original agreement value is less than 1 % of the total original agreement value.
    - i. Quantities operated upto and including 100% of the agreement quantity of the concerned minor value item, shall be paid at the rate awarded for that item in that particular tender;
    - ii. Quantities operated in excess of 100% but upto 200% of the agreement quantity of the concerned minor value item, shall be paid at 98% of the rate awarded for that item in that particular tender;
    - iii. Variation in quantities of individual minor value item beyond 200% will be avoided and would be permitted only in exceptional unavoidable circumstances and shall be paid at 96% of the rate awarded for that item in that particular tender.
- 2.2.4 In case of earthwork, the variation limit of 25% shall apply to the gross quantity of earthwork items and variation in the quantities of individual classifications of soil shall not be subject to this limit.

- 2.2.5 In case of foundation work, no variation limit shall apply and the work shall be carried out by the Contractor on agreed rates irrespective of any variation.
- 2.2.6 As far as Standard Schedule of Rates (SSOR) items are concerned, the variation limit of 25% would apply to the value of SSOR schedule(s) as a whole and not on individual SSOR items. However, in case of Non Standard Schedule of Rates (SSOR) items, the limit of 25% would apply on the individual items irrespective of the manner of quoting the rate (single percentage rate or individual item rate).
- 3.0 In cases where decrease is involved during execution of contract:
- The contract signing authority can decrease the items up to 25% of individual item without finance concurrence.
  - 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.
  - It should be certified that the quantities proposed to be reduced will not be required in the same work at a later stage.
- 4.0 In the case of failure of zonal contractor in particular work order/work orders the loss sustained by the Railway in completing the left over work or supply will be estimated as 10% of the value of the work order. The Railway Administration shall be at liberty to recover the said amount from the security deposit/pending bills without prejudice to any other legal remedies available to the Railway Administration.

## 5.0 VITIATION CLAUSE:

### 5.1 Vitiating during Variation in Contract Quantities

A contract shall be considered "vitiating" only when, the following percentage variation in contract value between tenderers are noticed to have been exceeded.

	Value of Contract	Percentage difference between present Contractor and new L-1 as a result of variation. (percentage shall be calculated with base as the revised contract quantities multiplied by the rates of the present contractor)
1	Small value contracts (Tender Value less than Rs 50 lakh)	10
2	Other than small value contracts (Tender Value equal to or more than Rs. 50 lakh)	5

When the percentage difference between present Contractor and new L-1 is noticed as becoming beyond the values specified above, the following action shall be taken.

The Railway administration should immediately examine whether it is practicable to bring in a new agency to carry out the extra quantity of work keeping in view the progress of the work in accordance with the original contract and the nature and lay-out of the work. If it is found that there will be no serious practical difficulty in meeting the additional quantity of work done by another agency, then fresh tenders for the extra quantity may be invited otherwise negotiating the rate with the existing contractor for arriving at a reasonable rate for the additional quantities of work, may be adopted.

The above shall be regulated as under:

- (a) The case shall be decided by the tender accepting authority (competent for the revised quantity) and shall not be treated as a case of single tender.
- (b) Vitiating should always be computed with respect to the items, rates, quantities and conditions as available at the time of Tender Opening and subsequent changes/additions by way of new items will not be counted for computing Vitiating.
- (c) Railway shall exercise control over the aspect of vitiating of tender with respect to variation in quantities and shall make all efforts that no vitiating takes place in normal circumstances.

## **6.0 BID SECURITY, SECURITY DEPOSIT AND PERFORMANCE GUARANTEE:**

### **6.1 BID SECURITY:**

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

<b>Value of the work ( Tender Value)</b>	<b>Bid Security</b>
For works estimated to cost up to 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.

#### **Note:**

- (i) The Bid Security shall be rounded off to the nearest ₹100. This Bid Security shall be applicable for all modes of tendering.
- (ii) Any firm recognized by Department of Industrial Policy and Promotion (DIPP) as 'Startups' shall be exempted from payment of Bid Security detailed above.
- (iii) Labour Cooperative Societies shall submit only 50% of above Bid Security detailed above.
  - (a) It shall be understood that the tender documents have been issued to the tenderer and the tenderer is permitted to tender in consideration of stipulation on his part, that after submitting his tender he will not resile from his offer or modify the terms and conditions thereof in a manner not acceptable to the Engineer. Should the tenderer fail to observe or comply with the said stipulation, the aforesaid amount shall be liable to be forfeited to the Railway.
  - (b) If his tender is accepted this Bid Security mentioned in sub clause (a) above will be retained as part security for the due and faithful fulfillment of the contract in terms of Clause 16 of the Standard General Conditions of Contract. The Bid Security of other Tenderers shall, save as herein before provided, be returned to them, but the Railway shall not be responsible for any loss or depreciation that may happen thereto while in their possession, nor be liable to pay interest thereon.
- (2) The Bid Security shall be deposited through e-payment gateway or submitted as Bank Guarantee bond from a scheduled commercial bank of India or as mentioned in tender documents. The Bank Guarantee bond shall be as per Annexure-VIA and shall be valid for a period of 90days beyond the bid validity period.
- (3) In case, submission of Bid Security in the form of Bank Guarantee, following shall be ensured:
  - i. A scanned copy of the Bank Guarantee shall be uploaded on e-Procurement Portal (IREPS) while applying to the tender.
  - ii. The original Bank Guarantee should be delivered in person to the official nominated as indicated in the tender document within 5 working days of deadline of submission of bids.
  - iii. Non submission of scanned copy of Bank Guarantee with the bid on e-tendering portal (IREPS) and/or non submission of original Bank Guarantee within the specified period shall lead to summary rejection of bid.



- iv. The Tender Security shall remain valid for a period of 90 days beyond the validity period for the Tender.
- v. The details of the BG, physically submitted should match with the details available in the scanned copy and the data entered during bid submission time, failing which the bid will be rejected
- vi. The Bank Guarantee shall be placed in an envelope, which shall be sealed. The envelope shall clearly bear the identification "Bid for the \*\*\*\*\* Project" and shall clearly indicate the name and address of the Bidder. In addition, the Bid Due Date should be indicated on the right hand top corner of the envelope.
- vii. The envelope shall be addressed to the officer and address as mentioned in the tender document.
- viii. If the envelope is not sealed and marked as instructed above, the Railway assumes no responsibility for the misplacement or premature opening of the contents of the Bid submitted and consequent losses, if any, suffered by the Bidder.

## 6.2 SECURITY DEPOSIT

The Security Deposit shall be 5% of the contract value. The Bid Security submitted by the Contractor with his tender will be retained/encashed by the Railways as part of security for the due and faithful fulfillment of the contract by the Contractor. Provided further that, if Contractor submits the Cash or Term Deposit Receipt issued from a Scheduled commercial bank of India or irrevocable Bank Guarantee Bond from a Scheduled commercial bank of India, either towards the Full Security Depositor the Part Security Deposit equal to or more than Bid Security, the Railway shall return the Bid Security, to the Contractor.

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

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

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

- 6.2.1 Refund of Security Deposit: Security Deposit mentioned in sub clause (1) above shall be returned to the Contractor along with or after, the following:
  - (a) Final Payment of the Contract as per clause 51.(1) and
  - (b) Execution of Final Supplementary Agreement or Certification by Engineer that Railway has No Claim on Contractor and
  - (c) Maintenance Certificate issued, on expiry of the maintenance period as per clause 50.(1), in case applicable.
- 6.2.2 Forfeiture of Security Deposit: Whenever the contract is rescinded as a whole under clause 62 (1) of these conditions, the Security Deposit already with railways under the contract shall be forfeited. However, in case the contract is rescinded in part or parts under clause 62 (1) of these conditions, the Security Deposit shall not be forfeited.
- 6.2.3 No interest shall be payable upon the Bid Security and Security Deposit or amounts payable to the Contractor under the Contract, but Government Securities deposited in terms of Sub-Clause 16.(4)(b) of this clause will be payable with interest accrued thereon.

- 6.2.4 Neither the standing deposit, if any lodged with this Railway nor any other deposit against any other tender will be accepted as bid security to this tender.

**6.3 PERFORMANCE GUARANTEE (P.G): As per IRGCC para 16(4) part-II:**

**The procedure for obtaining Performance Guarantee is outlined below:**

- (a) The successful bidder shall have to submit a Performance Guarantee (PG) within 21 (Twenty one) days from the date of issue of Letter of Acceptance (LOA). Extension of time for submission of PG beyond 21 (Twenty one) days and upto 60 days from the date of issue of LOA may be given by the Authority who is competent to sign the contract agreement. However, a penal interest of 12% per annum shall be charged for the delay beyond 21(Twenty one) days, i.e. from 22nd day after the date of issue of LOA. Further, if the 60th day happens to be a declared holiday in the concerned office of the Railway, submission of PG can be accepted on the next working day. In all other cases, if the Contractor fails to submit the requisite PG even after 60 days from the date of issue of LOA, the contract is liable to be terminated. In case contract is terminated railway shall be entitled to forfeit Bid Security and other dues payable against that contract. In case a tenderer has not submitted Bid Security on the strength of their registration as a Startup recognized by Department of Industrial Policy and Promotion (DIPP) under Ministry of Commerce and Industry, DIPP shall be informed to this effect.

The failed Contractor shall be debarred from participating in re-tender for that work.

- (b) The successful bidder shall submit the Performance Guarantee (PG) in any of the following forms, amounting to 5% of the original 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) Pay Orders and Demand Drafts tendered by any Scheduled Commercial Bank of India.
  - (v) Guarantee Bonds executed or Deposits Receipts tendered by any Scheduled Commercial Bank of India;
  - (vi) Deposit in the Post Office Saving Bank;
  - (vii) Deposit in the National Savings Certificates;
  - (viii) Twelve years National Defence Certificates;
  - (ix) Ten years Defence Deposits;
  - (x) National Defence Bonds and
  - (xi) Unit Trust Certificates at 5% below market value or at the face value whichever is less. Also, FDR in favour of FA&CAO (free from any encumbrance) may be accepted.
- (c) The Performance Guarantee shall be submitted by the successful bidder after the Letter of Acceptance (LOA) has been issued, but before signing of the contract agreement. This P.G. shall be initially valid upto the stipulated date of completion plus 60 days beyond that. In case, the time for completion of work gets extended, the Contractor shall get the validity of P.G. extended to cover such extended time for completion of work plus 60 days.
- (d) The value of PG to be submitted by the Contractor is based on original contract value and shall not change due to subsequent variation(s) in the original contract value.
- (e) The Performance Guarantee (PG) shall be released after physical completion of the work based on 'Completion Certificate' issued by the competent authority stating that the Contractor has completed the work in all respects satisfactorily.
- (f) Whenever the contract is rescinded, the Performance Guarantee already submitted for the contract shall be encashed in addition to forfeiture of Security Deposit available with railway.
- (g) The Engineer shall not make a claim under the Performance Guarantee except for amounts to which the President of India is entitled under the contract (not withstanding and/or without prejudice to any other provisions in the contract agreement) in the event of:
- i. Failure by the Contractor to extend the validity of the Performance Guarantee as described herein above, in which event the Engineer may claim the full amount of the Performance Guarantee.

- ii. Failure by the Contractor to pay President of India any amount due, either as agreed by the Contractor or determined under any of the Clauses/Conditions of the Agreement, within 30 days of the service of notice to this effect by Engineer.
- iii. The Contract being determined or rescinded under clause 62 of IRGCC.

**7.0 INCOME TAX:**

Income tax will be deducted at 2% (two percent) and also surcharge if any at source from each bill unless otherwise authorised by the Income-Tax department.

**8.0 TAXES AND ROYALTY CHARGES:**

- 8.1 This tender falls under the category of Civil Works Contract and is like all other Works contracts which attract provisions of GST under Central Goods and Services Taxes, 2017. All the bidders/ tenderers should ensure that they are GST compliant and their quoted tax structure/ rates are as per GST law.
- 8.2 Under the 'Building and other Construction Workers (RECS) Act, 1996 and the Building and other Construction Works Welfare Cess Act, 1996' the tenderer for carrying out any construction work in Railways in the State of Karnataka / Andhra Pradesh / Tamil Nadu / Goa must get themselves registered from the Registering Officer under Section 7 of the Building and Other Construction Workers Act, 1996 and rules made there to by the State Govt. of Karnataka / Andhra Pradesh / Tamil Nadu/ Goa and submit a certificate of registration issued by the Registering Officer of the State Government (Labour Department). For enactment of the said Act, the Contractor shall be required to pay a cess at 1% of the cost of the construction work which shall be deducted from the running bill of the Contractor for payment to the State Government. Only the cost of the material supplied under specific supply schedule items under the Contract will be outside the purview of this Cess.

**9.0 Rates, GST exemption & Format for bill of Supply:**

- 9.1 The rate quoted by the tenderer should take into account applicable GST and cess on GST (if any) thereof Railway will not pay any such charges levied upon tenderer and tenderer will only be paid at the rate accepted by the Railway administration under the Contract.
- 9.2 GST exemption for Railway equipment and materials moved by Indian Railways for its own consumption across various states.
- 9.3.1 As per Section 31(3) (C) of the CGST Act, 2017, Bill of supply in a prescribed format, as mentioned in Rule no.49 of the Chapter VI of the CGST Rules, 2017 accompanies such consignments and has to be issued by Railways while transferring Goods that are considered as exempted in case the value is more than Rs.200/-. Transfer of Goods / Stores from one State / UT to another State / UT is considered to be an exempted activity as per section 7(1) of the CGST Act, 2017 read with clause 1(b) of Schedule II of the CGST Act, 2017.
- 9.3.2 While transferring Railway Materials from the Depot / Workshop/Shed/Stock holder in one State to another State, it may be ensured that the Bill of Supply accompanies such consignments. A declaration may also be given in the Bill of Supply that:

*"This transfer of Railway Materials [description of material to be indicated] from the Depot/workshop/Shed/Stock holder of --- [Name of the Zonal Railway and the State (Originating Depot), GSTIN] to the Depot/workshop/Shed/Stock holder of ----- [Name of the Zonal Railways and the State (Destination), GSTIN], is without any transfer of title of the said goods, and is treated as supply of service between two distinct persons as defined in section 25(4) of the CGST Act, 2017 (CGST Act, 2017). As per Section 7(1) of the Central Goods and Services Tax Act, 2017 (CGST Act, 2017) read with Clause 1(b) of Schedule II of the CGST Act, 2017, this inter-state supply of service by the Central Government (Ministry of Railways) to Central Government (Ministry of Railways) is exempt from the levy of IGST vide Sl.No.8 of the Notification No. 9/2017 - Integrated Tax (Rate) dated 28.06.2017".*

**9.4 Format for bill of supply:**

- 9.4.1 (a) Name, address and Goods and Services Tax Identification Number of the supplier;

- (b) A consecutive serial number not exceeding sixteen characters, in one or multiple series, containing alphabets or numerals or special characters –hyphen or dash and slash symbolized as “-” and “/” respectively, and any combination thereof, unique for a financial year;
  - (c) Date of its issue;
  - (d) Name, address and Goods and Services Tax Identification Number or Unique Identity Number, if registered, of the recipient;
  - (e) Harmonised System of Nomenclature Code for goods or services;
  - (f) Description of goods or services or both;
  - (g) Value of supply of goods or services or both taking into account discount or abatement, if any; and
  - (h) Signature or digital signature of the supplier or his authorized representative:
- 9.4.2 Provided further that any tax invoice or any other similar document issued under any other Act for the time being in force in respect of any non-taxable supply shall be treated as a bill of supply for the purposes of the Act.
- 9.5 Tenderer should quote his/their rates taking into consideration the above and no claims whatsoever made by the contractor shall be entertained. This clause is an Excepted Matter as per Para 63 of General Conditions of Contract and in case the Contractor resorts to claims and demands arbitration, the same shall be excluded from arbitration at all stages.
- 9.6 (a) Tenderers may specifically note the modification to para (a) of Clause 6, Part I of Indian Railway standard GCC, the extract of which is available at Clause 8 (a) (b) (c) & (d) in Regulations and Instructions to Tenderers.
- (b) Tenderers may specifically note the modification to para (a) of Clause 46.A of Part-II of Indian Railway standard GCC, the extract of which is available at Clause 21.7 & 21.9 of Special Conditions of Contract.
- (c) Tenderers may specifically take note of instructions regarding payments of contractual bills, the extract of which is available at Clause 26 of Special Condition of Contract.

#### **10.0RECOVERY OF ROYALTY CHARGES:-**

- 10.1 Royalty charges/seigniorage on supply of Contractor’s own earth, ballast, moorum, and blanketing as fixed by the respective State Government (Karnataka, Andhra Pradesh, Tamil Nadu, Kerala, Maharashtra as the case may be ) as prevailing on the date of opening of tender as per extant notification of respective State government will be recovered by the Railway from the contractors through on account and final bills and will be remitted to the State Government. The rates quoted by the tenderer shall be inclusive of these charges.
- 10.2 Increase in Royalty charges during currency of contract:
- (a) When Royalty charges are recovered from contractors CC/Final bills and remitted to Mining department (of the concerned State Government) by Railway: The increased amount will be recovered by the Railway from the contractors “on account” and “final bills” and remitted to the State Government on receipt of the State Government orders to that effect. However, the Railway shall reimburse the additional liability to the contractor, provided that the work executed falls in the original completion period of the work or in the extended period granted on administrative grounds i.e., 17-A(i),(ii) or (iii) of GCC.  
As such, claims regarding reimbursement due to increase in seigniorage charges shall not be payable for work executed in the extended period granted on contractor’s account under clause 17(B) of GCC.
  - (b) When royalty is paid directly by the contractor to Mining department: In such cases, the increase in royalty charges over and above that prevailing on the date of tender opening, shall be

reimbursed to the contractor on production of documentary proof of payment of royalty at such increased rate. However, no reimbursement shall be made for such cases where time extension has been granted under clause 17(B) of GCC on contractor's account.

### 10.3 Decrease in Royalty charges during currency of the contract:

- (a) When Royalty is recovered from contractors CC/Final bills and remitted to Mining department (of the concerned State Government) by Railways: The recovery of Royalty charges from the contracts "on account" and "final bills" will be made as per the rate prevailing as on the date of Tender Opening but not at the reduced rate. However, remittance of royalty to the Mining Department shall be made as per the reduced rate and the benefit of reduction in rates shall be passed on Railways.
- (b) When Royalty is being paid directly by the contractor to Mining department: The difference in the rate of royalty will be recovered from the contractors CC/Final bills and shall be retained by the Railways.

### 11.0 CONSERVANCY CHARGES:

Necessary conservancy charge will be deducted from the running bills of successful tenderers as detailed below

Description	Average No. of Labours or Workman employed per day	Conservancy cess charges to be recovered per month
Railway contractor		
a. Engg. Works contractors (Engg, Elect, Mech, Signal etc.)	1 to 5	Rs.145/-
	5 to 10	Rs.285/-
b. Genl. Goods handling contractor including contractor awarded by stores dept.	11 to 25	Rs.717/-
	26 to 50	Rs.1044/-
	51 to 100	Rs.1402/-
c. Coal handling ash pit cleaning contractor	101 to 200	Rs.1760/-
	201 to 300	Rs.2118/-
d. Railway siding used by the contractor	301 to 750	Rs.2445/-
	751 to 1500	Rs.4918/-
e. Contractor supplying water to engines	1501 to 3000	Rs.9839/-
	3000 and above	Rs.19,653/-

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

- a. The removal from the site, within the time specified in the order, of any materials which in his opinion are not in accordance with the specifications or drawings.
- b. The substitution of proper and suitable materials, and
- c. the removal and proper re-execution, notwithstanding any previous tests thereof or on account payments therefor, of any work which in respect of materials or workmanship is not in his opinion in accordance with the specifications and in case of default on the part of the Contractor in carrying out such order, the Railway shall be entitled to rescind the contract under Clause 62 of these conditions.
- d. The provision of Construction and Demolition Waste Management Rule 2016 issued by Ministry of Environment Forest and Climate Change dated 29.03.2016 and published in the Gazette of India, Part - II, Section -3, Sub-section (ii) are binding upon the Contractor. Contractor shall implement these provisions at worksites, for which no extra payment will be payable.

**13.1 Final Payment:** On the Engineer's certificate of completion in respect of the works, adjustment shall be made and the balance of account based on the Engineer or the Engineer's representative's certified measurements or Engineer's certified "contractor's authorized engineer's measurements" of the total quantity of work executed by the Contractor upto the date of completion and on the rates accepted in Bills(s) of Quantities and for extra works on rates determined under Clause 39 of these Conditions shall be paid to the Contractor subject always to any deduction which may be made under these presents and further subject to the Contractor having signed delivered to the Engineer enclosing either a full account in detail of all claims he may have on the Railway in respect of the works or having delivered No Claim Certificate and the Engineer having after the

receipt of such account given a certificate in writing that such claims are not covered under excepted matter i.e. Clauses 7(j), 8, 18, 22(5), 39.1, 39.2, 40A, 43(2), 45(i)(a), 55, 55-A(5), 57, 57A, 61(1), 61(2) and 62(1), 63(iv), and 63.2.11 of Standard General Conditions of Contract or in any Clause (stated as excepted matter) of the Special Conditions of the Contract, that the whole of the works to be done under the provisions of the Contracts have been completed, that they have been inspected by him since their completion and found to be in good and substantial order, that all properties, works and things, removed, disturbed or injured in consequence of the works have been properly replaced and made good and all expenses and demands incurred by or made upon the Railway for or in the respect of damage or loss by from or in consequence of the works, have been satisfied agreeably and in conformity with the contract.

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

**14.0 Production of Vouchers etc. by the Contractor:**

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

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

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

**15.1 Lien in Respect of Claims in other Contracts:**

- i Any sum of money due and payable to the Contractor (including the Security Deposit returnable to him) under the contract may be withheld or retained by way of lien by the Railway, against any claim of this or any other Railway or any other Department of the Central Government in respect of payment of a sum of money arising out of or under any other contract made by the Contractor with this or any other Department of the Central Government.
  - ii However, recovery of claims of Railway in regard to terminated contracts may be made from the Final Bill, Security Deposits and Performance Guarantees of other contract or contracts, executed by the Contractor. The Performance Guarantees submitted by the Contractor against other contracts, if required, may be withheld and encashed. In addition, 10% of each subsequent 'on-account bill' may be withheld, if required, for recovery of Railway's dues against the terminated contract.
  - iii It is an agreed term of the contract that the sum of money so withheld or retained under this Clause by the Railway will be kept withheld or retained as such by the Railway till the claim arising out of or under any other contract is either mutually settled or determined by arbitration, if the other contract is governed by Arbitration Clause or by the competent court as the case may be and Contractor shall have no claim for interest or damages whatsoever on this account or on any other ground in respect of any sum of money withheld or retained under this Clause and duly notified as such to the Contractor.
1. **Signature on Receipts for Amounts:** Every receipt for money which may become payable or for any security which may become transferable to the Contractors under these presents, shall, if signed in the partnership name by anyone of the partners of a Contractor's firm be a good and sufficient discharge to the Railway in respect of the moneys or security purported to be acknowledged thereby and in the event of death of any of the Contractor, partners during the pendency of the contract, it is hereby expressly agreed that every receipt by anyone of the surviving Contractor partners shall if so signed as aforesaid be good and sufficient discharge as aforesaid provided that nothing in this Clause contained shall be deemed to prejudice or effect any claim which the Railway may hereafter have against the legal representative of any Contractor partner so dying for or in respect to any breach of any of the conditions of the contract, provided also that nothing in this clause contained shall be deemed to prejudice or effect the respective rights or obligations of the Contractor partners and of the legal representatives of any deceased Contractor partners interse.

## 17.0 Minimum Wages Act

- 17.1 **(Clause 54 of GCC) Minimum Wages To Labour :** The Contractor shall be responsible to ensure compliance with the provision of the Minimum Wages Act, 1948 (hereinafter referred to as the "said Act" and the Rules made there under in respect of any employees directly or through petty contractors or sub-contractors employed by him on road construction or in building operations or in stone breaking or stone crushing for the purpose of carrying out this contract.

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

If any moneys shall, as a result of any claim or application made under the said Act be directed to be paid by the Railway, such money shall be deemed to be moneys payable to the Railway by the Contractor and on failure by the Contractor to repay the Railway any moneys paid by it as aforesaid within seven days after the same shall have been demanded, the Railways shall be entitled to recover the same from any moneys due or accruing to the contractor under this or any other Contract with the Railways.

The Contractor will submit in writing for all CC bills that, wages to labour for subject contract has been paid by him in accordance with Minimum wages Act, 1948 (amended time to time). In case of any issues arises out of this, he will be legally answerable on behalf of Railway.

- 17.2 **(Clause 55 of GCC) Provisions Of Payments Of Wages Act :** The Contractor shall comply with the provisions of the Payment of Wages Act, 1936 and the rules made there under in respect of all employees employed by him either directly or through petty contractors or sub-contractors in the works. If in compliance with the terms of the contract, the Contractor directly or through petty contractors or sub-contractors shall supply any labour to be used wholly or partly under the direct orders and control of the Engineer whether in connection with the works to be executed hereunder or otherwise for the purpose of the Engineer, such labour shall never the less be deemed to comprise persons employed by the contractor and any moneys which may be ordered to be paid by the Engineer shall be deemed to be moneys payable by the Engineer on behalf of the Contractor and the Engineer may on failure of the Contractor to repay such money to the Railways deduct the same from any moneys due to the Contractor in terms of the contract. The Railway shall be entitled to

deduct from any moneys due to the contractor (whether under this contract or any other contract) all moneys paid or payable by the Railway by way of compensation of aforesaid or for costs of expenses in connection with any claim thereto and the decision of the Engineer upon any question arising out of the effect or force of this Clause shall be final and binding upon the Contractor.

**17.3 (Clause 55 A of GCC). Provisions Of Contract Labour (Regulation And Abolition) Act, 1970 :**

**17.4 (Clause 55 A(1) of GCC)** The Contractor shall comply with the provision of the contract labour (Regulation and Abolition) Act, 1970 and the Contract labour (Regulation and Abolition) Central Rules 1971 as modified from time to time, wherever applicable and shall also indemnify the Railway from and against any claims under the aforesaid Act and the Rules.

**17.5 (Clause 55-A(2) of GCC)** The Contractor shall obtain a valid license under the aforesaid Act as modified from time to time before the commencement of the work and continue to have a valid license until the completion of the work. Any failure to fulfil the requirement shall attract the penal provision of the Contract arising out of the resultant non-execution of the work.

**17.6 (Clause 55-A(3) of GCC)** The Contractor shall pay to the labour employed by him directly or through subcontractors the wages as per provision of the aforesaid Act and the Rules wherever applicable. The Contractor shall notwithstanding the provisions of the contract to the contrary, cause to be paid the wages to labour indirectly engaged on the works including any engaged by sub-contractors in connection with the said work, as if the labour had been immediately employed by him.

**17.7 (Clause 55-A(4) of GCC)** In respect of all labour directly or indirectly employed in the work for performance of the contractor's part of the contract, the Contractor shall comply with or cause to be complied with the provisions of the aforesaid Act and Rules wherever applicable.

**17.8 (Clause 55-A(5) of GCC)** In every case in which, by virtue of the provisions of the aforesaid Act or the Rules, the Railway is obliged to pay any amount of wages to a workman employed by the Contractor or his sub-contractor in execution of the work or to incur any expenditure on account of the Contingent, liability of the Railway due to the contractor's failure to fulfil his statutory obligations under the aforesaid Act or the rules, the Railway will recover from the Contractor, the amount of wages so paid or the amount of expenditure so incurred and without prejudice to the rights of the Railway under the Section 20, Sub-Section (2) and Section 2, Sub-Section (4) of the aforesaid Act, the Railway shall be at liberty to recover such amount or part thereof by deducting it from the Security Deposit and/or from any sum due by the Railway to the contractor whether under the contract or otherwise. The Railway shall not be bound to contest any claim made against it under Sub-Section (1) of Section 20 and Sub-Section (4) of Section 21 of the aforesaid Act except on the written request of the Contractor and upon his giving to the Railway full security for all costs for which the Railway might become liable in contesting such claim. The decision of the Railway regarding the amount actually recoverable from the contractor as stated above shall be final and binding on the Contractor.

**17.9 (Clause 55-B of GCC) Provisions of Employees Provident Fund and Miscellaneous Provisions Act, 1952:**

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

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

- a) Contractor shall apply for onetime registration of his company/firm etc. in the Shramikkalyan portal with requisite details subsequent to issue of Letter of Acceptance. Engineer shall approve the contractor's registration in the portal within 7 days of receipt of such request.
- b) Contractor once approved by any Engineer, can create password with login ID (PAN No.) for subsequent use of portal for all Letter of Acceptances (LoAs) issued in his favour.
- c) The contractor once registered on the portal, shall provide details of his Letter of Acceptances (LoAs) / Contract Agreements on shramikkalyan portal within 15 days of issue of any LoA for approval of



concerned Engineer. Engineer shall update (if required) and approve the details of LoA filled by contractor within 7 days of receipt of such request.

- d) After approval of LoA by Engineer, contractor shall fill the salient details of contract labours engaged in the contract and ensure updating of each wage payment to them on shramikkalyan portal on monthly basis.
- e) It shall be mandatory upon the contractor to ensure correct and prompt uploading of all salient details of engaged contractual labour & payments made thereof after each wage period.
- (ii) While processing payment of any 'On Account Bill' or 'Final Bill' or release of 'Advances' or 'Performance Guarantee / Security deposit', contractor shall submit a certificate to the Engineer or Engineer's representatives that "I have uploaded the correct details of contract labours engaged in connection with this contract and payments made to them during the wage period in Railway's Shramikkalyan portal at 'www.shramikkalyan.indianrailways.gov.in' till \_\_\_\_Month, \_\_\_\_Year."

**17.11 (Clause 55-D of GCC) Provisions of "The Building and Other Construction Workers (Regulation of Employment and Conditions of Service) Act, 1996" and "The Building and Other Construction Workers' Welfare Cess Act, 1996":**

The tenderers, for carrying out any construction work, must get themselves registered with the Registering Officer under Section-7 of the Building and Other Construction Workers Act, 1996 and Rules made thereto by the concerned State Govt. and submit Certificate of Registration, issued by Registering Officer of the concerned State Govt. (Labour Dept.). As per this Act, the tenderer shall be levied a cess @1% of cost of construction work, which would be deducted from each bill. Cost of material, when supplied under a separate schedule item, shall be outside the purview of cess.

**18.0 INSPECTION AND MAINTENANCE OF SITE:**

- 18.1 The Contractor before tendering shall inspect the site of work, examine the nature of soil to be excavated, nature of work to be executed, check up the availability of working space and other constraints if any and also acquaint himself of the available access to the site of work and make due provision in the rate for all such contingencies.
- 18.2 The contractor shall make his own arrangement for site clearance, clearance of debris, jungle, bushes etc., without any extra payment. If any heavier materials like Railways sleepers etc., are to be shifted from the site of work, the same should be carried out by the contractor for which separate payment will be made under relevant items of SSOR which is applicable. Contractor is also responsible to clear all construction debris, labour camps, and surplus materials from site of work without any extra payment as and when these are not required for the progress of the work.

**19.0 SERVICE ROADS:**

The Railway does not undertake to provide any service roads for the movement of the contractor's vehicles. The contractor can however make use of the service roads, where they exist free of charge. However, the railway shall not undertake to maintain them and the contractor shall maintain them at his own cost. In other places, the contractor should make his own arrangements for the movement of the vehicles and no extra rate shall be paid for this. The Railway reserves the right to make use of the roads formed and maintained by the contractor, as and when necessary, without any payment to the contractor. In the event of the contractor forming the service roads where Railway land is not available or cannot be given by the Railway for this purpose, it shall be clearly noted that the contractor shall make his own arrangements for obtaining the required land and the Railway shall not take any responsibility in this respect and shall not compensate the contractor in any way.

**20.0 WATER AND ELECTRICITY FOR WORKS:**

- 20.1 Water: The Contractor shall make his own arrangements within his quoted rates for necessary water required for the performance of the contract.
- 20.2 (i) Electricity: The Contractor shall make his own arrangements at his cost, for the supply of electricity for the works. He shall arrange for source, transformer protection and approval from the concerned authorities at his cost. If however Railway's electricity is available in the vicinity and if the Contractor requests the same to be provided due to compelling circumstances, the Railways at its sole discretion may agree to provide the same as per extant policy and guide lines and rates of the Electrical department of the Railways and the Contractors shall not have any claim whatsoever in this regard.
- 20.2 (ii) The Railway may supply to the Contractor in part or whole of the electric power wherever available and possible, required for execution of works from the Railway's existing electric supply systems at or near the site of works on specified terms and conditions and such charges as shall be determined by the Railway. The charges and advance payments as required by the Railways shall be paid by the contractor to avail of the

facility. The cost of arranging necessary connections to the Railways Electric Supply systems, and laying of underground/overhead conductor, circuit protection, electric power meters, transmission structure, shall be borne by the Contractor and that the Contractor shall not be entitled to any compensation for interruption or failure of the Electric supply system. Railways do not guarantee supply of electricity to any of the Contractor's works/requirement.

**21.0 PROGRAMME OF WORK:**

- 21.1 A tentative programme chart and / or a list of mile stones prepared by Railways for the contract to be achieved based on the Railway's needs will be attached along with Acceptance Letter. The contractor shall accept and return a copy of the programme chart to Railways within fifteen days of issue of LOA. The contractor may modify the programme to suit his resources, however, without any change in milestones and submit a modified programme to the Railways duly signed by him within fifteen days of issue of LOA. This is however subject to a condition that such shifting or change shall not affect the completion period of the contract in any manner whatsoever. The modified programme of the contractor shall not be conditional and will not affect the terms and conditions of the contract and if made conditional by the contractor, Railway reserves the right to reject the same and to treat such conditions as breach of contract as agreed to in the contractor's offer and in the LOA issued by the Railways. Railway reserves the right to accept or not the modified programme of the contractor. Contractor shall not have any claim whatsoever in this regard. Further programmes, as per the latest progress of work, will be prepared on similar basis from time to time.
- 21.2 If the confirmation of acceptance of programme as above is not received within fifteen days of issue of LOA, the contractor is liable to pay towards penalty up to Rs.50,000/- for delay in submission of the programme.
- 21.3 Non-acceptance of Railway Programme or submission of Modified Programme by the contractor which is not acceptable to the Railways, shall also tantamount to breach of contract by the contractor and the Railway shall be entitled to terminate the contract on account of the contractor's default under clause 62 of the General Conditions of Contract, for this lapse alone.
- 21.4 The Railway reserves the right of determining the contract at any stage of review of the progress referred above, if the above agreed programme(s) are not adhered to within the margin of 10% of the provision in the programme in terms of shifting of individual milestones or the quantum of progress at any stage, as envisaged in Clause 62(1)(viii) of the General Conditions of Contract and the Performance Guarantee & Security Deposit will be forfeited without prejudice to other remedies as contemplated under the Conditions of the Contract.

**22.0 INCENTIVE BONUS PAYMENT FOR EARLY COMPLETION OF WORK:** (For cases pertaining to doubling/traffic facility/throughput enhancement work or any other specified work)

- 22.1 In open tenders having advertised value more than Rs.50 crore and original period of completion 12 months or more, when there is no reduction in original scope of work by more than 10%, and no extension granted on either railway or Contractor's account, Contractor shall be entitled for a bonus of 1% for each 30 days early completion of work. The period of less than 30 days shall be ignored while working out bonus. The maximum bonus shall be limited to 5% of original contract value. The completion date shall be reckoned as the date of issuance of completion certificate by Engineer.
- 22.2 This incentive scheme shall not apply if any extension is granted beyond the original completion period or any revised completion period whichever is less, irrespective of any reasons whatsoever including FORCE MAJEURE conditions (i.e. irrespective of extension being given under Clause 17 or 17A(i) or 17A(ii) or 17A(iii) or 17B).
- 22.3 No relaxation with regard to 'holidays', 'no work days' or 'non availability of line blocks' or non-availability of materials to be supplied either by railway or by the contractor, loss of time due to FORCE MAJEURE situations of any nature will be allowed for this purpose. Date of completion shall be reckoned as per the satisfactory date of completion of the work as certified by the Divisional Railway Manager (Works)\_\_\_\_\_ Division, who shall decide the same based on the inspection notes of the Commissioner of

Railway Safety authorizing opening of the section or joint inspection notes between Open Line and Construction departments or based on his own personnel assessment duly recorded.

- 22.4 The decision of the Divisional Railway Manager (Works)\_\_\_\_\_ Division shall be final and binding on the contractor. No representation from the contractor in regard to early completion of work shall be entertained from the contractor.

### **23.0 IMPOSITION OF FINE, PENALTY AND COST OF DAMAGES FOR DELAY OF WORKS:**

- 23.1 In the event of the contractor not adhering to the agreed programme of work and / or not achieving the milestones or quality of work etc., specified, even if no physical or actual damages have occurred to the Railways and even if the currency of the work is not affected, the Railway reserves the rights of, with a view to improve, expedite and the make the contractor realise the effects of delays, levying fine or any value as deemed fit on the contractor by the Engineer – in – charge based on the merit of the case. The amount of fine will be solely decided by the Engineer – in – Charge at his discretion and will be based on his assessment of disturbances, difficulties or losses caused by the delay or poor quality of work, etc., including that of the reputation of the Railway. The contractor shall have no claims what-so-ever in this regard. Subsequent to the imposition of the fine, if contractor makes good, the progress / quality and achieves the milestones to the satisfaction of the Railways, part or full amount of the fine imposed may be waived and the amount so worked out will be released to the contractor at the sole discretion of the Engineer –in – charge duly recording necessary certification to the effect that no damages have occurred. However, in case of actual or anticipated damages occurred or occurring to the Railways, the recovery of agreed / liquidated damages will also be imposed and recovered from contractors due as per provisions in GCC in addition to the above fine.

### **23.2 IMPOSITION OF PENALTY IN CONTRACTS:**

**Penalty in contracts with incentive Bonus payment clause:** in case of non-completion of all works to the satisfaction of the Engineer-in-charge, a penalty of 1% of the value of balance works left to be completed as per contract per week of delay shall be imposed. This penalty will be applicable in all cases where currency extension is granted under clauses other than 17, 17A(i) or 17 A(iii) of GCC and / or whether any damages have occurred or likely to occur or not and the contractor shall have no claims in this regard.

#### **Notes:-**

- 1) The maximum fine or penalty liable to be imposed under the clauses under para 13.0 is limited to a maximum of 20% of the value of balance works left to be completed as per contract. However, on account of the extension granted, in case of actual or anticipated damages occurring to the Railway, the recovery of agreed/liquidated damages will also be imposed and recovered from contractors due in addition to the penalty as per provisions in GCC.
- 2) No relaxation with regard to 'holidays', 'no work days' or ' non availability of line blocks' will be allowed for the non-completion of the work as envisaged in the contract completion period. However, loss of time due to FORCE MAJEURE situations will be allowed for this purpose.
- 3) The date of completion shall be reckoned as per the satisfactory date of completion of the work as certified by the Engineer-in-charge.
- 4) The decision of the Engineer-in-charge shall be final and binding on the contractor. No representation from the contractor in regard to delayed completion of work shall be entertained.

### **24.0 SETTING OUT WORKS:**

The contractor shall be responsible for the correct setting out of all works in relation to original points, lines and levels of reference at his cost. The Contractor shall execute the work true to alignment, grade, levels and dimensions as shown in the drawing and as directed by the Engineer's representative and shall check these at frequent intervals. The contractor shall provide all facilities like labour and instruments and shall co-operate with the Engineer's representative to check all alignments, grades, levels and dimensions. If, at any

time, during progress of the works any error shall appear or arise in any part of the work, the contractor, on being required to do so by the Engineer's representative. Such checking shall not absolve the Contractor of his own responsibility of maintaining accuracy in the work. The contractor shall carefully protect and preserve all benchmarks, sight rails, pegs and other things used in setting out the work.

## **25.0 ENGAGEMENT OF TECHNICAL STAFF BY THE CONTRACTOR**

25.1 The contractor shall employ proper managerial and technical personnel during the execution of this work and the personnel deployed shall have adequate experience and thorough knowledge of the works executed including the specifications and proceedings involved. The list of managerial and technical personnel proposed to be engaged by the contractor shall be submitted to the Sr.DEN/DEN in charge of the project along with the programme chart and approval of Engineer to be obtained for engaging them for work.

25.2 Scale of personnel: Minimum scale of personnel to be engaged by the Contractor shall be as under:-

- 1) One Graduate Engineer and at least one diploma holder Engineer when the cost of work is more than Rs.5.00 crore.
- 2) One Graduate Engineer when the cost of work to be executed is between Rs.1.00 crore and up to 5.00 crore.
- 3) One qualified Diploma holder Engineer, when cost of the work to be executed is more than Rs.30.00 lakhs but less than Rs.100 lakhs.
- 4) Even if the value of agreement changes due to variations or even if the currency of contract is changed, the scale of personnel will remain same as per the original agreement value.

25.3 The contractor shall provide the technical personnel continuously on the project and the initially approved personnel should not be changed in the mid-course of the contract, except in exceptional situations and only with the approval of the Sr.DEN/DEN in-charge of the project. Continuous engagement of technical personnel is defined as under:

- 1) Record of engagement of technical personnel shall be maintained by the contractor at each site where his Engineers are deployed. This record will be verified by the Sr.DEN/DEN in-charge of the project or any other Railway representative. In case of non-availability on any single occasion at site, it will be treated as absence for a week.
- 2) Technical staff should be available at site whenever required by the Engineer-in-charge or his authorised representative to take instructions. In case, the contractor fails to employ the Technical staff as aforesaid, he shall be liable to pay Rs.30,000/- (Rupees Thirty thousand only) for each month of default or part thereof in case of each Graduate Engineer and Rs.20,000/- (Rupees Twenty thousand only) for each month of default or part thereof in case of each qualified diploma holder.
- 3) The contractor shall submit the copy of bio-data and Degree / Diploma certificate of the above technical staff employed by him for the scrutiny by Railway and for the record. Railway reserve the right to scrutinise the records of the contractor to ascertain as to whether the qualified staff has been actually employed by him and is paid for.
- 4) While passing each "on" account bill, the AEN/XEN in-charge will certify the availability of technical staff as above, otherwise the recovery as above shall be made from every bill.
- 5) The decision of the Engineer-in-charge, whether the required Technical staff was not employed by the contractor shall be final and binding upon the contractor.

- 25.4 The above provision shall be applicable for all type of works except supply of ballast, transportation of materials, track works, welding works, designing & drafting and consultancy works where separate provision as indicated in the special conditions for the said item will apply.
- 25.5 For carrying out supplying of ballast/transportation of materials/track works, sufficient number of trained Mates / Mistries / Supervisors shall be deployed to supervise stacking of ballast/loading, unloading of material/Track linking & maintenance works etc. No work shall be carried out without availability of well experienced Mates/Mistries/Supervisors. For track works, in addition to adequate number of Mates/Mistries/Supervisors, a well experienced Engineer (Diploma/Degree holder in Engineering) shall also be engaged for each ten kilometres of work in the contract or work of any yard or re-grading under traffic conditions. Non engagement of technical staff as aforesaid will lead to rejection of work and/or penalty of Rs.10000/- on the first occasion and Rs.25000/- for every subsequent defaults at the discretion of the Engineer-in-charge.
- 25.6 For carrying out welding works by any method such as SKV, Mobile Flash-butt etc., RDSO approved (or any other agency authorized by RDSO) welders and supervisors only shall be engaged by the contractor. The number of welders and Supervisors shall be sufficient so that no weld is made without personal supervision of a welder and at least one supervisor shall be available for doing every 50 welds in a day. Non engagement of technical staff as aforesaid will lead to rejection of welds and/or penalty of Rs.10000/- on the first occasion and Rs.25000/- for every subsequent defaults.

## **26.0 PRECAUTIONS AT WORK SITE:**

- 26.1 1)** All precautions to ensure safety of workmen must be taken while unloading and leading the materials during execution of work. Traffic rules should be strictly followed and the contractor should indemnify the Railway against any claim due to accidents and unforeseen incidents.
- 2)The contractor must ensure the safety of labourers engaged by him while crossing the track during the course of execution of work and the Railway will not be responsible for any injury sustained by the labourer or for any fatal accident. The contractor should bear all the loss and expenditure involved. Wherever necessary he should also provide necessary look out men.
- 3)The work should be carried out without any interference to the normal working of the Railway track and structures. The contractor will be held responsible for any loss or damage or injury caused during the course of work to the labourer or to the public/private person or to the Railway/ Public/private property and the contractor should bear all the loss and expenditure involved.
- 4) Wherever work is to be executed close to any running railway lines or roads or buildings or public passage, the Contractor shall ensure proper protection of public, railway/public property. He shall also ensure all special precautions as provided in this tender.
- 5)The contractor shall be responsible for anti-larval work at his cost during progress of works as may be prescribed by the Engineer on the advice of the Railway or any Government Medical authority and where use of insecticides are involved, it shall be done in accordance with the provisions of the act and rules in this behalf at the cost of contractor, who shall also be solely responsible for any acts or omissions under the provision of the aforesaid rules.
- 6) The Contractor shall ensure that necessary sanitary facilities are provided by the Contractor for their labour in terms of Clause 59(4) of the General Conditions of Contract, and where they fail to do so notice shall be given to the Contractor that the same will be provided by the Railway at their cost and recovery shall be made from their bills.

7)Where contractor avails existing sanitary arrangements of the Railways charges as decided by Railway from time to time is recoverable from the contractor.

26.2 The contractor shall arrange to obtain permission direct from the State Government or local authorities concerned for using Forest, PWD or Panchayat roads. The rates tendered shall be inclusive of any cess, tax or any other charges payable to the authorities concerned.

26.3 The contractor shall make his own arrangements for obtaining the license for any explosives, as may be necessary, for procurement, transportation, storage and use of the same. All possible assistance will be given by the Railway, should there be any difficulties in obtaining the license etc. However, any failure shall not form the basis for any claim by the contractor against the Railway or for additional payment for the work.

26.4 In case of use of explosives for blasting the contractor shall strictly abide by the Indian Explosive Act, the Rules and Regulations framed there under in carrying out the work, shall observe all the provisions of the Indian Mine Act and the metaliferous mines regulations and rules there under as well as any other Act and Rules, as may be enacted and laid down by the State and Central Government from time to time, for such work.

26.5 The contractor will be held responsible for any loss/damage/injury caused during explosion to the labourers or to the public/private persons or to Railway/Public/Private property and the contractor should bear all the loss/expenditure thereby involved.

#### **27.0OPTIC FIBRE CABLE MAINTENANCE:**

27.1 During the course of execution of work if any underground/overhead or any other cable/OFC are damaged by the contractor or his labour etc., purely due to the default of the contractor, the cost of damage, as decided by the Railway Administration will be borne by the contractor.

27.2 The contractor shall take special precaution while carrying out works at location where there is likelihood of any underground cables/OFC etc., and the work shall not be carried out without the presence of an authorised Railway Supervisor/staff deputed to supervise the work.

27.3 Before taking up any digging work, it is the responsibility of the contractor to get cable layout plan from Engineer-in-charge of the work and arrange to demarcate the same at the site.

#### **27.0CONTRACTOR'S VEHICLES, PLANT & MACHINERY ETC.:**

27.1Necessary permit/interstate permits for the movements of vehicles/Plant & machinery shall be arranged by the contractor.

27.2 Breakdown to transport vehicles, machinery etc., if any, will be on the contractor's account.

27.3 Accidents, if any, to his vehicles, Plant and Machinery or to persons would be the responsibility of the contractor and the Railway will not be responsible for the damage or compensation thereof.

#### **28.0 USE OF CONTRACTORS VEHICLES, PLANT & MACHINERY ETC., FOR ACCIDENT RESTORATION WORKS:**

28.1 The vehicle and equipment of contractors are liable to be drafted by Railway Administration in case of accidents / natural calamities involving human lives for speedy restoration work.

28.2 For payment purpose, this item will be operated as a Non-Schedule (NS) item, duly negotiating rates as per the conditions of contract.

28.3 Contractor/Tenderer shall furnish the details of vehicles /equipments available with them to keep a record of the same.

**29.0 Payment(s) of Advances** (Applicable for Advertised tender of value more than Rs.25.00 crore): As per para 46(4) of IRGCC part-II: are applicable in the contract, as mentioned in the Tender Documents, Railway shall make payment(s) of Interest bearing advances, on the request of contractor. The payment and recovery of such Advances shall be made as under:

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

Stage 1- 5% of Contract Value on signing of the contract agreement and

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

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

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

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

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

29.3 For further conditions to be referred in para 46 (4) part-II of IRGCC.

### **30.0 SETTLEMENT OF DISPUTES - INDIAN RAILWAY ARBITRATION RULES:**

Settlement of Disputes in connection with the contract shall be governed in terms of Para 63 and 64 of IRSGCC (Part – II) 2022 as amended from time to time through correction slips / modifications issued to IRSGCC by Railway Board posted in the official website indianrailway.gov.in under Civil Engineering Directorate which shall be binding in the contract.

### **31.0 SAFETY PRECAUTIONS AND MEASURES TO BE OBSERVED DURING EXECUTION OF ENGINEERING WORKS**

31.1 The contractor shall be fully responsible for ensuring safety at all times and shall bear the cost of all damages in cases of accidents/unusual occurrences resulting in damages to Railway property and passengers. Any breach of the safety conditions for precautions and measures as specified hereunder and/or elsewhere in the tender document by the contractor and/or his agents/representatives affecting the safety of movement of trains, engines, or other rolling stock of the Railway, shall constitute a breach of contract by the contractor leading to termination of contract for default on the part of the contractor including recovery of damages

- 31.2 The works required to be done under traffic block shall be carried out only in the presence of Railway officials. The Railway supervisor shall certify safe conditions for passage of trains before resumption of traffic. The works to be done under traffic Block shall be carried out under the provision of banner flag and protection of engineering flagman
- 31.3 Safe practices at all times and non infringement to moving trains shall be ensured. Road vehicles, material trolleys, dollys etc., which may have tendency to roll off towards the running lines shall be Checked by providing chains, locking arrangements, blocks etc. Site in-charge of the contractor shall be primarily responsible
- 31.4 All equipments like cranes, lifting jack etc., shall be tested, duly calibrated and certified prior to use at construction site. They shall also have specific indications conforming that the operators handling them are trained in the safety precautions near track
- 31.5 Construction workers at site shall be provided with personal safety gear like reflective vest, helmet, leather shoes, gloves, eye-wear etc., as approved as per construction industry standards. For persons working at pier top/girder level, temporary supports, hand railing etc., protection with help of ropes, slings and temporary railings shall be provided.
- 31.6 All locations, where construction activity is in progress adjacent to existing railway lines, should be cordoned off with proper barricades. Barricades consisting of bamboo/signalling poles and supported horizontally by similar bamboo/signalling poles should be provided. These barricades should be provided at a distance of approximately 3.5m from the centre line of track or as directed by the Engineer-in-charge. All the barricades are to be painted or struck on with red luminous paint/strips at suitable intervals on the barricades. Barricade should be available at every stage of work as directed by the Engineer-in-charge and shall be maintained in perfect condition all the time.
- 31.7 Road vehicles employed by the contractor should have the certificate for its road worthiness and each vehicle numbered and the license particulars maintained. Contractors should ensure that the drivers permitted by them to work on such road vehicles are identified, counselled, certified and are provided with photo Identity cards. Wherever the work requires the movement of road vehicle within a distance of 3.5 to 6m from the centre line of the nearest track, such work shall be done only in the presence of Railway's representative. The driver of the vehicle shall always face the track when reversing the vehicle and whenever he cannot face the track, for whatever reason, he shall be invariably assisted by a helper with a whistle who should guide him and ensure safety.
- 31.8 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 the contractor's agent in charge of the vehicle while driving or at rest. The person in charge of the vehicles and the attendants shall, at all times, be vigilant and on the lookout for signals from the lookout men, flagmen or other personnel available at site with a view to stop or regulate the 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 Railways Act and to seek and be guided by the signals and other directions of any lookout 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 look out men also at his own cost, irrespective of any other arrangement that railway may make in this regard
- 31.9 All work sites shall be supervised by the contractor's representative and also a representative of the Railway Organisation. Whenever work of plying road vehicle within 6m zone is actually in progress, Look-out



men should invariably be available. Lookout men will have to be provided by the contractor, from out of the list of persons who are authorised to carry out these duties. Authorisation will be issued to the individuals, by the representative of the Engineer-in-charge. Railway's supervisor will monitor the availability and alertness of the lookout men. In case of non-availability of lookout men, this Railway's supervisor shall stop further activities of plying of road vehicles. Even if no work is executed in the night, look-out men shall patrol the beat as identified by the representative of the construction organisation to ensure the safety of the running trains, especially from any infringement.

31.10 Working alongside the track during night hours is normally prohibited. Such work can be done in the night only with the written permission of the Engineer-in-charge. Where night working is permitted, lighting of the work site as required should be done.

31.11 The following activity of work shall be carried out under supervision of railway engineer or his nominated supervisor:

- a) Excavation of foundation/Ground level near to Railway track.
- b) Concrete casting and/or masonry very close to Railway track.
- c) Erection of temporary structures near to running lines.
- d) Casting of structures like girder/slab over railway track.
- e) Stage-Pre-stressing of girder when placed across Railway tracks properly supported.
- f) Launching of precast/pre-assembled girders across Railway track
- g) Any work of lifting, side shifting and slewing of girders over the Railway track.
- h) Dismantling of temporary structures, shutters, scaffolding, etc. Adjacent and above the Railway track.
- i) Any track work/P&C work on the running line or adjoining to the running line.
- j) Platform/structures/FOB/building works adjacent or over the running lines.

31.12 For carrying out above activities, the contractor's engineer shall furnish the construction programme in advance to railway Supervisor/Engineer. No such work should be taken up in absence of the supervising railway engineer.

31.13 For carrying out ROB/RUB works, the following additional precautions should be taken:

1. All the records of Quality Assurance/Quality Control, testing of the materials and satisfactory completion of an activity shall be maintained at site by the contractor's Engineer and Supervising Engineers. On the basis of these records, Railways' Engineer shall do stage-wise clearance of the work at following stages:

- i) Completion of foundation
- ii) Completion of substructure
- iii) Completion of superstructure

Without such stage clearance, the work in next stage of construction shall not be allowed by the Railway Supervisor, unless proper system of check and exercise is followed at the site.

2. Normally, the high beam PSC girders are designed with wider top flange and shorter bottom flange with very high beam which makes the girder unsuitable during lowering, slewing and launching time.
3. During launching of girders and subsequent adjustments for placement of bearings special attention and precautions are required at site to be followed rigorously without resorting to shortcut practices or leaving the work at site to untrained or inexperienced engineers. Normally, end diaphragms are not casted for the extreme both side girders. These shall to be casted min. 300 mm on both sides for all 'T' beam girders to provide temporary supports for ensuring stability.

Or,

For side adjustments and bearing placements below 'I' section girders, end brackets made of steel angles should be provided for all 'I' beams sequentially to avoid side tilting of individual girders. End brackets shall be removed only after placing girders on bearings and casting of diaphragms.

4. During lowering, the jacks shall be operated duly keeping wooden packing of various thicknesses fixing the amount of lowering to the barest minimum, so that even if the jack fails, the wooden packing will take load and further stability of girder is not endangered.
5. Temporary crib support staging shall be interlaced with clamps and angles. Adequate base width shall be maintained in proportionate to the height of stage, which is very essential for avoiding the along effect during launching of girders. During launching by RH girder method the movement of the PSC girders shall be controlled both from front and rear with winch mechanism having simultaneous operation, so that the speed of the launching is always under the control. Spare hydraulic jacks shall always be kept at side.

Lowering of girder shall always be carried out at one end only. Further, other end should be adequately secured by wire ropes, end brackets, etc. Thereafter, the alternate process shall be continued.

6. As far as possible launching of girders by temporary staging shall be avoided and launching by heavy capacity cranes, wherever feasible, shall be adopted.
  7. Steel girder launcher if used for launching of PSC girders, should be pre-tested for the critical loading (likely to be encountered during actual launching) before deployment on the approaches regarding its strength as well as amount of permissible deflection using actual test PSC girder as a testing load. Connections at supports shall be inspected and certified. Prior to actual launching, it shall be adequately secured to the base support system on the pier cap
- 32.14 The contractor will be supplying with necessary plans, specification, details of Special Conditions etc. for execution of work as required by the Railway. However, Contractor shall make his own detailed plans, working arrangements, etc., to make smoother and faster construction and get the same approved by the Engineer-in-charge at his own cost. For this purpose, he can contact the Office of Divisional Railway Managers (Works) , South Western Railway, \_\_\_\_\_.

**33.0 Assignment or subletting of Contract:** As per para 7 PART-II of IRGCC:

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

**33.2 Option for the contractor to take payment through a letter of credit (LC) arrangement:**

- (i) For all the tenders having advertised cost of Rs.10 lakh or above, the contractor shall have the option to take payment from Railways through a letter of credit (LC) arrangement.
- (ii) This option of taking payment through LC arrangement has to be exercised in IREPS (Indian Railway Electronic Procurement System – the e-application on which tenders are called by Railways) by the

tenderer at the time of bidding itself, and the tenderer shall affirm having read over and agreed to the terms and conditions of the LC option.

- (iii) The option so exercised, shall be an integral part of the bidder's offer.
- (iv) The above option of taking payment through LC arrangement, once exercised by tenderer at the time of bidding, shall be final and no change shall be permitted, thereafter, during execution of contract.
- (v) In case tenderer opts for payment through LC, following shall be the procedure to deal release of payment through LC:
  - a) The LC shall be a sight LC.
  - b) The contractor shall select his Advising/Negotiating bank for LC. The incidental cost towards issue of LC and its operation thereof shall be borne by the contractor.
  - c) SBI, New Delhi, Main Branch will be the nodal branch for issue of LCs based on online requests received from Railway Accounts Units for tenders opened in financial year 2018-19. SBI branches where the respective Railway Accounts Office has its Account (local SBI branch) will be the issuance/reimbursing branch for LC issued under this arrangement. The Bank shall remain same for this tender till completion of contract. The incidental cost @ 0.15% per annum of LC value, towards issue of LC and operation thereof shall be borne by the contractor and shall be recovered from his bills.
  - d) The LC shall be opened initially for duration of 180 to 365 days in consultation with contractor. The LC shall be extended time to time as per the progress of the contract, on the request of the contractor. The value of LC to be opened initially as well as extended thereafter shall be finalized by the engineer in consultation with the contractor on the basis of expected progress of work.
  - e) The LC terms and conditions shall inter-alia indemnify and save harmless the Railway from and against all losses, claims and demands of every nature and description brought or recovered against the Railways by reason of any act or omission of the contractor, his agents of employees, in relation to the Letter of Credit (LC). All sums payable/borne by Railways on this account shall be considered as reasonable compensation and paid by contractor.
  - f) The LC terms and conditions shall inter-alia provide that Railways will issue a Document of Authorization (format enclosed as Proforma 15) after passing the bill for completed work, to enable contractor to claim the authorized amount from their bank.
  - g) The acceptable, agreed upon document for payments to be released under the LC shall be the Document of Authorization.
  - h) The Document of Authorization shall be issued by Railway Accounts Office against each bill passed by Railways.
  - i) On issuance of Document of Authorization, a copy of Document of Authorization shall be posted on IREPS for download by the contractor. A digitally signed copy of Document of Authorization shall also be sent by Railway Accounts Office to Railway's bank (Local SBI Branch).
  - j) The contractor shall take print out of the Document of Authorization available on IREPS and present his claim to his bank (advising bank) for necessary payments as per LC terms and conditions. The claim shall comprise of copy of Document of Authorization, Bill of Exchange and Bill.
  - k) The payment against LC shall be subject to verification from Railway's Bank (Local SBI Branch).
  - l) The contractor's bank (advising bank) shall submit the documents to the Railway's Bank (Local SBI Branch).
  - m) The railway's bank (issuing bank) shall, after verifying the claim so received w.r.t. the digitally signed Document of Authorization received from Railway Accounts Office, release the payment to contractor's bank (advising bank) for crediting the same to contractor's account.
  - n) Any number of bills can be dealt within one LC, provided the sum total of payments to contractor is within the amount for which LC has been opened.
  - o) The LC shall be closed after the release of final payment including PVC amount, if any, to the contractor.

- p) The release of performance guarantee or security deposit shall be dealt directly by railway with the contractor i.e., not through LC.

**Note:** For opening of LC, executive department shall make a request letter to concerned accounts department on a format enclosed as proforma-14.

## PROFORMA - 1

दक्षिणपश्चिमरेलवे/ SOUTH WESTERN RAILWAY

### संकमठकेदारीकेलिएकरार/ AGREEMENT FOR WORKS CONTRACTS

1. Contract Agreement No..... of .....between the "President of India" acting through ..... of South Western Railway Administration herein after called the "Railway" of the one part and ..... hereinafter called the "Contractor" of the other part.
2. Whereas the Contractor has agreed with the Railway for the performance of the works "....." set forth in the Bill(s) of Quantities hereto annexed and in conformity with the Specifications for Materials and Works 2011 of the South Western Railway, the conditions and special conditions, special specifications and drawings, manuals and guidelines hereto annexed, if any, and the General Conditions of Contract, all known as "Contract Documents", and whereas the performance of the said work is an act in which the public are interested.
3. And whereas the contractor has deposited a sum of Rs...../- towards the Bid security and whereas the balance in the security deposit after adjustment of bid security of Rs...../- originally paid by the contractor is at the instance of the contractor recovered at 10 per cent of the value of the running bill till all the amount of security deposit of Rs...../- is fully recovered.
4. Now this indenture witness that in consideration of the payments to be made by the railway, the contractor will duly perform the said works in the said schedules set forth and shall execute the same with great promptness, care and accuracy in a workmanlike manner to the satisfaction of the railway and will complete the same in accordance with the contract documents on or before the ..... And will maintain the said works for a period of .....calendar months from the period of completion.
5. The certified date of their completion and will observe, fulfill and keep all the conditions therein mentioned (which shall be deemed and taken to be part of this contract as if the same had been fully set forth herein), and the railway doth hereby agree that if the contractor shall duly perform the said works in the manner aforesaid and observe and keep the said terms and conditions, the railway will pay or cause to be paid to the contractor for the said works on the final completion thereof, the amount due in respect thereof, at the rates set forth in the SWR USSOR 2021 & CPWD DSR-2018 as corrected by and upto correction slip no.....of..... For Sr.DEN/DEN/.....of.....division at par/enhanced/diminished by .....per cent in respect of schedule 'a' (items covered by the SWR USSOR 2021 & CPWD DSR-2018 ) and at the rates shown in schedule(s) .....(items not covered by the SWR USSOR 2021 & CPWD DSR-2018 ) and at the lump sum rates for items given in schedule(s).....
6. It is hereby agreed and declared that all the provisions of the said contract documents, which have been carefully read and understood by the contractor, shall be as binding upon the contractor and upon the railway as if the same had been repeated herein and shall be read as part of these presents.
7. रेलवेप्रशासनद्वाराइसकरारकेस्टांपशुल्ककावहनकियाजाएगा.  
The cost of stamp duty on this agreement shall be borne by the railway administration.

Contractor \_\_\_\_\_  
S.W. Railway Address \_\_\_\_\_  
(For President of India)  
Date \_\_\_\_\_  
Witnesses (to signature of contractor):  
Signature of witnesses with address  
\_\_\_\_\_

Designation \_\_\_\_\_

**PROFORMA - 2**

No.

Office of the.....

Date:.....

**EXPERIENCE CERTIFICATE**

To whomsoever it may concern

(Issued for the purpose of quoting in SWR Construction tenders)

M/s/Sri ..... (name and address of the contractor) is a working contractor of this unit and was awarded the following work. The relevant details of the work are as under: -

1.	Name of work:										
2.	Acceptance letter No. & Date:										
3.	Agreement No. & Date:										
4.	Value of work awarded (value of Agreement):										
5.	Date of commencement of work:										
6.	Whether work physically completed:										
7.	Date of completion:										
8.	Value of work completed as per last CC bill/final bill										
9.	Status of final bill										
10.	Details of values of major components/ works executed in the completed work.	<table><tr><th>Item</th><th>Qty</th><th>Value</th></tr><tr><td colspan="3">i) value of earthwork including blanketing</td></tr><tr><td colspan="3">ii) Value of Bridge works</td></tr></table>	Item	Qty	Value	i) value of earthwork including blanketing			ii) Value of Bridge works		
Item	Qty	Value									
i) value of earthwork including blanketing											
ii) Value of Bridge works											

Deputy Chief Engineer/ .....  
.....department, Govt. of .....  
.....Division/ Circle,.....(City)  
(PIN .....)

**Note: -** The certificate issued by a Junior Administrative Grade officer or above of the department in Govt. of India or Executive Engineer or above in State Govt. or equivalent official in other sections of the Governments only will be accepted.

## STATEMENT OF COMPLETED WORKS IN THE LAST THREE FINANCIAL YEARS

SL. No	Name of the Organisation	Name of work	Date of letter of acceptance	Place of work	Agt. Value	Present Physical progress in % age	Financial progress completion	Balance work yet to be completed
1	SOUTH WESTERN RAILWAY							
i)	Open line in the 3 Divns. Of SW.Rly							
ii)	CN Organisation under CAO/CN/BNC							
iii)	Railway Electrification Projects							
iv)	Others							
2.	Other Railways							
3	Other Public Sector undertakings							

The information's furnished above are correct and complete, to the best of our / my knowledge and belief.

We are / I am aware that if the information furnished above are found to be wrong or incomplete or any relevant information is found to have been suppressed, the tender is liable to be rejected, at any stage, as per Clause 20 of the Regulation for Tenders and contracts.

We are / I am aware that if the declarations as above in the tender are found to be not true, any agreement that may be entered in to, is also liable to be terminated by the Railway.

Signature of the tenderer :

Name :

Dated :

## STATEMENT OF WORKS ON HAND

SL. No	Name of the organisation	Name of work	Date of letter of acceptance	Place of work	Agt. Value	Present Physical progress in % age	Financial progress completion	Balance work yet to be completed
1	SOUTH WESTERN RAILWAY							
i)	Open line in the 3Divns. Of SW Rly							
ii)	CN Organisation under CAO/CN/BNC							
iii)	Others							
2.	Other Railways							
3	Other Public Sector undertakings							

The information's furnished above are correct and complete, to the best of our/my knowledge and belief.

We are / I am aware that if the information's furnished above are found to be wrong or incomplete or any relevant information is found to have been suppressed, the tender is liable to be rejected, at any stage.

We are / I am aware that if the declarations as above in the tender are found to be not true, any agreement that may be entered in to, is also liable to be terminated by the Railway.

Signature of the tenderer :

Name :

Date :



**LIST OF EARTHWORK MACHINERY, TOOLS, PLANT AND STAFF TO BE DEPLOYED ON THIS WORK:****a. PLANT & MACHINERY****i). Earthwork machinery**

	Name of machine and description	Number that the tenderer will deploy on this work
(1)	Own _____ _____ _____	_____ _____ _____
(2)	Arranging from others _____ _____ _____ _____	_____ _____ _____ _____

**ii) Plants & Equipments for concreting including testing equipments for concreting and soils.**

	Name of machine and description	Number that the tenderer will deploy on this work
(1)	Own _____ _____ _____	_____ _____ _____
(2)	Arranging From others _____ _____ _____	_____ _____ _____

**b) LIST OF PERSONNEL, ORGANIZATION ON HAND AND PROPOSED TO BE ENGAGED FOR THE SUBJECT WORK:****i) Available with the organisation:**

Name	Designation	Qualification & Experience
_____	_____	_____
_____	_____	_____

**ii) Proposed to be engaged from outside**

Name	Designation	Qualification & Experience
_____	_____	_____
_____	_____	_____

If the above documents are not submitted by the tenderer or insufficient details/documents are submitted, the tender is liable to be rejected.

Signature of the tenderer

Name :

Dated:

\*[PROFORMA FOR PERFORMANCE BANK GUARANTEE]\*

\*[PLEASE GO THROUGH THE CHECK LIST]\*

BANK GUARANTEE NO. \_\_\_\_\_

AMOUNT RS. \_\_\_\_\_

VALIDITY from \_\_\_\_\_

Valid upto \_\_\_\_\_

Last date for lodgment of claim \_\_\_\_\_

**PERFORMANCE GUARANTEE IN THE FORM OF BANK GUARANTEE**

1. In consideration of the President of India acting through the .....South Western Railway, .....*\*(give full address of the Official/ Department)\** (hereinafter referred to as the Government') having accepted vide letter No.....dated ....., the tender submitted by .....*\*(give full address of the contractor)\** (hereinafter referred to as "the contractor(s), and agreed to grant a Contract for .....*\*(indicate the nature of contract works)\** (hereinafter called the Contract) and whereas one of the terms agreed by the said Contractor, is that he should give a Performance Guarantee in the form of an irrevocable bank guarantee amounting to 5% of the contract value, i.e., Rs...../- (Rupees.....only) *\*(indicate PBG amount)\** valid upto .....*\*(Indicate date - Currency period + 60 days)\**, by way of security for the due observance of the terms and conditions, performance and fulfilment of the said contract, we.....*\*(indicate the name and full address of the bank)\** (hereinafter referred to as the 'the Bank') at the request of the Contractor do hereby irrevocably and unconditionally guarantee to the Government that the Contractor shall duly perform and discharge their obligations under the said contract to the full satisfaction of the Government and render all necessary and efficient services which may be required to be rendered by the Contractor in connection with and/or for the performance of the works as per the specifications stipulated in the tender no..... dated..... and Letter of Acceptance No..... dt..... Within the time of.....*\*(Indicate date - Currency period + 60 days)\** reckoned from the date as per the letter of acceptance, and further guarantees that the works which shall be done by the Contractor under the said Contract, shall be actually performed in accordance with terms and conditions of the Contract to the full satisfaction of the Government.
2. We, the Bank, do hereby undertake to pay to the Government an amount not exceeding Rs.....against any loss and/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 Contract.
3. We, the 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 and/or damage caused to 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 Agreement or by reason of the Contractor (s) failure to perform the said 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.....
4. We, the Bank, do hereby undertake to pay to the Government any money so demanded notwithstanding any dispute or disputes raised by the Contractor(s) in any suit or proceeding pending before any Court, Tribunal or Arbitrator(s) 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 there under and the Contractor(s) shall have no claim against us for making such payment.
5. We, the Bank, do 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 Agreement and that it shall continue to be enforceable till all the dues of the Government under or by virtue of the said Agreement have been fully paid and as its claims satisfied or discharged or till the Government certifies that the terms and conditions of the said Agreement have been fully and properly carried out by the said Contractor(s) and accordingly discharges the 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.

6. We, the Bank, do 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 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 to forbear or enforce any of the terms and conditions relating to the said 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 by any such matter or thing whatsoever which under the law relating to sureties would but for this provision have effect of so relieving us.
7. This Guarantee will not be discharged due to the change in the constitution of the Bank or the Contractor(s).
8. We,.....\*(*indicate the name of the 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.....20...

For.....

Seal and Signature(s) of the authorized  
Official(s) with designation

**Note:-**

1. Words appearing between asterisk "\*" marks in the PG form are for guidance only and not to be typed in the final/fair document of Bank Guarantee.
2. The PBG/BG before submission to Railways to be ensured the following compliances:

**CHECK LIST FOR SUBMISSION OF PBG**

Sl.No.	Description
1.	Document (PBG/BG) should be as per format
2.	Sufficient Stamp duty to be paid as per stamp duty Act of the state where BG executed
3.	Date of purchase of stamp paper is timely executed i.e., on or after date of purchase of stamp paper.
4.	BG No. amount, Date of issue, validity period mentioned or not
5.	LOA No. has mentioned or not
6.	Detail of work with Railways mentioned or not
7.	BG number mentioned on all pages or not
8.	Document paginated or not
9.	Signatories signed with PA/SS Nos. and designation seal affixed or not
10.	Bank round seal affixed or not
11.	Signatures of two executants with PA/SS Nos. in BGs wherever applicable as per Banks procedure and designation seal affixed or not
12.	Uniform dates like BG date, validity date etc., is incorporated or not
13.	Amount in figures is tallying with amount in words or not
14.	Corrections by pen, if any, is attested by the executants with seal or not.

## GENERAL INFORMATION: NEFT DETAILS

1. Name of the Tenderer : \_\_\_\_\_
2. Address : \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_
3. Contact Person : \_\_\_\_\_
4. Contact No. : \_\_\_\_\_
5. PAN of Tenderer : \_\_\_\_\_
6. GST No. : \_\_\_\_\_
7. Name of Bank : \_\_\_\_\_
8. Name of Branch : \_\_\_\_\_
9. Address of Branch : \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_
10. IFSC of the Branch : \_\_\_\_\_

**FORM FOR REPORTING OF EMPLOYMENT**

(Proforma to be filled in and signed by the Tenderer and submitted along with the tender)

(strike out whichever is not applicable)

1. The undersigned -

(a) is a retired Gazetted officer holding prior to retirement a pensionable / non-pensionable post in the Engineering Department of the .....Railway.

(b) is a partnership firm having as one of its partners a retired Engineer or a retired Gazetted officer as aforesaid.

(c) is an incorporated company having any such retired Engineer or retired Gazetted officer as aforesaid, as one of its directors.

(d) is having in my employment any retired Engineer or retired Gazetted officer as aforesaid.

(e) has no such retired Engineer or retired Gazetted officer so associated with me as stated above.

2. If falling under any of the above categories (a) to (d) particulars of the officer may be furnished hereunder:

(i) Post held before retirement .....

(ii) Date of retirement .....

(iii) .....

If not retired at least one year prior to date of submission of tender .....  
state whether permission for taking such contracts has been obtained from the President of India or any officer duly authorized in this behalf.

3. If the Tenderer or in the case of a firm or company, any of the shareholders has a relative or relatives employed in Gazetted capacity in the Engineering or any other Department of the Railways, particulars of such relatives in the Railway may be furnished hereunder:

(i) Name : .....

(ii) Designation : .....

(iii) Relationship: .....

Signature of Tenderer(s)

Name : .....

Address : .....

Signature:

Signature

Shri \_\_\_\_\_ Shri \_\_\_\_\_

Witnesses:

1) Name:Address:

2) Name: Address:

**MEMORANDUM OF UNDERSTANDING FOR JOINT VENTURE AGREEMENT**

*(To be executed in presence of Public notary on non-judicial stamp paper of the value of Rs.200/- or appropriate value as per Stamp Duty Act.*

*The stamp paper has to be in the name of the tenderer) \*\**

- 1) This Memorandum of understanding executed this \_\_\_\_\_ day of \_\_\_\_\_ 20\_\_\_\_ between \_\_\_\_\_ (Name of Co.)\_\_\_\_\_ a company registered under the companies Act 1956 having its registered office at \_\_\_\_\_ represented through its Director / Authorized Representative \_\_\_\_\_ (hereinafter referred to as \_\_\_\_\_ which expression shall unless repugnant to the context thereof includes its successors) of the FIRST PART.

**OR**

M/s.\_\_\_\_\_ a partnership firm registered under the Indian Partnership Act 1932, having its registered office \_\_\_\_\_ represented through its Partner Shri \_\_\_\_\_ / Authorised Representative \_\_\_\_\_ ( hereinafter referred to as \_\_\_\_\_ which expression shall unless repugnant to the context thereof includes its successors ) of the FIRST PART.

**AND**

- 2) M/s.\_\_\_\_\_ (Name of Co.)\_\_\_\_\_ a company registered under the Companies Act 1956 having its registered office at \_\_\_\_\_ represented through its Director or Authorized Representative \_\_\_\_\_ (hereinafter referred to as \_\_\_\_\_ which expression shall unless repugnant to the context thereof includes its successors) of the SECOND PART.

**OR**

M/s.\_\_\_\_\_ a partnership firm registered under the Indian Partnership Act 19\_\_\_\_ having its registered office \_\_\_\_\_ (hereinafter referred to as \_\_\_\_\_ which expression shall unless repugnant to the context thereof includes its successors) of the SECOND PART.

**AND**

- 3) This Memorandum of understanding executed this \_\_\_\_\_ day of \_\_\_\_\_ 20\_\_\_\_ between \_\_\_\_\_ (Name of Co.)\_\_\_\_\_ a company registered under the companies Act 1956 having its registered office \_\_\_\_\_ through its Director or Authorized Representative \_\_\_\_\_ (hereinafter referred to as \_\_\_\_\_ which expression shall unless repugnant to the context thereof includes its successors) of the THIRD PART.

**OR**

M/s.\_\_\_\_\_ a partnership firm registered under the Indian Partnership Act 19\_\_\_\_ having its registered office \_\_\_\_\_ through its Partner or Authorised Representative \_\_\_\_\_ (hereinafter referred to as \_\_\_\_\_ which expression shall unless repugnant to the context thereof includes its successors) of the THIRD PART.

- 4) This Memorandum of understanding executed this \_\_\_\_\_ day of \_\_\_\_\_ 20\_\_\_\_ between \_\_\_\_\_ (Name of Co.)\_\_\_\_\_ a company registered under the companies Act 1956 having its registered office \_\_\_\_\_ through its Director or Authorized Representative \_\_\_\_\_ (hereinafter referred to as \_\_\_\_\_ which expression shall unless repugnant to the context thereof includes its successors) of the FOURTH PART.

**OR**

M/s.\_\_\_\_\_ a partnership firm registered under the Indian Partnership Act 19\_\_\_\_ having its registered office \_\_\_\_\_ through its Partner or Authorised Representative \_\_\_\_\_ (hereinafter referred to as \_\_\_\_\_ which expression shall unless repugnant to the context thereof includes its successors) of the FOURTH PART.

AND

- 5) This Memorandum of understanding executed this \_\_\_\_\_ day of \_\_\_\_\_ 20\_\_\_\_ between \_\_\_\_\_ (Name of Co)\_\_\_\_\_ a company registered under the companies Act 1956 having its registered office \_\_\_\_\_ through its Director or Authorized Representative \_\_\_\_\_ (hereinafter referred to as \_\_\_\_\_ which expression shall unless repugnant to the context thereof includes its successors) of the FIFTH PART.

OR

M/s. \_\_\_\_\_ a partnership firm registered under the Indian Partnership Act 19\_\_\_\_ having its registered office \_\_\_\_\_ through its Partner or Authorised Representative \_\_\_\_\_ (hereinafter referred to as \_\_\_\_\_ which expression shall unless repugnant to the context thereof includes its successors) of the FIFTH PART.

Whereas Chief Administrative Officer, Construction, South Western railway hereinafter referred to as Owner/ Customer has invited Tender Nos. \_\_\_\_\_ hereinafter referred to as the South Western Railway Tender for the work of \_\_\_\_\_ hereinafter referred to as the said work.

Whereas, the party of the first part i.e. M/s. \_\_\_\_\_ details to be supplied of the expertise in their field.

Whereas, the party of the Second part i.e. M/s. \_\_\_\_\_ details to be supplied of the expertise in their field.

Whereas, the party of the Third part i.e. M/s. \_\_\_\_\_ details to be supplied of the expertise in their field.

Whereas, the party of the Fourth part i.e. M/s. \_\_\_\_\_ details to be supplied of the expertise in their field.

Whereas, the party of the Fifth part i.e. M/s. \_\_\_\_\_ details to be supplied of the expertise in their field.

And whereas parties to this MOU, have agreed to co-operative with each other to associate jointly and to form a joint Venture firm to participate in the South Western Railway Tender of Indian Railways.

Now, therefore, in consideration of the premises and mutual promises and of the undertaking contained herein, it is hereby agreed as follows:-

**1. The Purpose of MOU.**

M/s. \_\_\_\_\_ and \_\_\_\_\_ agree to co-operate with each other for the purpose of joint participation in the South Western Railway Tender and in the event, the contract is awarded, to jointly execute the contract. The broad interfaces and scope of work of each party is set forth below.

- 
2. The name of the Jt. Venture firm shall be \_\_\_\_\_

3. The parties, hereto, represented that:

- a) They are in possession of all approvals and valid authorization for the purpose of execution of this MOU.
- b) They have not entered into any agreement/MOU of equal or similar nature with any third party for the SOUTH WESTERN RAILWAY Tender.

That each of the parties of the J.V. agrees and undertake to place at the disposal of the JV, benefits of its individual experience, technical knowledge and skill and shall in all respects bear its share of the responsibility, including the provision of information advice and other assistance required in connection with the works. The share and the participation of the partners in the JV shall broadly be follows:

M/s.....%

M/s.....%

M/s.....%

M/s.....%

M/s.....%

**Lead Member:**

That one of the member of the JV firm shall be the lead member of the JV firm who shall have a majority (at least 51%) share of interest in the JV firm. The other members shall have a share of not less than 20% each in case of JV firms with up to three members and no less than 10% each in case of JV firms with more than three members. In case of JV firm foreign members(s), the lead member has to be an Indian firm with a minimum share of 51%.

And all rights, interest, liabilities, obligations, work experience and risks (net profits or net losses) arising out of the contract shall be shared or borne by the Parties in proportionate to their shares. Each of the parties shall be bound by guarantees, sureties required for the work as well as its proportionate share in working capital and other financial requirements.

4. The parties to this MOU undertakes:

- a) That after submission of the tender, the MOU shall not be modified/ altered/ terminated during the validity of the tender except when modification becomes inevitable due to succession laws etc. but in no case the minimum eligibility criteria would be vitiated. The parties to this MOU further agrees that the Lead Member will continue to be the Lead Member of J.V. Firm.
- b) That after the contract is awarded the constitution of the J.V. firm shall not be altered during the currency of contract except when modification becomes inevitable due to Succession Law etc. but in no case the minimum eligibility criteria would be vitiated.

**5. JOINT & SEVERAL LIABILITY**

In respect of the South Western Railway Tender, all terms shall be complied by each party on back-to-back basis as per specifications of the South Western Railway Tender or any other mutually agreed terms with the Owner / Customer. The Parties here to shall, if awarded the contract for the project for which the Joint Venture is formed, be jointly and severally liable to the Indian Railways for execution of the project in accordance with the contract. The Parties hereto also undertake to be liable jointly and severally for the loss, damages caused to the Customer in course of execution or due to non-execution of the contract or part thereof or arising out of the contract.

- 6. Shri \_\_\_\_\_ shall be authorized partner/person to digitally sign and upload the tender on IREPS Works Module Portal on behalf of the Joint Venture and to deal with tender, to 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 South Western Railway tender/contract. All notices/correspondence with respect to the contracts would be sent only to this authorised member of the JV firm.
- 7. Notwithstanding anything contained herein, in respect of the South Western Railway Tender with regard to the internal relationship, the inter se liabilities between the parties shall be in proportion to their respective scope of work and shall be subject to the provisions of this MOU.
- 8. The Parties agree that with respect to the South Western Railway Tender neither Party, nor any subsidiary company of either party, nor any joint venture company or any other entity, in which the party/ies, is or are in any way interested, shall compete together with or through any third party, nor shall the Parties advise, consult for, engage in or otherwise assist in any way any person or entity or any affiliate thereof in respect of any orders or contracts related to the South Western Railway Tender.



**a. Responsibility**

Each party shall assume and accept full responsibility for its Scope of Work and the obligations imposed in the contract and in this MOU as if it was, with regard to its Scope of work, an independent partner contracting individually with the Customer. In the event of any defect and damage or any claim arising from the Customer under the Contract or any third party in relation to or as a consequence of any failure to meet the performance specification the Party, within whose Scope of Work the claim arises, shall be entirely responsible for the claim and shall indemnify and hold harmless the other Party from any liability, demand, claim burden cost, expense attorney's fees and costs arising from thereof.

**b. Assignability**

No party to the Joint Venture has right to assign or transfer the interest, right or liability in the contract without the written consent of the other party and that of the Customer.

**c. Use of Machinery, Instruments, Labour Force etc.**

The Parties here to undertake that whatever the machinery, instruments, Labour force (including unskilled, skilled, inspectors, Engineers 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 the work, the Party/Parties having the control over the said machinery, instrument, 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 at the disposal of the other party who is actually executing the work for purpose of execution of the contract without any hindrances and obstacle.

**9. Duration of MOU**

It shall be valid during entire currency of contract including the period of extension, if any and also till the maintenance period is over or till all the contractual liabilities including warranty/guarantee obligations are discharged completely.

**10. Applicable Law**

This MOU and any arrangement/agreements regarding the performance shall be construed and interpreted in accordance with and governed by the Laws of India and shall be subject to the exclusive jurisdiction of the courts at Bangalore.

**11. Settlement of Disputes:**

In the event of disputes arising from this MOU, the Parties to the MOU undertakes to endeavour to settle the said disputes amongst them amicably. However, if the parties fail to resolve the disputes amongst them amicably, the said disputes arising out of or in connection with the present MOU shall be resolved through Arbitration as per the provisions enshrined under the Arbitration and Conciliation Act 1996 or/and amendments thereof.

**12. All communications or notices provided for herein shall be in English language and be delivered, mailed, or tele-faxed to the Parties addresses as indicated below:**

M/s.....

M/s.....

All correspondence and notices to the joint Venture shall be addressed to the Lead Member, i.e.

M/s..... Shri ..... at the address stated herein below.

M/s.....

.....

Such communication or notices shall be deemed to have been duly given when so delivered or, if mailed, when received at destination.

13. Each Party shall have full and sole responsibility to bear the expense of and effect the payment of any taxes, duties, special insurance, fees or assessments of any nature whatsoever (including personal income taxes level or imposed on any of its employees or personnel or any of its sub-contractor's employees or personnel) including penalties and interest, if any, levied in connection with the execution of this MOU.
14. The parties to this MOU declares and certifies that they have not been black listed or debarred by Railways or any other Ministry/Department of the Govt. of India/State Govt. from participation in tenders/contract in the past either in their individual capacity or the JV firm or partnership firm in which they were member/partners.

In witness whereof, the Parties have caused this MOU to be executed by their respective authorised representatives on the date and year mentioned herein above.

Signature

Signature

Signature

Shri \_\_\_\_\_ of Shri \_\_\_\_\_ of Shri \_\_\_\_\_ of

M/s. \_\_\_\_\_ M/s. \_\_\_\_\_ M/s. \_\_\_\_\_

Signature:

Signature

Shri \_\_\_\_\_ Shri \_\_\_\_\_

Witnesses:

1) Name

Address:

2) Name

Address:

**FORMAT FOR AFFIDAVIT TO BE SUBMITTED BY TENDERER ALONG WITH THE TENDER DOCUMENT**

I ..... (Name and designation) \*\*appointed as the attorney / authorised signatory of the tenderer (including its constituents) M/s ..... (herein after called tenderer) to digitally sign and upload the tender on IREPS Works Module Portal, for the purpose of the tender for the work as per the tender Notice No. .... of South Western Railway, do hereby solemnly affirm and state on the behalf of tenderer including its constituents as under:

1. I/We the tenderer(s) am / are digitally signing this document after carefully reading the contents and uploading the offer on IREPS Works Module Portal.
2. I/We, the tenderer(s) have read, understood and agree to all the conditions of the tender uploaded in IREPS Works Module and hereby give an undertaking in confirmation thereof that these terms and conditions shall be final and binding on me/us.
3. I/We hereby declare that I/We have downloaded the IREPS tender document uploaded by South Western Railway from IndianRailway Web site [www.ireps.gov.in](http://www.ireps.gov.in). I/we have verified the contents of the printed document from the website and there is no addition, no deletion or no alteration to the contents of the tender document in case of any discrepancy noticed at the stage i.e., evaluation of tenders, execution of work or final payment of the contract, the master copy available with the railway administration shall be final and binding upon me / us.
4. I / we declare and certify that I / We have not made any misleading or false representation in the forms, statements and attachments in proof of the qualification requirements.
5. I/we also understand that my / our offer will be evaluated based on the documents / credentials submitted along with the offer and same shall be binding upon me/us.
6. I/we declare that the information and documents submitted along with the tender by me / us are correct and I / we are fully responsible for the correctness of the information and documents submitted by us.
7. I/we certify that I/we the tenderer(s) is/are not blacklisted or debarred by Railways or any other Ministry / Department of Govt. of India from participation in tender on the date of submission of bids, either in individual capacity or as a HUF/ member of the partnership firm/LLP/JV/Society/Trust.
8. I/we understand that if the contents of the affidavit submitted by 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 Bid Security besides banning of business for a period of upto five year. Further, I/we (insert name of the tenderer) \*\*\_\_\_\_\_ and all my/our constituents understand that my/our offer shall be summarily rejected.
9. I/we also understand that if the contents of the affidavit submitted by us are found to be false / forged or incorrect at any time the award of the contract, it will lead to termination of the contract, along with forfeiture of Bid Security/Security Deposit and Performance guarantee besides any other action provided in the contract including banning of business for five year on entire IR.
10. I/We have read the clause regarding restriction on procurement from a bidder of a country which shares a land border with India and certify that I am/We are not from such a country or, if from such a country, have been registered with the competent Authority. I/We hereby certify that I/we fulfil all the requirements in this regard and am/are eligible to be considered (evidence of valid registration by the competent authority is enclosed)

DEPONENT

SEAL AND SIGNATURE OF THE TENDERER

VERIFICATION:

I/we above named tenderer do hereby solemnly affirm and verify that the contents of my 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 :

Date :

SOUTH WESTERN RAILWAY  
FORM FOR SUBMISSION OF REQUEST FOR AVAILING MOBILISATION ADVANCE

TO.

THE PRESIDENT OF INDIA,  
Acting through the Chief Administrative Officer/Construction  
Chief Engineer/ Dy. Chief Engineer/Construction/-----  
South Western Railway.

Sir,

Subject: Name of the work: -----

Ref: Tender Notice no: -----; Item no: -----

I/We ----- (Name of Individual/ Firm/Company/JV) represented by its authorised signatory Sri / Smt. ....hereby submit that, in the event of I / We becoming a successful tenderer in the subject tender and followed by Railway placing on us the order for work execution, I/We intend to register our request for availing the grant of Mobilisation Advance as per the terms and conditions applicable for this purpose as detailed in tender conditions.

I/We have read and understood the conditions of tender/contract pertaining to Mobilisation Advance and do here by agree that I / We abide by all terms and conditions of tender / contract governing Mobilisation Advance. Further, I / We hereby agree that subsequent modifications, if any, in respect of grant of Mobilisation Advance issued from time to time by Railway during the currency of the contract is binding on us.

Yours Sincerely

(Signature of the Tenderer)

Name:

Place :

Date:

Address:

### AGREEMENT FOR ZONE CONTRACT

CONTRACT AGREEMENT No. \_\_\_\_\_, DATED \_\_\_\_\_. ARTICLES OF AGREEMENT made this \_\_\_\_\_ day of \_\_\_\_\_ between the President of India acting through the \_\_\_\_\_, South Western Railway hereinafter called the "Railway" of the other part and \_\_\_\_\_ hereinafter called the "Contractor" of the other part.

WHEREAS the Contractor has agreed with the Railway during the period of \_\_\_\_ months from \_\_\_\_\_ to \_\_\_\_\_ for the performance of :

- a) New Works, additions and alterations to existing structures, special repair works and supply of building materials subject to the contract value for such works not exceeding Rs. \_\_\_\_\_.
- b) All ordinary repair and maintenance works at any site between kilometre \_\_\_\_\_ and kilometre \_\_\_\_\_ as will be set forth in the work orders (which work orders shall be deemed and taken to be part of this contract) that will be issued during the said period at \_\_\_\_\_% above/below the Standard Schedule of Rates (SSOR) of the \_\_\_\_\_ Railway, corrected up to the latest Correction Slips and Standard Specifications of the \_\_\_\_\_ Railway corrected up to latest Correction Slips and the Special Conditions and Special Specifications, if any in conformity with the drawings (if any) that will be issued with the work order, aforesaid AND WHEREAS the performance of the said work is an act in which the public are interested.

NOW THIS INDENTURE PRESENTS WITNESSETH That in consideration of the payment to be made by the Railway, the Contractor will duly perform the works set forth in the said Work Order and shall execute the same with great promptness, care and accuracy, in a workman like manner to the satisfaction of the Railway and will complete the same on or before the respective dates specified therein in accordance with the said specifications and said drawings (if any) and said conditions of contract and will observe, fulfil and keep all the conditions therein mentioned, (which shall be deemed and taken to be part of this contract as if the same had been duly set forth herein), AND the Railway both here-by agree that if the Contractor shall duly perform the said work in the manner aforesaid and observe and keep the said terms and conditions, the Railway will pay or cause to be paid to the Contractor for the said works on the completion thereof the amount due in respect thereof at the rates specified above.

Contractor \_\_\_\_\_

Designation \_\_\_\_\_ S.W. Railway

Address \_\_\_\_\_

(For President of India)

Date \_\_\_\_\_

Witnesses (to signature of contractor) :

Signature of witnesses with address \_\_\_\_\_

Date \_\_\_\_\_

Signature of witnesses with address \_\_\_\_\_

Date \_\_\_\_\_

\_\_\_\_\_

*Authority* \_\_\_\_\_ *Allocation* \_\_\_\_\_

Date \_\_\_\_\_ for President of India

*Request letter from Executive branch to Accounts Office for opening of LC*

Office of \_\_\_\_\_

\_\_\_\_\_ Railway

No. \_\_\_\_\_

Dated \_\_\_\_\_

**The PFA/Sr.DFM/Dy.FA**  
**HQ/Division/Workshop/Cost**

Sub: Opening of LC

Ref: Supply Order/Contract Agreement No.

It is requested to open a sight LC against the above referred Order/Agreement in favour of  
 \_\_\_\_\_. The details of beneficiary are as under:

- (i) Name of Contractor/Supplier
- (ii) Vendor Code
- (iii) Address
- (iv) Tender No.
- (v) Contract Agreement No.
- (vi) Description of Goods/Service
- (vii) Value of Contract
- (viii) Stages of payment
- (ix) Expected payment within 6 months (LC Amount)
- (x) Beneficiary bank details:
  - a) Bank Name
  - b) Address
  - c) Account No.
  - d) IFSC code
- (xi) Validity/Period for which LC is to be opened.

It is certified that the supplier/contractor has exercised the option of payment due against the tender, through LC arrangement in IREPS portal at the time of bidding itself and the option has been flagged in the IREPS. This has the approval of \_\_\_\_\_.

(Signature)

Name: \_\_\_\_\_

Designation: \_\_\_\_\_

(Official Seal)

LCDA No. (18 DIGIT IPAS GENERATED NO.)

Dated: \_\_\_\_\_

**DOCUMENT OF AUTHORIZATION**

Reference: (i) Works Contract/Supply Contract No. \_\_\_\_\_ Dated \_\_\_\_\_

(ii) Inland Letter of Credit No. \_\_\_\_\_ Dated \_\_\_\_\_

This document is issued against contract No. \_\_\_\_\_ (FROM IREPS) \_\_\_\_\_ dated \_\_\_\_\_ for supply/work of \_\_\_\_\_ (DESCRIPTION OF GOODS/WORK FROM IREPS) \_\_\_\_\_

The beneficiary of the aforementioned Letter of Credit M/s \_\_\_\_\_ (NAME AND VENDOR CODE) \_\_\_\_\_ (Vendor Code \_\_\_\_\_ as per IREPS) is entitled to receive payment, aggregating INR \_\_\_\_\_ (FROM ABSTRACT OF BILL PASSED) \_\_\_\_\_ out of a total LC amount of INR \_\_\_\_\_ (FROM MASTER TABLE OF LC OPENED) \_\_\_\_\_ against the first/second\* commercial Invoice No. (FROM IPAS) \_\_\_\_\_ dated \_\_\_\_\_ FROM IPAS \_\_\_\_\_ for INR (FROM IPAS) \_\_\_\_\_ raised against the above contract from State Bank of India \_\_\_\_\_ (branch FROM LC MASTER TABLE) \_\_\_\_\_, on the strength of this Certificate.

The details of payments already made to the beneficiary under this Letter of Credit are as follows:

S.No.	Invoice No.	Invoice date	Invoice Amount (INR)	LDCA No.	LDCA date	Amount paid (INR)
<b>Total Paid</b>						

THIS PAYMENT: \_\_\_\_\_ \$\$\$ \_\_\_\_\_

LC BALANCE AFTER THIS PAYMENT: \_\_\_\_\_

(Signature of authorised Railway authority)

Name :

Designation :

Official Seal :

\*As applicable-TO BE PROGRAMMED



## **A. TECHNICAL SPECIFICATIONS & SPECIAL CONDITIONS FOR SUPPLY OF CEMENT FOR CONSTRUCTIONWORKS**

### **1. SUPPLY OF CEMENT**

- i. Supply of cement to various specifications as required for various items under different schedules will be paid under Schedule for supply of cement.
- ii. The cement required for various items of work under different schedule shall be supplied by the Contractor at the site of work in accordance with the requirements and specifications. The payment for the cement supplied and used by Contractor for USSOR items and Non USSOR items shall be based on the norms for use as prescribed in the Technical Specifications/Special Conditions/Cement Schedule etc., and shall be made as per relevant items under Schedule for supply of cement. However, Railway reserves the right to supply departmental cement to the extent available which shall be transported by the Contractor from depot to the work spot. Payment towards such transportation will be made under relevant item of Standard Schedule of Rates of the Railway. For supply and use of cement in various works, relevant IRS codes, specifications, IS Specifications and Railway's specifications will be applicable. Wherever, relevant specifications are not available, decision of the Engineer-in-charge is final and binding on the contractor.

#### ***I) Specifications for Cement***

The cement used shall conform to any of the following standards.

- a. 33 Grade Ordinary Portland Cement conforming to IS:269
- b. 43 Grade Ordinary Portland Cement conforming to IS:8112
- c. 53 Grade Ordinary Portland Cement conforming to IS:12269
- d. Rapid Hardening Ordinary Cement conforming to IS:8041
- e. High Strength Portland Cement conforming to IRS:T:40
- f. Portland Slag cement conforming to IS:455(See note 1&4 below)
- g. Portland Pozzolana Cement conforming to IS:1489(See Note 2&4 below)
- h. Sulphate Resistance Cement conforming to IS:12330(see Note 3 below)

Note: (1) Use of any cement other than OPC Grade 43/53 shall have the pre- approval of the Sr.DEN in charge.

Mixing of blast furnace slag with OP cement at site shall not be permitted.

(2) Portland Pozzolana cement/Portland slag cement shall not be used for PSC works. When Portland Pozzolana cement is approved for use in plain and reinforced concrete by the Engineer-in-charge, proper damp curing of concrete at least for 14 days and supporting form work till concrete attains at least 75% of the design strength shall be ensured.

(3) The sulphate resisting cement conforming to IS:12330 shall be used only in such conditions where the concrete is exposed to the risk of excessive sulphate attack e.g., concrete in contact with soil or ground water containing excessive amount of sulphate shall not be used under such conditions where concrete is exposed to risk of excessive chlorides and sulphate attack both.

(4) The rate of development of strength is slow in case of blended cement i.e., Portland Pozzolana cement and Portland slag cement, as compared to ordinary Portland cement. This aspect should be taken care while planning to use blended cement. Accordingly period of removal of form work and period of curing etc., should be suitably increased.

(5) Compatibility of chemical admixtures and super plasticizers with Portland Pozzolana cement and Portland blast furnace slag cement shall be ensured by trials before use and with pre approval.

(6) Unified Standard Specification for Works and materials 2010 shall prevail and referred for detailed specifications.

**II) SOURCE AND PACKAGING:**

- i. Cement to be used on the works shall be procured from the main / reputed cement plants or from their authorized dealers. Decision of Engineer-in-charge regarding reputed firms shall be final and binding on the contractor.
- ii. Cement bags preferably in paper bags and packings should bear the following information in legible markings:
  - a) Manufacturer's name
  - b) Registered Trade Mark of manufacturer, if any
  - c) Type of cement
  - d) Weight of each bag in Kg. or No. of bags/Tone
  - e) Date of manufacture, generally marked as week of the year/year of manufacture, eg. 30/13 which means 30th week of 2013.
  - f) IS Code to which cement conforms.
- iii. All cement bags shall have company stitched intact and if any sign of tampering with company stitches is noticed it will be rejected without any test.

**III) *Test certificate regarding quality of cement:***

- i) Necessary test certificates will have to be produced by the tenderer regarding the quality of the cement conforming to the specification indicated above in addition to the manufacturer's certificates.
- ii) The Railway reserves the right to take samples during the course of the work and get the cement tested in reputed laboratories to ascertain the conformity to the specification. Cost of such testing shall be borne by the contractor without any extra payment.
- iii) Tests on cement are to be done as per relevant IS Codes. Some of the tests which may be carried out are:
  - 1. Compressive Strength
  - 2. Initial & final setting time
  - 3. Consistency
  - 4. Soundness
  - 6. Fineness
- iv) The contractor shall arrange to carry out above tests for every 100 T of cement and for every change in lot/ batch and the same shall be submitted and take approval of Engineer in charge before using in work. No extra payment will be made for conducting tests and the quoted rate is inclusive of testing charges.

**IV) *Storage***

- i) Any temporary structure required for storage of cement, steel etc., has to be provided by the tenderer at his cost. The Railway will only provide suitable land/shed for construction of the above temporary shed free of cost wherever land/shed is available and is free for use. Double lock arrangement (Contractor and Railway) for the temporary stores shed should be provided by contractor. On completion of the work or as directed by the Engineer-in-charge, the shed if put up by the Contractor, should be removed by the contractor and site cleared at his cost.
- ii) Stacking and storing of cement can be done as per Unified Standard Specification for Works and materials 2010.

**V) *Consumption of cement:***

- i) The cement consumption for the works shall be as per the Unified Standard Specification for Works and materials 2010 along with the "Cement Schedule" of the Railway or as per the

approved design mix and as per the Minimum and Maximum content specified for various grades. Excess cement used will not be paid for and the decision of the Engineer-in-charge is final and binding on the Contractor.

- ii) In case of design mix (M20, M30, M40 mix etc., or similar mix design), the quantity of cement will be decided based on the approved design mix and the decision of the Engineer-in-charge is final and binding on the contractor. The Contractor should submit design mix details at his cost from the approved laboratory to the Engineer-in-charge before getting the trial mix approval / use in construction.
- iii) The following minimum quantity of cement shall be used for various grade of concrete as per relevant IS specifications.

Environment	Grade of Concrete & Cement content					
	PCC		RCC		PSC	
MILD	M20	300	M25	350	M35	400
MODERATE	M25	350	M30	400	M45	400
SEVERE	M25	380	M35	400	M45	430
VERY SEVERE	M30	400	M40	430	M50	440
EXTREME	M30	400	M45	430	M50	440

Depending upon the environment to which the structure is likely to be exposed during its service life, minimum cementations material content in concrete shall be as given in above table .

Maximum cementations material content shall be limited to 500 kg/cum.

- iv) The minimum grade concrete in bridges shall be: Plain Cement concrete - M20; Reinforcement Cement concrete - M25; Pre-stressed Cement concrete -M40. Only the approved design mix shall be used for the concrete works. The quantity of cement used shall be based on the design-mix in such cases subject to the limitations of minimum and maximum laid down in relevant specifications. No wastage of cement shall be payable by the Railway.

#### **VI) *Payment for supply of cement***

- i) Cement supplied for the work and measured under the Schedule for supply of cement will be paid only after its use in various works under the Schedules of the contract as per conditions and no advance payment for supply will be admissible.

#### **VII) *General***

1. No wastage of any of the materials supplied and used in the work by the contractor including cement is payable by the Railway, contractor will make his own arrangements for storing cement for use in work.
2. Contractor should take proper precautionary measures to store the cement in good condition against rains, cyclones. Railway is not responsible for any loss of cement due to clodding on account of defective storage or delay and Railway will not permit usage of such cement in the works.
3. 53 Grade/43 Grade/any other types of cement should be stacked separately in countable manner.
4. Admixture / Plasticizers of approved specifications will be permitted to be used in concrete

- wherever required and into the approval by the Engineer-in-charge. However, no extra payment for the admixtures used shall be payable unless otherwise specified in the Schedule.
5. Cement for temporary and enabling works shall be arranged by the contractor at his own cost and no extra payment will be paid on this account.
  6. Empty cement bags on release from the work is the property of the contractor and shall be disposed off by the contractor himself.

## B . TECHNICAL SPECIFICATIONS & SPECIAL CONDITIONS FOR SUPPLY OF STEEL FOR CONSTRUCTION WORKS.

### SUPPLY OF STEEL FOR VARIOUS WORKS

- i) Supply of steel to various specifications as required under various schedules in the contract is governed by the Technical specifications and Special Conditions specified hereunder.
- ii) All steel shall be supplied by the Contractor at the site of work and stacked, stored, protected and maintained by him at his cost till they are put into use. However, Railway reserves the right to supply departmental steel to the extent available which shall be transported by the Contractor from depot to the work spot. Payment towards such transportation will be made under relevant item of the USSOR 2011. Payment for cutting, fabrication etc., done on the Railways steel will also be made as per the USSOR or as per relevant items available in schedules. Any temporary structure required for storage of steel etc., has to be provided by the Contractor at his cost and should be removed after completion of the work. The Railway will only provide suitable land for construction of the above temporary shed free of cost wherever available.
- iii) For supply and use of steel in various works, relevant IRS Codes Specifications, IS Specifications and Railways specifications will be applicable and wherever, relevant specifications are not available, decision of the Engineer-in-charge is final and binding on the Contractor.

### II. SPECIFICATIONS FOR STEEL

- a. The steel supplied by the contractor must satisfy any of the following material specifications as required for the work along with other concerned specifications.
  - i) The reinforcement steel shall be High Yield Strength Deformed steel conforming to IS 1786 (up to date) and in case of mild steel rods it shall conform to IS 432 (Part-I Up to date) as specified. The steel to latest code and of latest manufacturing technique, as approved, shall be made available by the contractor and the agreement rate applies to the same.
  - ii) The structural steel shall be conforming to IS 2062 (up to date) as specified.
  - iii) HTS wires/strands shall be conforming to IS 14268 (Up to date) as specified.
  - iv) Relevant other IS and IRS Specifications with regard to properties, testing and use of the above steel items also shall govern.
  - v) Only steel of grades Fe500/Fe550 shall be used in bridge construction and Fe415, if used, shall have pre- approval of Sr. DEN-in-charge. For special cases and in seismic zones III, IV and V, only Fe500D/Fe550D shall be used. For other concrete, IS 432/Fe415/Fe 500/Fe550 may be used as specified.
  - vi) The contractor shall produce the manufacturers test certificate for each lot of supply satisfying the requirements of relevant IS specifications and at the specific frequency as laid down.
  - vii) The Contractor shall arrange to carry out additional tests on physical properties of steel for every 50 metric tone (t) of steel and for every change in lot/batch for reinforcement steel and structural steel at his cost. For HTS wires and strands, Contractor shall arrange to test the steel at a rate of one test per 3 metric tone (t). The same shall be submitted to the Railways and approval taken of the Engineer-in-charge before using in work. No extra payment will be made for conducting such tests and the agreemental rate is inclusive of above testing charges.
  - viii) Further, specimen of the material shall be tested before it is put to use in recognized

laboratory and the cost of testing shall be borne by the Contractor, whenever directed by the Engineer-in-charge. The Engineer-in-charge reserves the right of testing of specimen at his own discretion and the cost of testing will be borne by the Contractor.

**III. Procurement of steel:**

- i) All steel ( reinforcement steel, structural steel etc) for the work shall be procured from SAIL /TISCO /IISCO / RINL (VIZAG steel) directly or through their authorized stockists. In case of steel supplied from any other source other than these approved producers and if the same are used in specific circumstances with the specific approval of the Sr. DEN -in-charge, the same will be paid only at 85% of the agreed rates subject to its passing the test requirements of the relevant steel specifications in the tender.
- ii) The contractor shall have to submit the cash memo and challans along with the lot / batch of steel purchased  
in token of proof of purchase of steel from reputed dealers. Steel shall be approved by Engineer- in-charge only after production of necessary certificates before use in works.

**IV. Payment for supply of steel**

- i) Payment for supply of all types of steel will be made for the quantity required / used as per the USSOR 2010 of South Western Railway and as per drawings issued from time to time and as per approved designs for the completed and measured quantity of Prestressed concrete/Reinforced concrete works. No payment will be admissible for quantity supplied in excess of the required quantity as per designs/drawings. However, contractor will be permitted to take the excess quantity back by his own means, but no claim for payment for transportation so involved will be admissible. No payment will be made for more supply of steel at the site/excess used in Construction. No payment will be made for steel used in temporary or enabling works unless explicitly provided for in the Schedules. Steel for enabling/temporary works shall be arranged by the Contractor at his own cost.
- ii) Payment for reinforcement steel will be as per reinforcement actually utilized in the work based on approved designs/bar bending schedule. Payment for HTS will be made for the length between the bearing plates in the pre-stressed structures as used only. Structural steel will be paid for the weights of steel work calculated from final working drawings based on nominal weights given in the producer's hand books and using minimum square over all dimensions, no deductions being made for skew cuts, holes or notches. The drawing office dispatch lists (D.O.D.Ls) when prepared according to above procedure shall be the basis and shall be submitted by the contractor to the Engineer-in-charge for approval. 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. An addition of 1.5% shall be made to the member quantities as arrive above, to account for the weight of rivets and welds. Nothing extra will be paid for wastage or for cut rods/wires/steel sections which will be the property of the contractor. The weight of the steel will be calculated from the nominal weight as per relevant IS Specifications or the actual unit weight whichever is less based on linear measurements. GI wire or other binding material used in Construction shall not be covered under this supply schedule.
- iii) 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. Should the actual weight fall short of the calculated weight by more than 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. In the event 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.
- iv) The cutting, bending and placing of reinforcement or other types of steel shall conform to relevant IS/IRS codes and instructions on detailing of reinforcement or other types of steel as directed by Engineer-in- charge. However, payment for the same will not be made under

this schedule.

- v) Payment for steel overlap will be limited to a maximum limit of 5% of the total consumption of steel irrespective of whatever over lap provided actually even with approval. Unauthorized overlaps will not be paid for. Over laps in critical locations shall not be permitted.

#### **V. STAGE PAYMENTS**

- i) Stage/Advance Payment will be made by the Railways for steel physically brought to site by the contractor, before actual use in the work against irrevocable Bank Guarantee or Indemnity Bond (as the case may be ) and on production of necessary records.
- ii) In case of contracts of values upto Rs.15 crores, Stage/Advance payment will be made on submission of irrevocable Bank guarantee covering the stage/advance amount. The Bank guarantee shall be valid upto the period covering actual use of steel in the work.
- iii) In case of contracts of values more than Rs.15 crores, Stage/Advance payment will be made on submission of Indemnity bond covering the stage/advance amount.
- iv) Stage/Advance payment for steel will be released subject to the following conditions:
  - a. The material shall be strictly in accordance with the contract specifications.
  - b. The steel shall be delivered at site and properly stored under covered sheds in measurable stacks and separately maintained for various sizes, sections and dates of supply.
  - c. The quantities of steel shall be brought to the site only in such instalments that would facilitate smooth progress of work and consumed in reasonable time. The payment will be restricted to a maximum of 30% of  
the schedule quantity at any point of time.
- d. Proper accountal in the Steel Register is to be maintained in the prescribed format at the site for the receipt and use of the steel.
- e. Ownership of such steel shall be deemed to vest with the Railways
- f. Before releasing the stage payment, the contractor shall insure the steel at his own cost in favour of Railways against theft, misuse, damages, fire etc., and submit the insurance along with Indemnity bond /Bank Guarantee covering the Stage/advance amount for steel.
- g. Stage/Advance payment shall not be more than 75% of the rate of steel awarded in the contract. The balance payment shall be released only after the material is actually consumed in the work.
- h. The price variation claim for steel will continue to be governed as per extant PV clause and with reference to delivery at site.
- i. The Stage/Advance payment will be made, only when the Engineer-in-charge or his authorized representative certifies that the said quantity of steel is received at site and entered in the register and that in his opinion the steel is actually required in accordance with the contract.
- j. No Stage/ Advance payment is permitted for steel required for temporary and enabling works.
- v) Any Stage/ Advance payment found to be made against the materials brought to the site in excess over the actual materials consumed in work shall be recovered from the contractor dues.

#### **VI. Others**

- i) Steel, reinforcement and other types, shall be stored in such a way so as to avoid distortion and to prevent deterioration by corrosion. All steel used should be free from loose Mill scale, loose rust, paints and oil covering / coating etc.
- ii) Steel material, for which stage payment has been availed by the Contractor, shall be property of Railways and will be issued to contractor by Engineer-in-charge whenever required for the work. Contractor will be solely responsible for guarding against theft/misuse of the consignment due to any cause what so ever. The stage payment will be made, only when the Engineer-in-charge certifies that in his opinion that the materials are actually required in accordance with the contract. It is the responsibility of the agency to ensure that steel as per the requirement is brought to site as per approved drawings/requirements and entered in MAS register.
- iii) The contractor shall make his own arrangements for the binding wire as per the relevant specifications at his own cost for all concreting works including works under the USSOR items in any schedules, even if mentioned otherwise in any other documents.

- iv) Cutting, bending, welding, placement of reinforcement steel shall conform to relevant IRS/IS Codes including requirements for laps, dowelling, other detailing etc. Rates for concrete items include the cost of the above activities in complete. Rates quoted includes that of GI binding wire of appropriate specifications.
- v) The contractor shall be bound to store the materials at site of work earmarked for the purpose by engineer in charge and shall not remove from the site nor use for any other purposes than exclusively for execution of the work for which the materials intended for.
- vi) Welding of reinforcement will not be generally permitted except in special circumstances under the written approval of the Engineer in charge.
- vii) Contractor shall remove from site any steel materials rejected by the Engineer-in-charge within reasonable time as specified by him. In case of failure to remove the rejected material within reasonable time as specified, penalty @ Rs 100/-per ton per day will be imposed and recovered from subsequent running bills.
- viii) A register shall be maintained by the contractor with full details of reinforcement for accountal and payment of steel. The contractor should sign a similar such register maintained by Railway before undertaking concreting works as a token of acceptance of the details of the reinforcement in works, failing which the details as recorded by Railway are binding on the contractor for the purpose of payment and no dispute will be entertained by Railway on this account.
- ix) If MS bars are supplied in coils, then the contractor will have to straighten them before cutting and bending etc. with in quoted rate and no extra payment will be made on this account.
- x) Prestressing Steel: The prestressing steel shall be used not later than 6 months from the date of manufacture or 3 months from the date of arrival at site and shall be Uncoated stress relieved low relaxation strand conforming to IS 14268-1995 or as specified.
- xi) Steel for temporary and enabling works shall be arranged by the contractor at his own cost and no extra payment will be paid on this account.
- xii) Stock piling of Prestressing steel in the open at the work site will not be allowed under any circumstances. Special care shall be taken by the contractor to store the H.T. steel under suitable covered shed as approved by the Engineer. The Engineer/his representative shall always have an easy access to store yard for inspecting the H.T. Steel for satisfying themselves regarding the condition thereof. Any modification/protection suggested by them shall be scrupulously followed by the Contractor.
- xiii) In addition to manufacturer's certificate, the acceptance of H.T steel shall be subjected to the independent testing of steel for the following characteristics by the Contractor at his cost, and nothing extra shall be paid on this account.
  - o Mechanical properties like diameter, mass of strand
  - o Ultimate tensile strength and lead extension curves, yield point, proof stress and modulus of elasticity.
  - o Elongation after fracture
  - o Relaxation after 1000 hour test.
- xiv) Before the test pieces are selected, the Contractor shall furnish copies of the mill records of the H.T steel giving number of coils in each cast with sizes and identity marks to enable identification of the material with the bill produced.
- xv) Wires/strands shall be supplied/brought to site in reels or in reel-less packs having a

minimum core diameter of 600mm. The coil shall be securely strapped to prevent distortion in transit and handling.

- xvi) The wires/strands shall be quoted with water soluble oils to prevent corrosion
- xvii) Anti corrosion treatment to HYSD/TMT reinforcement steel: Reinforcement steel does not require any special treatment normally since South Western Railway is identified as moderate / mild environment sections only. However, all steel used in bridges shall be treated with Truncated Inhibited Cement Slurry by the contractor and the coating is maintained throughout till concreting is done. No extra payment for this treatment is admissible except that the cement used will be paid for separately.
- xviii) However, for aggressive (severe, very severe and extreme) environment conditions, special anti corrosion treatment of reinforcement steel used in bridges may be necessary. The steel shall be treated by one of the following methods as indicated in table below and only with specific approval of the Sr.DEN in charge. Extra payments for the same are admissible unless otherwise included in the relevant schedules.
- xix) Protective Coatings:- In order to offer adequate resistance against corrosion reinforcement bars shall be provided with suitable protective coatings depending upon the environmental conditions.

The recommended coatings are as under

Aggressive environment		Non Aggressive environment
Important & Major Bridges	Minor bridges & structures	All structures
Cement polymer composite coating or Fusion Bonded Epoxy coating	Cement polymer composite coating or Inhibited Cement Slurry coating	Truncated Inhibited Cement Slurry coating

- xx) The steel consumption shall be as per the designs/drawings issued/ adopted by the Railways. Quantity of steel reinforcement consumption shall be as per reinforcement actually utilized in the work based on approved bar bending schedule. Nothing extra will be paid for wastage or for cut rods, if any, which will be property of the contractor. The weight of the steel will be calculated from the nominal weight as per relevant IS Code or the actual unit weight whichever is less based on linear measurements.

### C. TECHNICAL SPECIFICATIONS & SPECIAL CONDITIONS FOR CONCRETE

#### I) **Specifications**

- i) Concrete for PCC, RCC and PSC shall be as per Unified Standard Specification for Works and materials 2010, relevant IRS and IS specifications / Rules/ guidelines. Some important ones are listed below. Along with these, all other relevant IRS, IRC and IS specifications with their update versions shall also govern. These govern all concrete works in bridges, buildings etc as applicable.
  - IRS Bridge rules
    - IRS concrete bridge code
    - IRS Substructure and foundation code
    - IS 456 – Code of practice for Plain and Reinforced Concrete.
      - IS 1343 – Code of practice for pre stressed concrete.
      - UIC 772R – Neoprene/ Elastomeric Bearings etc.
- ii) Specification for cement, steel, binding wire, HTS wires/ strands used in concrete construction shall be as per specifications indicated under the supply schedules or as per relevant IRS/ IS specifications. Aggregates shall comply IS 383. Water used in concrete shall comply IS 3025. Admixtures, if permitted, shall comply IS 9103 or equivalent. Mix design shall be as per IS 10262. Ready-Mix concrete shall be as per IS 4926. IS 2911 and IS 3955



govern pile & well foundations. The above are not exhaustive, but indicative only and their latest or updated versions shall govern the construction of works. Any other specifications/rules/guidelines issued from time to time by Railway Board/RDSO shall also govern the works.

- iii) In all matter of execution, including testing of various components, where the above codes/ specifications/ guidelines are not clear or explicit, the direction given by the Engineer in charge is final and binding on the contractor.

## **II) Coarse & Fine Aggregate**

- i. Aggregates shall comply with the requirements of IS:383 and shall be subjected to the tests in accordance with IS: 2386. Coarse aggregates shall be from crushed stone from approved quarries. Sand shall be from good river sources of approved quarries only.
- ii. The nominal maximum size of the aggregate should be as specified but in no case greater than one-fourth of the minimum thickness of the member, provided that the concrete can be placed without difficulty so as to surround all reinforcement and pre-stressing tendons thoroughly and fill all corners of the formwork.
- iii. For heavily reinforced concrete members as in case of ribs of main beams, the nominal maximum size of the aggregates may be restricted to 5mm less than minimum clear distance between main bars, cables, strands or sheathing or 5mm less than minimum cover to the reinforcement, whichever is smaller. However, lightly reinforced concrete members such as solid slabs with widely spaced reinforcement limitation of the size of the aggregate may not be so important and nominal maximum size may sometimes be as great as or even greater than the minimum cover.
- iv. For Reinforced Concrete and Prestressed Concrete works, aggregate of nominal maximum size of 20 mm or as specified shall be used. In special cases larger size aggregate may be specifically permitted by the Engineer- in-charge but in no case the maximum size shall be more than 40 mm.
- v. Coarse aggregate shall be jaw crushed and cubical in shape. Fine aggregate shall be naturally produced. Creek/ Marine sand shall not be used in permanent works.
- vi. Sand if found too coarse, shall be suitably blend with finer sand obtained from approved sources to obtain desired grading. The provision of two types of sand , their stacking separately and their mixing in specified proportion shall be at contractor's cost. The sand shall not contain silt, shale, clay and other weak particles as specified in relevant specifications.
- vii. The grading of sand shall conform to IS 2386. The sand shall be screened on a 4.75mm size screen to eliminate over size particles. The sand shall be washed in screw type mechanical washers in potable water to remove excess silt, clay and chlorides wherever required. It should be done one day before concreting. The washed sand can be stored on a sloping platform and in such manner as to avoid contamination.
- viii. Aggregate shall be stored in such a way as to prevent segregation of sizes and avoid contamination with fines and other undesirable material.

## **III) Water**

- i. Water used for washing of aggregates and for mixing and curing concrete shall be clean, potable and free from injurious amounts of oils, acids, alkalis, salts, sugar, organic matters or other substances that may be deleterious to concrete or steel shall conform IS 3025.
- ii. In case of doubt regarding development of strength, the suitability of water for making concrete shall be ascertained by the compressive strength and initial setting time tests specified as per IS 516/ IS 4031.
- iii. Water found satisfactory for mixing is also suitable for curing also. However, water used for curing should not produce any objectionable stain or unsightly deposit on the concrete surface. The presence of tannic acid or iron compounds is objectionable.

## **IV) Concrete Admixtures**

i. Engineer-in-charge may permit the use of admixtures, with approval of competent authority, for imparting special characteristics to the concrete or mortar on satisfactory evidence that the use of such admixtures does not adversely affect the properties of concrete or mortar particularly with respect to strength, volume change, durability and has no deleterious effect on reinforcement. In rail bridges, use of admixtures is governed by clause 4.5 of IRSConcrete Bridge Code.

- ii. The admixtures, when permitted, shall conform to IS:9103. They shall be non-air entraining type. Calcium chloride or admixtures containing calcium chloride shall not be used in structural concrete containing reinforcement, prestressing tendon or other embedded metal. The admixture containing Cl & SO<sub>3</sub> ions shall not be used. Admixtures containing nitrates shall also not be used. Admixtures based on thiocyanate may promote corrosion and therefore shall be prohibited. Naphthalene or melamine based admixtures may be used selectively.
- iii. It should be obtained from established manufactures with proven track record or as per approved list wherever available.
- iv. The contractor shall provide the following information after obtaining from manufacturer before the same is put to use.
  - 1. The chemical names of the main ingredients in the admixture
  - 2. Chlorine content if any, expressed as a percentage by the weight of the admixtures
  - 3. Values of dry material content, ash content and relative density of the admixtures which can be used for uniformity tests.
  - 4. Whether or not the admixture leads to the entrainment of air when used as per the manufacturer's recommended dosage, and if so to what extent.
  - 5. Where 2 or more admixtures are proposed to be used in any one mix, confirmation as to their compatibility.
  - 6. There would be no increase in risk of corrosion of the reinforcement or other embodiments as a result of using the admixture.
  - 7. Retardation achieved in initial setting time.
  - 8. Normal dosage and detrimental effects, if any, of under or over dosage.
  - 9. Recommended dosage and expected results, including proof for the same wherever required. Independent test result shall be produced by the contractor on demands/ as specified.

#### V) *Storage of materials*

- i. Storage of materials shall be as per IS: 4082. All materials may be stored at proper places so as to prevent their deterioration or intrusion by foreign matter and to ensure their satisfactory quality and fitness for the work. The storage space must also permit easy inspection, removal and restoring of the materials. All such materials even though stored in approved godowns / places, must be subjected to acceptance test prior to their immediate use.
- ii. Aggregate stockpiles may be made of ground that is denuded of vegetation, is hard and well drained. If necessary the ground shall be covered with 50mm plank. Coarse aggregate, unless otherwise agreed by the engineer in charge in writing, shall be delivered to the site in separate sizes. Aggregate placed directly on the ground shall be removed from the stockpile within 30cm of the ground until the final cleaning up of the work, and then only the clean aggregate will be permitted to be used. In case of fine aggregate these shall be deposited at mixing site

not less than 8 hours before use and shall have been tested and approved by the engineer in charge before use.

- iii. Cement shall be transported, handled and stored at the site in such a manner as to avoid deterioration or contamination. Cement shall be stored above ground level in perfectly dry and water-tight sheds and shall be stacked not more than eight bags high. Wherever bulk storage containers are used their capacity should be sufficient to cater to the requirement at site and should be cleaned at least once every 3 months. Cement older than 3 months from the date of manufacture shall not be used. Each consignment shall be stored separately so that it may be readily identified and inspected and cement shall be used in the sequence in which it is delivered at site. Any consignment or part of a consignment of cement which had deteriorated in any way, during storage, shall not be used in the works and shall be removed from the site by the Contractor without charge to Railways.
- iv. Supply of Reinforcement steel shall be taken from approved supplier as per the list only and no rerolled steel shall be incorporated in the work. The reinforcement bars, when delivered on the job, shall be stored above the surface of the ground upon platforms, skids or other supports, and shall be protected from mechanical injury and from deterioration by exposure. Every bar shall be inspected before assembling on the works and any defective, brittle, excessively rusted or burnt bars shall be removed. Cracked ends of bars shall be cutout.

***VI) Testing of steel and cement & others:***

- i. Prestressing steel, reinforcement steel, cement and other items shall be tested and results produced by the contractor as specified under the supply items. However, the contractor shall also arrange for additional tests at his own cost as required by the Engineer-in-charge as and when required. The decision of the Engineer-in-charge is final in this regard.

***VII) Concreting***

- i. The contractor shall make his own arrangements for supply of water and electricity for all his works at his own cost. He shall arrange potable quality water for use in all concrete works and samples of water shall be got tested from approved laboratory/approved by the Engineer-in-charge before being used in concreting. Apart from water, fine & coarse aggregates and all other materials shall be tested from time to time by the contractor at his cost to ensure proper quality works.
- ii. Maximum/minimum size of aggregates, standards of quality of materials, minimum cover for concrete, use of admixtures/chemicals, treatment to reinforcement/finished surfaces, etc., shall be as per relevant Codes, IS/IRS specifications and conditions of contract as specified.
- iii. All exposed concrete surfaces shall be finished smooth by the contractor at his own cost. Shuttering materials for RCC and PSC in superstructure shall be strictly of steel only to permit vigorous vibration and to ensure no deviation of finished dimensions by more than +5/-0 mm and wooden shutters are not permitted. For other works also, proper quality of shuttering materials which will permit vibrating and will not require additional finishing shall only be used. If there is any variation in the surface, alignment or lines in the products beyond permissible rejection limits indicated in these conditions, the Railway reserves the right to reject the same and the contractor shall not have any claim in this regard and cost of railway materials involved will be recovered from the contractor including penalties, if any imposed.

***Weigh batching, vibrating, curing & testing:***

- iv. All concrete, i.e. Plain, RCC & PSC, shall be machine mixed and vibration compacted by using appropriate vibrators. Weigh batching plant, mixers, vibrators, etc., of appropriate capacity, as specified/directed by the Engineer-in-charge, shall be arranged by the contractor at his cost. Weigh batching plants, for major works, shall have computerized control for weighing, loading, mixing and delivery. Major works for this purpose are those

where the quantity of concrete in all types of concrete produced in a single site is more than 2500 cum or in multiple sites more than 4000 cum in one work.

- v. For major works, batching plants, transit mixers, concrete pumps, etc., shall be installed by the contractor necessarily at site. In case of failure of any of the above, standby arrangements for ensuing continuous concreting has to be provided by the contractor at his cost. For piling works & PSC works, concreting shall be done continuously as per the volumes designed without break and accordingly standby arrangements shall be ensured by the contractor. Wherever concreting by means other than weigh batching is done, even with the approval of the Sr. DEN in charge in case of special situations, the quantities & other details shall be recorded and maintained by the contractor and Railway reserves the right to reduce payment by 10% of the agreement rates for such concreting done and the decision of the Engineer-in-charge is final in this regard.
- vi. Curing & vibrating shall be arranged by the contractor at all locations/heights at his own cost and no extra payment on this account will be admissible. Curing of concrete shall be done as per relevant IS Codes/Specifications. If curing is not done by the contractor properly, Railway may get it done through any other means at the Contractor's cost without any notice to him and recover from his bills the same including penalty if any at the discretion of the Engineer-in-charge. The concrete shall be kept wet constantly by bonding or covered with a layer of sacking canvas etc. Steam curing or bonding is mandatory for special PSC works as specified and as per approved designs.
- vii. Test cubes shall be cast at regular intervals and tested to ascertain the strength of concrete. The contractor shall establish a cube testing facility along with operator at the site or nearby area to facilitate prompt testing of concrete. Test cube moulds as required as per IS Codes shall be made available by the contractor at his cost.

### **VIII) Design Mix**

- i. For all items of concrete only design mix shall be used. Prior to the start of construction, the Contractor shall design the mix and submit to the Engineer-in-charge for approval, the proportions of materials, including admixtures to be used. Admixtures (including plasticizers or super- plasticizers) may be used as specified in the conditions of the contract. Atleast 8 weeks before commencing any concreting, the contractor shall make trial mixes using samples of coarse aggregates, sand, water etc., typical of those to be used in the works.
- ii. The mixes are designed to yield to mean strengths (fcm) greater than the correspondence specified characteristic strengths (fck) as indicated in table below. Mix design shall be as per IS10262.

The grades of concrete and the required average strength at 28 days for a few mixes are specified below for guidance:

Grade of concrete	Max size of aggregate (mm)	Characteristic strength (fck) at 28 days (kg/sqmm)	Target Mean Strength (fcm) 28 days (kg/sqmm)
M20	10	20	29
M20	20	20	29
M35	20	35	44
M35	40	35	44
M45	20	45	54
M45	40	45	54

- iii. Trial mixes including making of cubes, curing, testing shall be in accordance with IS516. Wherever there is a significant change in materials used, fresh trial mix shall be arranged by the contractor as required by the Engineer-in-charge. When the proportions of the mix are approved, the contractor shall not vary any of the design parameters or the source of the materials without the approval of the Engineer-in-charge.
- iv. Requirements of Consistency: The mix shall have the consistency which will allow proper placement and consolidation in the required position. The slump of concrete shall be checked as per IS:516 as directed by the Engineer-in-charge. For guidance, recommended

slump are as under:

Sl.no.	Type of structure	Slump in mm
1	RCC structures with widely spaced reinforcement, eg. Solid column, pier, abutments, well footing etc	40-50
2	RCC structures with fair degree of congestion of reinforcement, eg. pier, abutment cap, well cap, beam etc	50-75

## IX) *Durability*

- i. The durability of concrete depends on its resistance to deterioration and the environment in which it is placed. The resistance of concrete to weathering, chemical attack, abrasion, frost and fire depends largely upon its quality and constituents materials. Susceptibility to corrosion of the steel is governed by the cover provided and the permeability of concrete. The cube crushing strength alone is not a reliable guide to the quality and durability of concrete; it must also have an adequate cement content and water-cement ratio. The general environment to which the concrete will be exposed during its working life is classified in five levels of severity that is mild, moderate, severe, very severe and extreme, as described below

Environment	Exposure Conditions
Mild	Concrete surfaces protected against weather or aggressive conditions, except those situated in coastal area.
Moderate	Concrete surface sheltered from severe rain or freezing whilst wet; Concrete exposed to condensation and rain; Concrete continuously Under water. Concrete in contact or buried under non-aggressive soil/ groundwater. Concrete surfaces sheltered from saturated salt air in coastal area.
Severe	Concrete surfaces exposed to severe rain, alternate wetting and drying or occasional freezing whilst wet or severe condensation; Concrete completely immersed in sea water; Concrete exposed to coastal environment.
Very severe	Concrete surfaces exposed to sea water spray, corrosive fumes or severe freezing conditions whilst wet. Concrete in contact with or buried under aggressive sub-soil/ ground water.
Extreme	Concrete surface exposed to abrasive action/ Surface of members in tidal zone. Members in direct contact with liquid / solid aggressive chemicals.

## X) *Maximum Water Cement Ratio*

- i. Maximum water-cement ratio, grade of concrete and cementitious material content for various environment conditions for achieving durability are indicated below for guidance:
- ii. The limits for maximum water cement ratio for design mix shall be based on

environmental conditions and durability.

The limits for maximum water cement ratio for different environmental conditions shall be as given below

Environment	Plain Concrete (PCC)	Reinforced Concrete (RCC)	Pre-stressed Concrete (PSC)
Mild	0.55	0.50	0.45
Moderate	0.50	0.50	0.40
Severe	0.50	0.45	0.40
Very severe	0.50	0.45	0.35
Extreme	0.45	0.40	0.35

**XI)**

***Grade of concrete***

From durability consideration, depending upon the environment to which the structure is likely to be exposed during its service life, minimum grade of concrete shall be as given in table below.

Environment	Plain Concrete (PCC)	Reinforced Concrete (RCC)	Pre-stressed Concrete (PSC)
Mild	M20	M25	M35
Moderate	M25	M30	M35
Severe	M25	M35	M45
Very severe	M30	M40	M50
Extreme	M30	M45	M50

**XII)**

***Cementitious Material Content***

Maximum Cementitious Material Content shall be limited to 500kg/m<sup>3</sup>. Depending upon the environment to which the structure is likely to be exposed during its service life, minimum cementitious material content in concrete shall be as given in table below.

Environment	Plain Concrete (PCC)	Reinforced Concrete (RCC)	Pre-stressed Concrete (PSC)
Mild	210	300	350
Moderate	250	300	400
Severe	250	350	430
Very severe	300	400	440
Extreme	300	400	440

**XIII)**

***Permeability of concrete***

Permeability test shall be mandatory for all RCC/PSC bridges under severe, very severe, and extreme environment. Under mild and moderate environment, permeability test shall be mandatory for all major bridges, and for other bridges and structures permeability test is desirable. Depth of penetration of moisture shall not exceed 25mm or as specified.

**XIV)**

***Mixing of concrete***

- i. Concrete shall be mixed either in a mini mobile batching plant or in a batching and mixing plant as per the specification. Hand mixing shall not be permitted. Mixer or the plant shall be at an approved location considering the properties of the mixes and the transportation arrangements available with the contractor. The mixer or the plant shall be approved by the engineer in charge.

- ii. Mixing shall be continued till materials are uniformly distributed and a uniform color of the entire mass is obtained, and each individual particle of the coarse aggregate shows complete coating of mortar containing its proportionate amount of cement.
- iii. Mixers which have been out of use for more than 30 minutes shall be thoroughly cleaned before putting a new batch. The first batch of concrete from the mixer shall contain only two thirds of the normal quantity of coarse aggregate. Mixing plant shall be thoroughly cleaned before changing from one type of mix to another.

**XV) *Transporting, placing and compaction of concrete***

- i. The method of transporting and placing concrete shall be approved by the engineer in charge. Concrete shall be transported and placed as near as practicable to its final position, so that no contamination, segregation or loss of its constituent materials takes place. Concrete shall not be freely dropped into place from a height exceeding 1.5m.
  - ii. When concrete is conveyed by chute, the plant shall be of such size and design as to ensure practically continuous flow. Slope of the chute shall be so adjusted that the concrete flows without the use of excessive quantity of water and without any segregation. The delivery end of the chute shall be as close as possible to the point of the deposit. The chute shall be thoroughly flushed with water before and after each working period and the water used for this purpose shall be discharged outside the formwork.
  - iii. All formwork and reinforcement contained in it shall be cleaned and made free from standing water, dump, immediately before placing of concrete.
  - iv. No concrete shall be placed in any part of the structure until approval of the Engineer in charge has been obtained.
  - v. If concreting is not started within 24 hours of the approval given, it shall have to be obtained again from the engineer in charge. concreting shall then proceed continuously over the area between the construction joints. Fresh concrete shall not be placed against concrete which has been in position for more than 30 minutes unless a proper construction joint is formed.
  - vi. Except where otherwise specified by the engineer in charge, concrete shall be deposited in horizontal layers to a compacted depth of not more than 450mm.
  - vii. Concrete when deposited shall have a temperature of not more than 40°C. it shall be compacted in its final position within 30 minutes of its discharge from the mixer, unless carried in properly designed agitators, operating continuously when this time shall be within 1 hour of the addition of cement to the mix and within 30 minutes of its discharge from the agitator. In all such matters, the engineer – in charge's decision shall be final.
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- viii. Concrete shall be thoroughly compacted by vibration or other means during placing and worked around the reinforcement, embedded fixtures and into corners of the formwork to produce a dense homogenous void-free mass having the required surface finish. When vibrators are used, vibration shall be done continuously during the placing of each batch of concrete until the expulsion of air has practically ceased and in a manner that does not promote segregation. Over vibration shall be avoided to minimize the risk of forming a weak surface layer. When external vibrators are used, the design of formwork and disposition of vibrator shall be such as to ensure efficient compaction and to avoid surface blemishes. Vibrations shall not be applied through reinforcement and where vibrators of immersion type are used, contact with reinforcement and all inserts like ducts etc., shall be avoided. The internal vibrators shall be inserted in an orderly manner and the distance between insertions should be about one and half times the radius of the area visibly affected by vibration. Additional vibrators in serviceable condition shall be kept at site so that they can be used in the event of breakdowns.
  - ix. Mechanical vibrators used shall be of appropriate specifications, type and capacity and as directed by the Engineer-in-charge.

**XVI) *Equipment & machinery for concreting***

- i. For major concrete works, the following equipments in numbers indicated are considered necessary for efficient and speedier concreting. However, the actual numbers may be arranged as required by the Engineer-in-charge, taking into account the site conditions.

1	Concrete batching plant (10-20cum capacity)	1no.
2	Transit mixers (4-7 cum capacity)	2no.
3	Concrete vibrators (2HP)	4no
4	Vibrators of needles (60mm & 40mm)	4no.
5	Screed vibrator (for ROB)	2no.
6	Form vibrator (500Watt capacity)	2no.
7	Generator (35KV capacity)	1no.
8	Welding set (3- 5KV capacity)	1no.
9	Reinforcement steel cutting maxchine	1 no.
10	Reinforcement steel bending maxchine	1no.
11	Concrete pumps (10-20HP capacity with 40m pipe length)	1no.
12	Hydra 12.0 capacity crane	1 no.
13	Concrete funnel bucket	1no.
14	Air compressor (100-150cum capacity)	1no.
15	Concrete Dumpers	2no.
16	Any other including power lifts etc, as required to suit site	Adeq uate no.

- i. For smaller works, equipments as required by the Engineer in charge shall be arranged by the contractor. The contractor may make his own arrangements such as the above or with better machinery with the approval of the Engineer in charge; however the plants shall be able to produce at least 20cum of the concrete per hour continuously in major works site to enable speedier completion of the works.
- ii. All the above machineries are required to be arranged by the contractor at his own cost and the agreement rates for concreting include the same. No extra payment is admissible for any machines arranged by the contractor.

## ***XVII) Construction joints***

- i. Construction joints shall be avoided as far as possible and in no case case the locations of such joints shall be changed or increased from those shown on the drawings, except with express approval of the engineer in charge. The joints shall be provided in a direction perpendicular to the member axis. Sequencing of concrete placement should be organized in such a way that cold joints are totally eliminated. The sequence of concreting shall be submitted for the approval of engineer prior to concreting of the structural element. Concreting shall be carried out continuously up to the construction joints, the position and arrangement of which shall be pre determined by the designer.
- ii. The use of Construction joints in prestressed concrete should preferably be avoided. If it is found necessary, they shall be restricted to bare minimum duly adopting proper construction techniques.
- iii. Construction joints should be positioned to minimize the effect of the discontinuity on the durability, structural integrity and appearance of the structure. Joints should be located away from regions of maximum stress caused by loading particularly where shear and bond stresses are high. Construction joints between slabs and ribs in composite beam should be avoided. As a general rule joints in column are made as near as possible to the beam hunching. Joints in beams and slabs should normally be made at the centre or within the middle third of the span. As far as possible, joints for fair faced concrete should be located where they conform with the architectural features of the construction. Unless they are masked in this way, the position of the joints is always obvious, even when the concrete is



given a textured finish. If substantial changes in the cross-section of a member are necessary, the joints should be formed where they minimize stresses caused by temperature gradients and shrinkage.

- iv. Laitance, both on the horizontal and vertical surfaces of the concrete, should be removed before fresh concrete is cast. The surface should be roughened to promote good adhesion. Various methods for removal can be used but they should not dislodge the coarse aggregate particles. Concrete may be brushed with a stiff brush soon after casting while the concrete is still fresh and while it has only slightly stiffened. If the concrete has partially hardened, it may be treated by wire brushing or with a high pressure water jet, followed by drying with an air jet, immediately before the new concrete is placed. Fully hardened concrete should be treated with mechanical hand tools or grit blasting, taking care not to split or crack aggregate particles.
- v. Where there is likely to be a delay before placing the next concrete lift, protruding reinforcement should be protected. Before the next lift is placed, rust loose mortar or other contamination should be removed from the bars and where conditions are particularly aggressive and there has been a substantial delay between lifts, the concrete should be cut back to expose the bars for a length of about 50mm to ensure that contaminated concrete is removed.
- vi. In all cases, when construction joints are made, it should be ensured that the joint surface is not contaminated with release agents, dust or curing membrane and that the reinforcement is fixed firmly in position at the correct cover.
- vii. When the form work is fixed for the next lift, it should be inspected to ensure that no leakage can occur from fresh concrete. It is a good practice to fix a 6mm thick sponge which seals the gap completely. The practice of first placing a layer of mortar or grout is not recommended. The old surface should be soaked with water without leaving puddles, immediately before starting concrete, then the new concrete should be thoroughly compacted against it. When the fresh concrete is cast against existing matured concrete or masonry, the older surfaces should be thoroughly cleaned and soaked to prevent the absorption of water from the new concrete. The standing water should be thoroughly vibrated in the region of the joint.

#### **XVIII)      *Concreting under water***

- i. The permanent structure shall not be allowed to come in contact with sea water/sewage for at least 72 hours after the green concrete is laid. When it is necessary to deposit concrete under water, the methods, equipment, materials and proportions of mix to be used shall be got approved from Engineer-in-charge before any work is started. Concrete shall contain 10% more cement than that is required for the same mix placed in dry conditions.
- ii. In case cofferdams are required, the same shall be provided. Nothing extra shall be paid on this account unless specified in the schedules otherwise. Cofferdams shall be sufficiently tight to ensure free of water conditions, in any case to achieve still water conditions. Cofferdams shall be sufficiently tight to prevent loss of mortar through the joints in the walls. Pumping of water shall not be done while concrete is being placed or until 24 hours thereafter. To minimize the formation of laitance, great care shall be exercised not to disturb the concrete as far as possible while it is being deposited.
- iii. All under-water concreting shall be carried out by tremie method only as per relevant IS specifications, using tremie of appropriate diameter. The number and spacing of the tremies should be worked out to ensure proper concreting. The tremie concreting when started should continue without interruption for the full height of the member being concreted. The concrete production and placement equipment should be sufficient to enable the underwater concrete to be completed uninterrupted within the stipulated time. Necessary stand-by equipment should be available for emergency situations.

#### **XIX)      *Finishing of concrete***

- i. The finished surface of concrete after removal of form work shall be such that no touching up is required. All fins / holes caused by form joints, supports, rods etc shall be ground / filled up effectively using appropriate machinery shutters, formwork etc used in construction shall be specified in the conditions and the labour used shall be as skilled to suit the quality requirements of the work. Any surface, finished poorly in the opinion of engineer in charge's decision requires repair / remedial measures at the cost of the contractor and the engineer in charge's decision in this regard is final. Any structure which has deficiencies in finishing including product parameters beyond the rejection limits, as specified in these conditions, are liable to be rejected and the decision of Sr.DEN/ DEN is final in this regard.

## **XX) *Coatings of concrete***

- i. Normally finished concrete structures do not require any surface protective coatings in mild, moderate and severe aggressive environments. A cement coat is considered adequate. For very severe and extreme conditions, however, phenolic IPN coating or CECRI Integrated four coat system can be used.

## **XXI) *Use of RMC***

- i. Ready Mix Concrete (RMC) shall be used only as provided for in the contract and with the approval of the Chief Engineer / Sr.DEN as specified.
- ii. Use of RMC:- RMC shall conform to the specifications of concrete, as laid down in Indian Railways Concrete Bridge Code. For other aspects which are not covered in this code, IS:4926 (Specification for Ready Mixed Concrete) shall apply. The mix design proposed to be adopted and RMC shall be approved by the Engineer-in-charge. Minimum Cement content, maximum cement content, maximum water cement ratio, initial setting time, etc., shall be as specified by Railways.
- iii. Preparation of RMC:- RMC shall be produced by completely mixing cement, aggregates, admixtures, if any, and water at a Central Batching and Mixing Plant of reputed producers and delivered in fresh condition at site of construction. The producer of RMC shall be approved by the Railway and contractor shall have no claim in this regard.
- iv. Effect of transit (Transportation) time on RMC:- As RMC is available for placement after lapse of transit time, reduction in workability occurs, which may lead to difficulty in placement of concrete. In addition, in case of longer transit time, initial setting of concrete may also take place, which may render it unusable. Thus, while planning for using of RMC, these aspects should be kept in view and got approved.

### ***Checking suitability of Admixtures:***

- v. Generally admixtures, like water reducing agent, retarder etc., are used in Ready Mixed Concrete for retention of desired workability and to avoid setting of concrete. In such cases, admixtures should be tested for their suitability as per IS: 9103 at the time of finalizing mix design. Records of all test carried out to judge the suitability of admixture, shall be furnished by the RMC producer to Railways. Regarding specification of admixtures, clause 4.4 of Concrete Bridge Code may be referred.

### ***Quality control***

- vi. The producer of RMC shall adopt quality assurance programme duly approved by Railways. He shall have necessary tests to ensure quality control at each stage during production of concrete.

### ***Access to Railway Officers to RMC plant***

- vii. RMC producer shall allow railway officials to supervise the operations involved in concrete production, materials proposed to be used and take samples of materials used.

***Accessibility to technical records maintained by RMC producer.***

- viii. RMC producer shall allow railway officials to peruse the past and present records of concrete produced for the work.
- ix. Deputation of Railway supervisor:- RMC Producer shall allow Railway supervisor at RMC plant on the date of \_\_\_\_\_ concrete supply and even prior date to see arrangements.
- x. Transportation of RMC:- The RMC shall be transported in concrete transit agitators conforming to IS:5892 (Specification for concrete transit mixers and agitators). Agitating speed of the agitators during transit shall not be less than two revolutions per minute and not more than six revolutions per minute.

***Time period for delivery of concrete :***

- xi. The concrete shall be delivered completely to the site of work within 1½ hours (when the atmospheric temperature is above 20°C) and within 2 hours (when the atmospheric temperature is at or below 20°C) of adding the mixing water to the dry mix of cement and aggregate or adding the cement to the aggregate, whichever is earlier. In case, location of site of construction is such that this time period is considered inadequate, increased time period may be specified provided that properties of concrete have been tested after lapse of the proposed delivery period at the time of finalizing mix design. Concrete received after the transit time limit as specified above shall not be accepted. Concrete shall be placed in position within the designed initial time. At the end of initial setting time, the left over portion of the concrete if any shall be rejected.

***Re-tempering with Concrete :***

- xii. Under any circumstances, re-tempering i.e. addition of water after initial mixing shall not be allowed, as it may affect the strength and other properties of concrete.

***Testing of workability and strength of concrete at the time of placing***

- xiii. The concrete shall be tested for the required workability and strength at the time of placement. Concrete shall be deemed to satisfy the strength requirement when it fulfils the criteria laid down IRS concrete bridge code clause no. 8.7

***Dosing of Admixtures at site of concreting***

- xiv. After arrival of RMC at site, additional dose of admixture shall not be added unless pre approved with proper designs / testing by the Sr.DEN.

**XXII)**

***SHUTTERING:***

- i. Shuttering, Formwork & False work shall be designed to meet the requirements of the permanent structure, taking into account the actual conditions of materials, environment and site conditions. Careful attention shall be paid to the detailing of connections and functions. All the materials used for shuttering, formwork & false work shall conform to the specified quality consistent with the intended purpose and actual site condition as applicable. All shuttering, formation, false work, etc., shall be got approved by the Engineer-in-charge before it is put into use.
- ii. Forms shall not be struck until the concrete has reached strength at least twice the stress to which the concrete may be subjected at the time of removal of formwork or as approved by the Engineer-in-charge. In normal circumstances and where Ordinary Portland Cement is used, forms may generally be removed after the expiry of the following periods:-

Type of Formwork	Minimum Period before striking Form work

(a) Vertical formwork to columns, walls, beams	16 – 24 hours
(b) Soffit formwork to slabs (Props to be refixed immediately after removal of formwork)	3 days
(c ) Soffit formwork to - beams (Props to be refixed immediately after removal of formwork)	7 days
(d) Props to slabs (1) Spanning up to 4.5m (2) Spanning over 4.5 m	7 days 14 days
(e) Props to beams and arches: (1) Spanning up to 6m (2) Spanning over 6m	14 days 21 days

- iii. Where the shape of the element is such that the form work has re entrant angles, the form work shall be removed as soon as possible after the concrete has set, to avoid shrinkage crack occurring due to the restraint imposed.
- iv. Shutters for PSC / Box/ other type of girder be such that it permits pouring of concrete in one pour without requiring any dismantling / striking of any part / full of the shutters at any stage.
- v. Specialized formwork may be required in the case of slip formwork, underwater concreting etc. Such specialized formwork shall be designed and detailed by competent agencies and a set of complete working drawings and installation instructions shall be supplied to the Engineer-in-charge before commencement of work. The site personnel shall be trained in the erection and dismantling as well as operation of such specialized formwork. In case proprietary equipment is used, the supplier shall supply drawings, details, installation instructions, etc. in the form of manuals along with the formwork. Where specialized formwork is used close coordination with the design of permanent structure is necessary. For slip form the rate of slipping the formwork shall be designed for each individual case taking into account various parameters including the grade of concrete, concrete strength, concrete temperature, ambient temperature, concrete admixtures, etc. In order to verify the time and sequence of striking/removal of specialized formwork, routine field tests for the consistency of concrete and strength development are mandatory and shall be carried out before adoption.

### **XXIII) Defective Concrete and measurement of concrete**

- i. Should any concrete be found honey combed or in any way defective which may be, at the discretion of Engineer in charge suspected to affect the performance of the structure, shall be rejected out right. Contractor shall have no claim in this regard and the decision of Sr.DEN is final. The member, structurally independent, in which the concrete is found to be defective, shall be replaced by the contractor at his cost fully. The damages arising on account of such defective concreting shall also be recoverable from the dues of the contractor, including penalties if any. Railway reserves the right to get the member replaced by any means at the cost of the contractor at any cost if the contractor delays reproduction.
- ii. However some surface defects, not affecting structural properties shall on the instruction of the engineer in charge, be repaired as per the approved procedures. The complete cost of such repairs shall be borne by the contractor and no compensation shall be payable. Records of such repairs done shall be maintained by the contractor.
- iii. The tolerances for finished concrete bridge structures shall be governed by IRS Concrete Bridge Code and shall be as follows; deviations beyond the permissible limits shown are liable to be rejected. These tolerances apply to other structures also appropriately.

S No	Description of defects in any part or full member or the structure at the decision of the Engineer-in-charge	Permissible limits (specified designs/drawings) unless otherwise
1 Shift	from alignment	1) $\pm 25$ mm in member. 2) 10 mm in reinforcement
2	Deviation from specified batter.	1 in 250
3	Deviation from plumb in abutments or variation from specified batter	1 in 125
4	Cross sectional dimensions of piers, abutments and girders	+20mm/-5mm
5	Thickness of deck slab of bridges	+ 6 mm / - 3 mm
6	Size and location of openings	$\pm 12$ mm
7	Plan dimensions of footings (formed excavation)	+ 50 mm / - 25 mm
8	Plan dimensions of footings (unformed excavation)	+ 75 mm / - 25 mm
9	Thickness of footings	$\pm 5\%$ , not exceeding 25mm
10	Footing eccentricity	0.02 times the width of the footing in the direction of deviation, but not more than 50 mm
11	Reduced level of top of footing / pier / bed block	$\pm 5$ mm
12	Centre to centre distance of pier and abutments at pier top	30 mm
13	Centre to centre distance of bearings along span	$\pm 5$ mm
14	Centre to centre distance of pier bearings across span	$\pm 5$ mm
15	Honey combing in any part of any member	Not more than 100mm in surface dimensions and not more than 20mm in depth.

In prestressed concrete construction, permissible tolerances are 75% of the above permissible limits only.

#### XXIV) *Tests & Standards of Acceptance*

- i. Testing and acceptance of concrete shall be as per IRS Concrete Bridge Code read along with relevant IS specifications.
- ii. Samples from fresh concrete shall be taken as per IS1199 and testing shall be as per IS516.
- iii. Random sampling and lot by lot of acceptance inspection shall be made for the 28 days cube strength of concrete. Concrete under acceptance shall be divided into lots for the purpose of sampling, before commencement of work. The delimitations of lots shall be determined by the following:
  - No individual lot shall be more than 30cum in volume.
  - At least one cube forming an item of sample representing the lot shall be taken from concrete of the same grade and mix proportions cast on any day.
  - Different grades of mixes of concrete shall be divided into separate lots.
  - Concrete of a lot shall be used in the same identifiable component of the structure.

#### XXV) *Sampling and testing*

- i. Concrete for making 3 test cubes shall be taken from a batch of concrete at point of delivery into construction. A random sampling procedure to ensure that each of the concrete batches

forming the lot under acceptance inspection has equal chance of being chosen for taking cubes shall be adopted. 150mm cubes shall be made, cured and tested at the age of 28 days for compressive strength.

- ii. 3 test specimens shall be made from each sample for testing at 28 day. Additional cubes may be required for various purposes such as to determine the strength of the concrete at 7 days or any other purpose. The test strength of the sample shall be the average of strength of the 3 cubes. The individual variation should not be more than + 15% of average. when the individual variation exceeds this limit, the procedure for the fabrication of specimen and calibration of the testing machine should be checked and tested.
- iii. Frequency  
The minimum frequency of sampling of concrete of each grade shall be in accordance with table below. At least one sample shall be taken from each shift of work.

Quantity of concrete (m3)	No. of samples
1-5	1
6-15	2
16-30	3
31-50	4
51 and above	4 plus one additional samples for each additional 50m3 or part thereof.

#### **XXVI) Acceptance criteria**

- i. It will be as per clause no. 8.7.6 of IRS Concrete bridge code and the following instructions shall be strictly followed.
- ii. Whenever a mix is re designed due to change in the quality of aggregate or cement or any other reason, it shall be considered a new mix and initially subject to the acceptance criteria above.
- iii. If the concrete produced in the site does not satisfy the above strength requirement the engineer in charge  
will reserve the right to require the contractor to improve the method of batching, the quality of the ingredients and design the mix with increased cement content, if necessary. The contractor shall not be entitled to claim any extra cost for the extra cement used for the modifications stipulated by the Engineer in charge for fulfilling the strength requirement specified.
- iv. It is the complete responsibility of the contractor to redesign the concrete mixes by approved standard methods and to produce the reinforced concrete conforming to the specification and the strength requirements approved by the engineer in charge. it is expected that the contractor will have competent staff to carry out this work.
- v. As frequently as the engineer in charge may require, testing shall be carried out in the field for:
  - test for silt content in sand
  - grading of fine aggregate
  - test for particle size
  - Slump test
  - Moisture content and absorption and density of sand and aggregate
  - Concrete cube test

- Permeability test for concrete as per DIN 1048
- Density and Ph value of plasticizer

**XXVII) *Setting of field laboratory by the contractor***

- i. For all the major works, the Contractor shall set up a field laboratory of his own for testing of cement/steel/water/concrete at work site, which should be open for use and inspection by the Railway officials at any time and carryout the tests with his own equipments, gauges, machinery, consumables and operators, at his own cost. The laboratory shall be equipped with necessary equipment to carry out various tests such as property tests, sieve analysis, setting time of cement, compression tests on cubes, slump test, workability test etc., on aggregate, cement, water and concrete required for ensuring the required quality. For steel and cement however, test reports of reputed institutes/laboratories are acceptable.
- ii. The cost of setting up the laboratory, equipping the same, maintaining, conducting all tests on materials and cubes shall be borne by the contractor, within his quoted rates for works and no extra payment is eligible for the same.
- iii. All gauges, machines, equipments and other measuring and testing equipment of the laboratory shall be got checked / calibrated regularly and the necessary certificate furnished to Engineer in charge by the contractor.
- iv. All the equipments, machinery etc., shall be kept in good working condition. Contractor shall also maintain therequired qualified/experienced staff at the laboratory.
- v. The following is the minimum laboratory facilities at the site which are to be provided and operated by the contractor at his cost.
  - Testing of aggregates – IS 383 & 2386
  - Testing of cement concrete - IS 8142 & 516
  - Testing of water – IS 456 & 3025
  - Compressive strength testing of cubes of M55 Concrete
- vi. Certain non-routine testing such as (a) Testing of admixtures, (b) Chemical testing of fine and coarse aggregates (c) Permeability of concrete (permeability test on concrete shall be got done when the mix design is approved/changed of the reputed laboratories as approved by Engineer-in-charge). The frequency and need for these tests shall be decided by the Engineer-in-charge, based on stipulations contained in conditions of contract or on the basis of accepted Engineering practice (e.g. whenever source of admixture is changed, tests stipulated in the codes will have to be carried out afresh, etc).

**The work should be carried as per the South western Railways Specification of Work 2022 and the CPWD specification -2023 and corrected up to date where ever applicable.**

## **SOUTH WESTERN RAILWAY**

**Name of the work: DRU-CMGR Section: Protection works for vulnerable cutting from Km 34/700 to Km 35/300 between SHYP-CMGR stations.**

### **GENERAL CONDITIONS**

These conditions should be read in conjunction with the South Western Railways Standard 'Indian Railway Standard General Conditions of Contract' April - 2022 on Indian Railway with up to date corrections slip issued.

1. This tender consists of schedule A& B. The quantities given there in are only approximate and intended for the guidance of the tenderers to quote their rates.
2. SCHEDULE-`A': Consists of items of works that are covered by the South Western Railway Unified Standard Schedule of Rates 2022 for execution of formation works, Bridge works and P- way works. The items of works and quantities given in this Schedule are only approximate. The tenderers should quote percentage rate above or below or at par on the Unified Standard Schedule of Rates 2022. If any other items of work included in the USSOR and DSR are also required to be carried out in this connection with this work, they shall also be carried out at the rates shown therein enhanced or diminished as the case may be by the same percentage as tendered for Sch A.
3. SCHEDULE-`B': Consists of items of works that are not covered by the South Western Railway Unified Standard Schedule of Rates 2022.
4. This work should be completed within **Twelve Months** from the date of issue of letter of acceptance. This work will have to be maintained for **Twelve Months** after the completion of the work.
5. The works should be carried out as per the South western Railways Specification of Work 2022 and DSR as corrected up to date and in accordance with the type plan and detailed drawings unless otherwise specified and as directed by the Engineer- in-charge.
6. The Contractor should obtain prior approval of the Engineer-in-charge for the materials to be supplied by him for the work by submitting samples. Supply of the materials to be used for the work should be as per the samples approved by the Engineer-in-charge.
7. The Divisional Railway Manager (works), South Western Railway, Mysore reserves the right to reject any tender without assigning any reasons whatsoever.
8. The contractor shall make use of the existing facilities such as roads, level crossings etc., and no new approach road and other facilities will be provided for the execution of this work.
9. Proper levels will be given by the Railway and the contractor should adhere to these levels and the rates shall be inclusive of provision of level pegs, boning rods & sighting posts etc.
10. Tools & plants other accessories such as ladder, scaffolding, shuttering & centering etc. required for this work will be provided by the contractor at his own cost.
11. All plans can be seen in the office of the Divisional Railway Manager (works), South Western Railway, Mysore on all working days. The tenderer should inspect the site work and study concerned plans carefully before tendering and no claims will be entertained after the acceptance of the tender.
12. Materials shall not be staked in any way hinder the progress of the work and free movement of the Railway.
13. It is to be clearly noted that 10% of extra payment is not admissible for this work.
14. Observance of contract labour (Regulation & Abolition) Act-1970 and the Central rules 1971 will apply to the present contract. The contractor shall observe the provisions thereof.
15. The bonded labour system (Abolition) Ordinance Act 1975 will apply to the present contract and the contractor shall duly observe the provision thereof.



## TECHNICAL SPECIFICATIONS FOR EARTH WORK

The Earth work for Railway formation in cutting and embankment is to be carried out as per RDSO guidelines with latest correction slips and also South western Railways Specification of Work 2022 with latest correction slips.

Trees in the Railway limits shall not be cut by the Contractor or his men without the permission of the Engineer-in-charge.

Contractor shall clear the jungle, shrubs, bushes having girth not more than 30 cms. coming in the alignment and arrange for taking initial levels for the work with his own survey equipments in the presence of Railway Engineer-in-charge.

After site clearance, all pocket and depressions, if any, left in the ground shall be made good and compacted.

5(a). Earthwork shall be done in layers not exceeding 300 mm thick in the loose state and compacted preferably at or near the optimum moisture content (OMC) with suitable rollers to obtain the density specified below. The number of passes of the rollers and the optimum thickness of earth layer will be fixed after carrying out field trials with the roller proposed to be used, from time to time, at different location; the main criteria being to obtain the required density.

5(b) Cohesion less soils shall be compacted to get a minimum density index (relative density) of 70% as obtained in accordance with IS 2720 (part-XIV) 1983.

5(c) All other types of soils when compacted shall attain at least 98% of the maximum dry density as determined using heavy compaction in accordance with IS 2720 (part-VIII) 1983 followed by field trials as per IS 10379 - 1982.

Where the moisture content of the earth in any layers is above OMC, it shall be left for drying for a suitable period to bring down the moisture content very near to OMC before rolling is commenced. If the soil is dry, water shall be sprinkled over the spread layer in order to attain a moisture content near to OMC, before rolling is commenced.

Each layer shall be compacted to the desired density over its entire width commencing from the two sides, before another layer is started.

While compacting, it shall be ensured that there is a minimum overlap of 150 mm. between each run of the rollers.

Care shall be taken during the compaction operation, to slope the surface of the bank to facilitate the shedding and to minimize the absorption of rain water, particular attention being given to prevention of ponding.

The density of each layer of compacted soil shall be ascertained by testing an adequate number of soil samples as directed by Engineers in the presence of Railway Engineers.

The quality of work shall be determined by considering the mean density of the samples in each layer. The mean dry density shall be equal to or exceed the minimum specified density. In no individual case shall the density be less than the minimum value specified by more than 5%; otherwise further rolling shall be done at all the appropriate locations.

The Contractor shall be allowed to lay a further layer of soil only after the compaction of the particular layer has been found satisfactory.

The top of the formation shall be finished to a slope of 1 in 40 away from the center.

In bank filling, above or against or in filling over masonry or other structures, the materials shall be deposited in layers not more than 20 cms. thick, sloping away from the structure with each layers carefully tamped. Only the

best available materials shall be used for this purpose. Highly cohesive wet impervious materials shall not be employed.

The filling over arches and pipe culverts shall be made up simultaneously from both sides. Water proofing treatment done over these culvert must be kept undamaged and intact during the filling operations.

While rolling each layer, the earthwork along outer edge where the roller cannot safely work shall be specially consolidated by hand ramming in layers not exceeding 150 mm. so as to achieve the prescribed degree of compaction.

While rolling each layer, extra width of 50cm shall be rolled on either side to facilitate rollers to properly compact the edge of the formation; The extra width of soil on the slopes are to be neatly dressed and surplus soil is to be reused for the work without any extra payment for the same.

In case the bank is formed with Railways cut spoil, the Earthwork in banking shall be restricted to only standard minimum profile and extra earth cut and dressed out is to be led for further works in banking and ensure that no cut spoil is wasted.

To ensure quality control of earthwork, contractor shall establish a soil testing lab at site equipped with all soil testing apparatus at his own cost. The minimum apparatus required to be provided in laboratory are :-

Compaction testing apparatus as per IS 2700	... 1 No.(Part-VII)
Proctor Penetrometer spring type	... 1 No.
Speedy moisture meter	... 1 No.
Core cutter with dolly and rammer IS 2700	... 5 Sets(Part-XXIV)
Carbide reagent set of six bottles	... 6 Nos.
Rammer 4.89 Kg. X 450 mm. control No. EDFALL	... 1 No.
Measuring jar made of glass - 50, 100, 200, 500ml	... 2 Each
Electronic weighing balance 10 Kg	...1 No.

Contractor shall arrange at his own cost all lab. tests as required before starting earthwork to assess the type of soil and other soil parameters required to judge suitability of soil to be used for constructing bank by Railway cut spoil/contractor's own earth. Whenever soil strata changes, one such sample shall be tested as directed by Engineer-in-charge.

The contractor shall make his own arrangements for all earth moving vehicles and any other tools and plants as may be required for the efficient execution of the work, with necessary personnel and consumable stores at his own cost. On a written requisition from the Tenderer/Contractor, the Railway may give permission to those suitable places of land for the stabling of the earth moving vehicles and for putting up temporary sheds for crew and labour. The land so allotted shall be used solely for the purpose connected with the execution of this contract work and shall not be used otherwise. The area shall be vacated and restored to the original condition and handed over to the Railway immediately after the completion of work.

The tenderer should furnish the list of earthwork equipments like excavators, bulldozers, tippers, lorries, tractor-trailers etc. owned moving and proposed to be used by them/him in this work. He or they will also confirm at the time of tendering that all such equipments are in good working conditions.

Telegraph posts, electrical posts and wires etc., wherever coming in the way of formation will be arranged to be shifted by the Railway. The presence of such post etc., in the formation stretches will not be basis for any claim by the contractor and the contractor will execute the work without endangering the posts existing.

The contractor shall take adequate precautions to ensure that no interference is caused to the Telephone/Electric wire crossings and take safety measures for the life and property and workmen working at the vicinity of the power line crossings. The contractor shall be responsible for any damage caused to any communication, life or property during the course of execution.

While working close to or alongside existing Railway track, the Contractor shall be responsible for ensuring that no obstructions to safe running of trains or interferences with the signaling arrangements, electric wires, water supply line etc., is caused at any time. He shall also make adequate arrangement to keep a sharp look out to keep a sharp look out for trains approaching from either directions and warn the workmen, vehicles etc. well in advance.

The contractor shall arrange to obtain permission directly from the State Government or local authorities concerned for using Forest, PWD or Panchayat Roads. The rates tendered shall be inclusive of any cess, tax or any other charges payable to the authorities concerned.

The Contractor shall arrange the setting out of the alignment at closer intervals as directed, based on reference centreline pillars available along the alignment, with his own survey equipments of good quality and of such accuracy as desired by Engineer-in-charge at his own cost. The Contractor shall also arrange for setting out of curves, if any, as per the directions of Engineer-in-charge.

The contractor should fix the intermediate pegs, additional bench marks by the side of the bank/cutting suitably for referring the alignments in future. Wherever the center line reference pillars or Bench Mark pillars are missing/not available the contractor must fix the same as per issued drawing/consultation with Engineer-in-charge.

Contractor shall arrange for making and fixing of toe line with wooden pegs for earthworks (both embankments and cuttings) and for bridges without extra cost. The above details should also be submitted to Engineer-in-charge before commencement of work.

Kilometers/Chainages referred is approximate and likely to vary marginally. Local chainages may, however, be fixed by the Engineer. The chainages references are purely intended for Railway purpose only.

For forming embankment by Contractor's own earth, no borrow pits shall be dug within Municipal limits or in close proximity to towns or villages except with the prior concurrence of the respective authorities/bodies concerned, so that public health and future developments of the respective areas may not be affected thereby.

No extra allowance shall be allowed to cover any settlement or subsidence of the natural ground under weight of the embankment. The Contractor's rate shall be deemed to be covered any eventuality taking into account the local conditions. The payment for the embankment shall be based on the profile measurements computed with reference to initial levels recorded before the works are commenced.

Payment in all cases of earthwork shall unless otherwise specified be based on cross section measurements. The existing ground levels, as done formation as recorded and signed by the Contractor before commencement of work and after completion of work shall be the basis for computation of final quantity. Payment would be made on the basis of final cross section within the required profile only. Any earthwork done beyond the required profile of cutting and embankment shall not be paid for. However, any settlement noticed during the maintenance period shall be made good by the contractor at his own cost.

The classification of the earthwork shall be carried out as the work proceeds. The classification of the soils met with in cuttings shall be done by Asst. Executive Engineer/Executive -in-charge of the work shall be final and binding on the contractor. No claims or representations shall be entertained by Railway administration in this connection.

The detailed measurements of the embankment executed by cut spoils are to be taken before starting earthwork in embankment by contractor's own earth over and above the part embankment made by cut spoils lead from the cutting or vice-versa.

36 Whenever earthwork is done in forming embankment, partly by leading cut spoils and partly by contractor's own earth, payment for the work done in leading cut spoils will be made by cross-section measurements of cutting quantity. Where earthwork in forming bank is required to be done by leading of cut spoils and conveyance of own earths the quantity of own earth done will be assessed by deducting the cut spoils lead from the cutting.

The usable rock spoils excavated will be the property of Railway and it must be lead and stacked in the Railway land as directed by the Engineer-in-charge within Reach limits with all lead and lift. The rates quoted will include leading and stacking of the released rock spoils. These shall be used for filling behind retaining walls, flooring, pitching, etc., duly treating this as work executed with Railway stone at the discretion of the Engineer duly operating.

The cut spoils from cuttings which will be found unusable for embankment is to be dumped beyond 10 mtr. from edge of cutting within the Reach at contractor's cost. However an amount up to 10% of the cutting value will be withheld and the same will be released only after disposal of cut spoils as directed by Engineer-in-charge or his representative.

Manual compaction is restricted to locations where mechanical compaction by rollers cannot be done. The contractor shall execute the earthwork in coordination with other bridge work contracts in the section, if any.

Contractor shall arrange for computer plotting and computation of Earthwork quantities with theoretical profile for bank/cuttings. Contractor shall also arrange for final plotting of the finished profiles as per Final level books and submit the final earthwork quantities for verification by Railway Engineer-in-charge. The document so submitted shall be the property of Railway. Payment of this shall be made separately vide relevant items of Schedule.

The contractor shall arrange to obtain permission direct from the State Government or local authorities concerned for using Forest, PWD or Panchayat roads. The rates tendered shall be inclusive of any cess, tax or any other charges payable to the authorities concerned.

The contractor shall make his own arrangements for obtaining the license for any explosives, as may be necessary and for procurements, transportation, storage and use of the same. All possible assistance will be given by the Railway, should there be any difficulties in obtaining the license etc. However, any failure shall not form the basis for any claim by the contractor against the Rly. or for additional payment for the work.

In case of use of explosives for blasting the contractor shall strictly abide by the Indian Explosive Act, and the Rules and Regulations framed there under and in carrying out the work, shall observe all the provisions of the Indian Mine Act and the metaliferous mines regulations and rules there under as well as of the Act and Rules, as may be enacted and laid down by the State and Central Government from time to time, for such work.

The contractor will be held responsible for any loss or damage or injury caused during explosion to the labourers or to the public/private persons or to Railway (Public), Private property and the contractor should bear all the loss/expenditure thereby involved.

Necessary permit/interstate permits for the movements of vehicles shall be arranged by the contractor.

Breakdown to transport vehicles; if any, will be on the contractor's account.

Accidents, if any to his vehicles or to persons would be the responsibility of the contractor and the Railway will not be responsible for the damage or compensation thereof.

The contractor is deemed to adhere to the workmen's compensation Act, State Motor Vehicles Act' etc., and any infringement to the same should be at his own risk and cost.

### **SPECIFICATIONS FOR STEEL WIRE ROPE NET AND MESH**

#### **Material Specifications:**

The steel wire ropes shall meet the requirement as per IS 2266 / ISO 2408. They shall be made from galvanized steel wire in accordance with IS 1835.

**Table 1- Required Properties of Steel wire rope net**

<b>Property</b>	<b>Value</b>
Type	Galvanised steel wirerope net
Aperture size (cm) (maximum)	45 x 60
Rope grade (IS 2266/ ISO 2408)	1770 N/mm <sup>2</sup>
Rope Wire Diameter (mm)	9 mm
Tolerance on rope diameter (ISO 2408 Table-2)	+5 to 0 %
Rope Type (IS 2266/ ISO 2408)	6 x 19 M – CWR/ IWRC
Minimum Breaking Force (kN) (IS 2266 Table 2)	48
Zinc coating of steel wire (IS 1835)	Class A minimum & above

All steel wires used in the manufacturing of Steel wire mesh during construction shall confirm to EN 10223-6.

**Table 2- Required Properties of Chain link mesh net**

Property	Value
Mesh Type	Galvanised steel wire
Mesh size (mm) (maximum)	80 x 80
Mesh Wire Diameter (mm)	2.4mm
Tolerance on Mesh Wire Diameter (mm) (EN 10218-2 Table-1)	(+/-) 0.06
Mesh wire Zinc coating (g/m <sup>2</sup> ) (EN 10244-2 Table 1)	230

Joining of chain-link mesh & steel wire rope net and joining of adjacent nets shall be done with galvanised spiral lock springs of steel wire dia. 2.2mm; inner dia. of springs 18mm; total length 50mm +/- 0.5mm; pitch 4mm. Fixing of spiral springs for joining of adjacent nets shall be at ratio of 1 no. per 0.6m in longitudinal direction of net portion and additional locks for lacing chain-link netting with rope net to be provided.

**Testing and acceptance criteria for Quality Control:**

Material shall be approved by engineer –in-charge before supply. Testing on mesh wire & rope shall be performed prior to manufacturing the Steel wire mesh as mentioned in the following Table.

SN	Type of Test	Frequency of testing & minimum number of samples	Test Location	Reference Code	Remarks
1	Tensile test on Wire Rope	01 sample per 3000 sqm	Supplier of Wire ropes factory/ independent laboratory (as directed by Engineer-in-charge)	IS 2266/ ISO 2408	
2	Zinc Mass of Wires used for rope	01 sample per 3000 sqm	Supplier of Wire ropes factory/ independent laboratory (as directed by Engineer-in-charge)	IS 1835	
3	Properties of GI Wire				
a	Tensile Strength and Elongation %	01 sample per 3000 sqm	Manufacturers Lab/ independent laboratory (as directed by Engineer-in-charge)	EN 10223	
b	Zinc mass & Zinc Adhesion	01 sample per 3000 sqm	Manufacturers Lab/ independent laboratory (as directed by Engineer-in-charge)	EN 10244	

Mode of Measurements: The mode of measurement shall be based on Sq.m of Area of Steel Wire Mesh supplied.

**Materials shall confirm to following standards:**

Cables – Tensile Strength shall not be less than 1770N/mm<sup>2</sup>

EN 13411-5-Clamps/Ferrules / U bolt

EN 10223 and EN 10244 Chain linked steel wired mesh and Zn coating

EN 10025 -2- Hot Rolled Products