

SOUTH WESTERN RAILWAY

**Name of the work:** Mysore– Construction of New AC Loco Trip Shed at Mysore(JRU)

GENERAL CONDITIONS

These conditions should be read in conjunction with the South Western Railways Standard General Conditions of Contract (GCC) April 2022 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 CPWD Delhi Schedule of Rates for execution of all civil engineering works related to Building Works, Road Works (except Formation Works Bridge Works and P.Way works) on Indian Railways. 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 DSR. If any other items of work included in the DSR are also required to be carried out in this connection with this work, they shall also be carried out at the rates shown there in 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 under DSR -2023.
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 **Thirty Six Months** after the completion of the work.
5. The work should be carried out as per the Indian Railway Standard Specification and as directed by the engineer-in-charge.
6. The Chief Project Manager, Gati Shakati Unit, South Western Railway, Mysore reserves the right to reject any tender without assigning any reasons whatsoever.
7. 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.
8. Proper levels will be given by the Railway and the contractor should adhere to this levels and the rates shall be inclusive of provision of level pegs, boning rods & sighting posts etc.
9. Tools & plants another accessories such as ladder, scaffolding, shuttering & centering etc. required for this work will be provided by the contractor at his own cost.
10. The tenderer should inspect the site work carefully before tendering and no claims will be entertained after the acceptance of the tender.
11. Materials shall not be staked in any way hinder the progress of the work and free movement of the Railway.
12. It is to be clearly noted that 10% of extra payment is not admissible for this work.
13. 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.
14. The bonded labour system (Abolition) Ordinance Act 1975 will apply to the present contract and the contractor shall duly observe the provision thereof.
15. All other conditions as specified in DSR – 2023 will apply to the contract.

**SPECIAL CONDITIONS OF CONTRACT (SCC)****1. Introduction**

The Indian Railway Standard General Conditions of Contract, i.e., IRSGCC- 2022 has been published in the month of April-2022. The intending bidders are requested to acquaint themselves with all the conditions of IRSGCC- 2022 and Advance Correction Slips (ACSS), SCC, Technical Specifications and all other documents before participation in tender.

The following Special Conditions of Contract (SCC) are supplement to the Indian Railway Standard General Conditions of Contract, IRSGCC-April 2022 read along with up-to-date correction slips, Indian Railways Unified Standard Schedule of Rates 2021 (South Western Railway), DSR-2021 (for building and Road works) and notes appearing under the relevant chapters and sub- chapters including up to date corrections should be considered as part of the tender document. Where the provisions of Special Conditions of Contract (SCC) are at variance with the IRS General Conditions of Contract (IRSGCC- 2022) including Correction Slips and other documents mentioned above, these Special Conditions shall prevail.

**2. Prices and Payments**

**Contract Prices:** The contract shall be firm & fixed and inclusive of all as per clause-37 IRSGCC-April2022(Part-II) unless expressly provided for, in the conditions of contract. Railways shall have no liability to pay anything over and above the accepted rate.

**Price Variation:** As per IRSGCC-April2022 and amended by ACSs.

On Account Payment:

- a) **Civil Works:** The payment will be made as defined in the schedule/technical specifications and as per the progress of the work.

**Mobilization Advance (Applicable for Advertised tender of value more than Rs. 50.00 crore as per clause 19 of IRSGCC-April2022 (Part-I)):** The rate of interest as communicated by Railway Board is RBI Bank Rate + 5% (Five percent) simple interest for the tenders to be opened in the financial year 2022-23, subsequent years, after 2022-23, the rate will be communicated separately.

**Taxes**

- a) **Income Tax:** Income tax will be deducted at 2% (two percent) and also surcharge if any at source from each bill unless otherwise authorized by the Income-Tax department.
- b) **Goods and Service Tax (GST):**
- i. With GST Act in force, it will be the responsibility of service providers (i.e., contractors) to submit the invoice (bill) duly segregating the GST component from the gross amount of work executed. The procedure to be followed is Annexed in this document.
  - ii. This tender falls under the category of 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. The TDS on GST @ 2% or as amended from time to time shall be recovered from the running on-account bills.

- iii. The rate quoted by the tenderer should take into account applicable GST and cess on GST (if any) there of 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.

#### **Royalty Charges:**

- a) 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. However, no royalty charges/fee shall be recovered from the bills of the contractor, if the contractor produces documentary evidence e.g., transit pass/Mineral Dispatch Permit issued by State Government Officials in token of having paid royalty fee. In such cases, the genuineness of such documentary evidence produced along with proof of payment of royalty charges, shall be got verified by the Railway from the website/online portal of the concerned Mining and Geology Department.

- b) In States where the system of online verification of Mineral Dispatch Permit has been introduced by DoMG, the procedure to be adopted is as follows:
  - i. On production of the original Mineral Dispatch Permit by the contractor towards payment of Royalty charges, SSE/P.Way/Works shall verify the authenticity of the documents submitted by following the procedure mentioned on the reverse side of the Mineral Dispatch Permit and then submit, a certified extract of the quantity as per the "Mineral Dispatch Permit" issued by the Department of Mines & Geology along with the CC/final bill.
  - ii. XEN/AXEN concerned shall check the correctness of the extract prepared by SSEs randomly to the extent of 10% of the total MDPs submitted.
  - iii. Dy.CE/concerned shall submit a certificate to the effect that quantity of minerals supplied for which payment is proposed in CC bill/final bill is supported by the original Mineral Dispatch Permits and genuineness of which is verified from the DoMG portal by in-charge field SSE/AXEN/XEN, and certificate is forwarded to finance to pass the CC/FCC bills without effecting the recovery of Royalty charges.
- c) In States where the system of online verification of Mineral Dispatch Permit has not been introduced by the concerned DoMG, the system of obtaining written confirmation from the Department may be followed.
- d) Any instructions issued by Department of Mines & Geology from time to time shall become applicable automatically in addition to the conditions contained herein.
- e) Increase in Royalty charges during currency of contract:

- i. **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.
  - ii. **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.
- f) Decrease in Royalty charges during currency of the contract:
- i. **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.
  - ii. **When Royalty is being paid directly by the contractor to Mining department:** The difference in the rate of royalty will be recovered from the contractor’s CC/Final bills and shall be retained by the Railways.
- g) A register shall be maintained by Dy. CE/Executive Engineer/Gati Shakti concerned in which the entries should be made regarding the documentary evidence i.e., Serial No. of “transit passes” issued by concerned authority showing proof of payment of royalty charges, for each bill. Relevant entries shall also be made on receipt of verified document from Mines & Geology department of State Government against the particular bill and “Transit pass”. The verified “Transit passes” shall be scored out with cross mark with an endorsement “Accounted against CC/Final Bill No. \_ dated for Agreement No. ”. These passes shall be kept on record for subsequent verification till closure of the contract. The register should be page numbered and one page allotted to one contract. The reference where the verified, “Transit pass” is filed shall also be made on the register.

**Conservancy Charges:** Necessary conservancy charge will be deducted as per the Railway board letter No.F(X)I/95/I/I Dt.07.09.2021 annexed in this document or latest as applicable from time to time will be deducted from Bill.

**Letter of Credit (LC):** 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. Payment through LC shall be as per procedure as per Railway board letter No. 2018/CE-I/CT/9 Dt.04.06.2018 Annexed in this document.

Documents to be submitted along with bill

- a) Tax Invoice as per Railway Board letter No.2016/CE-I/CT/12/GST/Pt.I Dt.29.06.2017 annexed in this document. Implementation of GST ACT-2017: Procedure for payment of Contractual Bill
- b) Test reports as mentioned in the technical specifications
- c) All required Certificates by SSE/AXEN.
- d) Labour registration certificate
- e) No of Labour engaged for the work duly updating the data in <https://shramikkalyan.indianRailways.gov.in/portal> along with reports.
- f) All other documents required by Railways

### **3. Measurement of works:**

- a) It is mandatory to follow the e-measurement & e-Billing through IRWCMS. It may be noted that no manual measurement/billing is permitted.
- b) The Contractor's Measurement shall be applicable mandatorily with the provisions of para 1316A of engineering code for the contract costing more Rs.5.0 Cr.

### **4. Variations in extent of contract:**

The procedure detailed below shall be adopted for dealing with variations in quantities during execution of works contracts:

#### **Variation due to Increase in quantities: As per IRGCC-2022**

Variation due to decrease in quantities shall be as under

- a) The contract signing authority can decrease the items upto 25% of individual item without finance concurrence.
- b) For decrease beyond 25% for individual items or 25% of contract agreement value, the prior approval of Competent Authority will be required as per extant instructions issued by Railway from time to time, after obtaining "No Claim Certificate" from the contractor and with finance concurrence, giving detailed reasons for each such decrease in the quantities.
- c) It should be certified that the work proposed to be reduced will not be required in the same work.

#### **Vitiation due to variation in Contract Quantities**

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

SN	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

- b) 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.
- c) 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.
- d) The above shall be regulated as under:
- 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.
  - Vitiation 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 Vitiation.
  - Railway shall exercise control over the aspect of vitiation of tender with respect to variation in quantities and shall make all efforts that no vitiation takes place in normal circumstance

## 5. Inspection

### Materials requiring Inspection:

- The inspection of material shall be done by Engineer/ Engineer's Representative/ RDSO/ RITES/ Any other agency at manufacturer's premises before dispatch of material and at consignee depot after receipt of material. The inspection of material shall include type test, routine test, stage test and acceptance test whichever applicable.
- The inspection procedure shall be approved by Railway. No materials shall be dispatched from the manufacturer's factory or assembling unit prior to inspection and/or without approval of Railway.

- c) For the inspections at out stations, the contractor shall give at least two weeks' notice to the engineer to enable him to arrange necessary inspection. All the cost for the inspection shall be borne by the contractor.
- d) Notwithstanding any approval, the material non-conformance to technical specification, specified performance & reliability and quality standard shall be rejected during inspections. The rejected material shall be marked with "rejection mark" for identification. The contractor shall take immediate action to replace the rejected material. All the cost regarding replacement shall be borne by the contractor.
- e) The rejected material shall be lying at the risk & account of the contractor. Railway shall also be entitled to recover from the contractor the handling and ground rent/demurrage and any other charges for the period the rejected stores are not removed within justifiable period. Railway shall also have the right to dispose of such stores, as deemed fit, at the contractor's risk and account if contractor failed to remove the rejected material.
- f) The decision of the Engineer with regards the inspection & rejection shall be final and binding on the contractor.

#### **6. Inspection of Works:**

- a) The inspection of works shall be done by Engineer/ Engineer's Representative at site during execution of work. The inspection of works shall include stage inspections, inspection for testing & commissioning etc. The inspection procedure/ inspection forms shall be approved by Railway.
- b) Notwithstanding any approval, the work non-conformance to the technical specification, specified performance, reliability and quality standard shall be rejected during inspections. The contractor shall take immediate action to correct the non-conformity in the work. All the cost regarding this shall be borne by the contractor.
- c) The contractor has to arrange the Road Vehicle whenever required to the use of the Railway Officials for inspection of works as per site requirement. No separate payment will be made for this.

#### **7. 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.

#### **8. Machinery, Tools, Plants and Instruments:**

- a) All the M&P, Tools, Special tools, Test & Measuring Instruments required for installation, testing and commissioning of work shall be arranged by the contractor in adequate quantities. The contract shall use the standard, good quality tools, healthy and

defect free M&P, Tools, Special tools, Test & Measuring Instruments for the execution of work. Any non-standard or inferior tools being used by the contractor shall lead to rejection of work. The engineer's decision shall be final.

- b) 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. For payment purpose, this item will be operated as a Non-Schedule (NS) item, duly negotiating rates as per the conditions of contract. Contractor/Tenderer shall furnish the details of vehicles/equipment available with them to keep a record of the same.

## **9. Supply of Material**

All materials mentioned in the schedule and required for the execution of work shall be supplied by the contractor to the consignee's depot unless specified otherwise. The consignee shall be nominated by the Engineer. The material required for work at site will be issued to the contractor by consignee as and when required. All the cost for supply of material to consignee depot and from consignee depot to the site of work shall be borne by contractor. The contractor will be responsible for the safety of the material at site from the date of issue to the date of commissioning of the system.

## **10. Maintenance and Warranty:**

The Contractor shall maintain the work in all respects, for any defect, deficiencies and fault etc during Maintenance & Warrantee period. The contractor shall rectify any defects, deficiencies and faults etc within 72 hours from the time of complaints. The complaints shall be reported through Phone Call/ SMS/ Whatsapp/ Email. The contractor shall do the failure analysis and identify the pattern failures and shall implement the reliability action plan to stabilize the system. If performance of the Equipment(s) is observed to be poor, the warrantee of the equipment(s), as deemed fit, shall be extended. Penalty of Rs. 500/- per day shall be imposed if contractor failed to attend the failure/complaint within stipulated time during maintenance/ warrantee period subject to maximum of the amount of security deposit.

## **11. Operation and Maintenance**

- a) The contractor shall arrange and conduct training to Railway's staff for operation, troubleshooting, software configuration and maintenance etc of the system and equipment's.
- b) The contractor shall supply all the software or life time license of the software to Railway for operation, user configuration, maintenance etc.
- c) The contractor and OEM shall supply the spare parts as and when required for the maintenance of the equipment.

## **12. Quality & Safety**

The contractor shall depute a qualified and experienced quality & safety engineer (QSE) for ensuring quality and safety at the work as an internal mechanism of contractor. The QSE shall do the quality and safety audit regularly. QSE shall submit report once in the month and non-conformities shall be complied by the contractor.

- 1. **Safety Training & Counselling:** The contractor shall not deploy any staff for execution or work until the staff is provided sufficient training for safety. The record of safety training shall be maintained at Site duly acknowledge under the signature of the staff in Safety Assurance Register. Safety counseling of staff working at site has to be done



at regular intervals at least once in week and as per latest directives issued by Railways time to time and record of same shall be maintained.

- b. **Safety Procedures & Guidelines:** All of the contractor's staff, supervisor, manager, and team leaders shall follow the rules and regulations, procedures in the shed, stations, yards, tracks, buildings etc. The contractor shall ensure that his staff do not trespass and limited the site of work only.
- c. **Traffic and Power Block:** The contractor shall work under traffic block and power block. The contractor shall take all the precaution so that no infringement causes for train movements.
- d. **Personal Protection and Safety Gears to the Contractor's Staff:** The workers and supervisors of the contractor, shall be always in uniforms with all the personal protection and safety gears eg; Self illumination Vest, Safety Shoes, Safety Belts, Safety Goggles and Helmets etc. of approved industry standard. 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.

#### **Barricading:**

- a) The contractor shall barricade the site entirely with steel framed barriers or as directed by Engineer for separation and confinement of work site.
- b) These barricades should be provided at a distance of approximately 3.5m from the center 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 and shall be maintained in perfect condition all the time. Payment will be made separately as per the item available.

**Signages:** The contractor shall provide and display appropriate signages.

**Contractor's Electrical Licence:** The Electrical General & Electrical Traction works shall be carried out only by a Tenderer/Contractor holding a valid Electrical licence on their own name or person whom they are engaging to supervise/execute this work, issued by the any state Government for carrying out the installation work of the voltage classes involved, under the direct supervision of the persons holding valid certificates of competency for the same voltage classes issued or recognised by the State Government. The successful tenderer should submit the valid Electrical licence on their own name or person whom they are engaging to execute this work and the names and particulars of certificates of competency of the supervisors and workmen to be engaged for carrying out this works before commencement of work.

#### **Penalty:**

- a) The contractor's execution of work shall not cause any damage to Railway equipment, installation, property etc.
- b) 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.
- c) 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, Passengers etc, 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.

- d) A penalty as deemed fit by the engineer shall be imposed on the contractor considering the level and seriousness of safety lapse at the work site. The decision of engineer shall be final for imposition of penalty.
- e) Penalty for Cable Cut shall be imposed as per Railway Joint Procedure Order (JPO).

### **13. List of Documents attached with this document.**

- a) Railway Board letter No.[2016/CE-I/CT/12/GST/Pt.I](#) Dt.[29.06.2017](#), Implementation of GST act,2017 for procedure for payment of contractual bill.
- b) Railway board letter No.[2018/CE-I/CT/9](#) Dt.[04.06.2018](#) for Letter of credit (LC).
- c) Railway board letter No.[F\(X\)I/95/I/I](#) Dt.[07.09.2021](#) for recovery of conservancy charges.
- d) Form for submission of request for availing mobilization advance as per Annexure-I.

## **TECHNICAL SPECIFICATIONS AND SPECIAL CONDITIONS FOR SUPPLY OF REINFORCEMENT AND STRUCTURAL STEEL**

### **SUPPLY OF STEEL FOR VARIOUS WORKS:**

Supply of steel to various specifications as required under various schedules in the contract are governed by the Technical specifications and Special Conditions specified hereunder.

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 Standard Schedule of Rates of the Railway. Payment for cutting, fabrication etc., done on the Railways steel will also be made as per the SSR 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.

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.

### **SPECIFICATIONS FOR STEEL:**

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 (upto date) and in case of mild steel rods it shall conform to IS 432 (Part-I Upto 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 (upto date) as specified.

- iii) HTS wires/strands shall be conforming to IS 14268 (Upto date) as specified.
- iv) The structural steel hollow sections shall be conforming to IS 1161/4923 (upto 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 Fe 500/ Fe 500D / Fe 500S / Fe 550 / Fe 550D shall be used in bridge construction. Fe 415 or its variants Fe 415D / Fe 415S, if used, shall have pre- approval of Dy. Chief Engineer-in-charge. For special cases and in seismic zones III, IV and V, only Fe500D/Fe550D shall be used. For other concrete, Fe415/Fe 500/Fe550 / their variants shall be used as specified in the respective schedule items and as decided by the Engineer-in-charge.

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.

The Contractor shall arrange to carryout additional tests on physical properties of steel for every 50 metric tonne (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 tonne (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.

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.

#### PROCUREMENT OF STEEL:

Structural steel for the work shall be procured from following manufacturers:

1. Steel Authority of India Ltd (SAIL)
2. Tata Iron & Steel Company Ltd .(TISCO)
3. Indian Iron & Steel Company (IISCO)
4. Rastriya Ispat Nigam Ltd. (RINL)
5. JSW Steel Ltd.
6. ESSAR steel Ltd.

**Note-1.** The hollow sections may be procured from reputed manufacturers having experience of supplying the hollow sections to Indian Railway/ Metros/ DFFCIL/ NHRCL with the prior approval of CPM/GSU. However, steel plates for manufacturing the hollow sections shall be procured only from the manufacturers mentioned in clause 3.1 above. The approval shall be given after evaluation of facilities, machinery & plants, quality control, testing laboratory, past experience, detailed factory inspection etc. and the decision of CPM/GSU shall be final and binding on the contractor.

**Note-2** Fabrication of PEB sections shall be done in the premises of reputed manufacturers having experience of supplying of PEB structures to Indian Railway/ Metros/ DFFCIL/ NHRCL/ Airports etc; with the prior approval of CPM/GSU. However, steel plates for manufacturing the PEB sections shall be procured only from the manufacturers mentioned in clause 3.1 above. The approval shall be given after evaluation of facilities, machinery & plants, quality control, testing laboratory, past experience, detailed factory inspection etc. and the decision of CPM/GSU shall be final and binding on the contractor

Reinforcement steel for the work shall be procured only from the manufacturers shown in the table below for various grades of steel mentioned against each:

2658062/2026/O/o OS/GSU/MYS/SWR

No	Manufacturer	Grades of steel
1	Steel Authority of India Ltd. (SAIL)	All grades
2	Tata Iron & Steel Company Ltd. (TISCO)	All grades
3	Indian Iron & Steel Company (IISCO)	All grades
4	Rashtriya Ispat Nigam Ltd. (RINL)	All grades
5	Shyam Steel Industries Ltd. (SHYAM)	Fe 500, Fe 500D, Fe 550, Fe 550D, Fe 600 & CRS (Corrosion Resistant Steel) of sizes 8 mm upto & including 32 mm nominal dia confirming to IS 1786:2008 with latest amendment.
6	Electrosteel Steels Ltd.(ELECTRO STEEL)	Fe 500 (8mm-32mm dia), Fe 500D (8mm- 32mm dia), Fe 550 & Fe 550D for 36 mm nominal dia confirming to IS 1786:2008 with latest amendment.
7	M/s Shri Bajrang power & Ispat Ltd. (GOEL TMT)	Fe 500(8mm-40mm dia), Fe 500D (8mm- 32mm dia), Fe 550 (8mm-32mm dia),Fe 550D(8mm-32mm dia), & Fe 600(8mm- 32mm dia) confirming to IS 1786:2008 with latest amendment
8	M/s JSW Steel Limited, JSW Centre, Bandra Kurla Complex, Bandra(East), Mumbai-400051.	Fe 500(8-40mm dia), Fe 500D(8-40mm dia), Fe 550 (8-40mm dia), Fe 550D(8-40mm dia), Fe 600 (8-40mm dia) & CRS (8-40mm dia) (Corrosion Resistant Steel) nominal dia confirming to IS 1786:2008 with latest amendment.
9	Any other firm as and when approved by RDSO (Research Designs & Standards Organisation) for supply of reinforcement bars (from the date of approval) for the grades of steel approved.	

All steel (reinforcement steel, structural steel etc) for the work shall be procured from the Producer/vendors approved by RDSO. 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 CPM/GS, 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. 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.

#### **PAYMENT FOR REINFORCEMENT, HTS. STRUCTURAL STEEL:**

- i. Payment for supply of all types of steel will be made for the quantity required / used as Indian Railway Unified Standard Specifications (Works & Materials) 2021 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 utilised 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 overall 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 weighing 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 overlap provided actually even with approval. Unauthorized overlaps will not be paid for. Over laps in critical locations shall not be permitted.

i. **STAGE PAYMENTS:**

1. 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.
2. 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.
3. 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.

Stage/Advance payment for steel will be released subject to the following conditions:

- (i) The material shall be strictly in accordance with the contract specifications.
- (ii) 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.
- (iii) 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.
- (iv) 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.
- (v) Ownership of such steel shall be deemed to vest with the Railways.

- (vi) 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.
- (vii) 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.
- (viii) The price variation claim for steel will continue to be governed as per extant PV clause and with reference to delivery at site.
- (ix) 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.
- (x) No Stage/Advance payment is permitted for steel required for temporary and enabling works.

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.

**OTHERS:**

- a. 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.
- b. 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.
- c. The contractor shall be bound to store the materials at site of work earmarked for the purpose by the 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 are intended for. Safe guarding of the materials is the responsibility of the contractor even if the material is deemed to be owned by the Railway and insurance etc., have been arranged by the contractor.
- d. Welding of reinforcement will not be generally permitted except in special circumstances under the written approval of the Engineer-in-charge.
- e. 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.
- f. A register shall be maintained by the contractor with full details of reinforcement provided for accountal and payment of steel reinforcement. The contractor should sign a similar register maintained by Railway before undertaking concreting works, as a token of acceptance of the details of reinforcement steel provided 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.
- g. 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.
- h. 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

**2658062/2026/O/o OS/GSU/MYS/SWR**

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.

- i. 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.

a) Mechanical properties like diameter, mass of strand.

b) Ultimate tensile strength and lead extension curves, yield point, proof stress and modulus of elasticity.

c) Elongation after fracture.

d) Relaxation after 1000 hour test.

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.

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.

The wires/strands shall be quoted with water soluble oils to prevent corrosion.

Signature of Tenderer / Contractor  
Name of Tenderer / Contractor :  
Date :  
Address :

Chief Project Manager  
Gati Shakti, Mysore ,

GENERAL CONDITIONS – TRACK WORKS

1. The work should be done in accordance with the provision made in Indian Railway Permanent Manual (IRPWM-2024), Specification for track ballast IS/RDSO-GE/0001:2023 February 2023, Manual for fusion welded by Aluminio Thermic Process (revised-2022), Indian Railway Standard Track Manual (Vol-I & II) or other relevant Manuals/specifications for these works with all correction slips/amendments/re-print up to the date of calling of tenders.
2. Sleepers, rails, fastenings and all P.Way materials will be supplied by Railways for carrying out the work
3. No plant and machinery shall be supplied by the Railways for this work. The contractor shall, at his own cost, arrange and provide all materials, plant, and machinery required for the execution of the work, except those specifically mentioned in the Schedule under the respective items.
4. In the event of any discrepancy, conflict, or inconsistency between the working drawings referred to in the Schedule and the specifications of the work for any item, the provisions of the working drawings shall prevail. The decision of the Engineer-in-Charge in resolving such discrepancies shall be final and binding on the contractor
5. **Work to be carried out without disturbance etc.**  
The contractor shall carry the work in such a manner as to avoid any inconvenience and disturbance to Railway working and to the public using the Railway premises and he will adjust his programme of work accordingly in consultation with the engineer in charge.
6. **Legal charges**  
All charges and expenses that Railway may have to incur to examine the validity of power of attorney, partnership etc. executed before or after the execution of the contract will have to be borne by the contractor.
7. **INSPECTION REGISTER:**  
  
An inspection register is maintained at the site of the work by the Railway wherein instructions regarding the working etc., are received by the Engineer or his executive sub ordinates. It is expected of the contractor, his representatives at the site to note such instructions whenever called upon to do so and take action accordingly
8. The contractor will be responsible for safe passage of all the trains. Trains will be allowed on the specific approval of SSE/P.WAY in charge in the portion where the track is under repair by contractor, any violation in this regard, the contractor will be held responsible for all the damages arising out of the negligence, manipulation by his staff.
9. The quantities shown in the tender schedule are approximate and shall be operated in full or part at the discretion of the engineer in charge.
10. The works are to be carried out under the traffic conditions. It is the responsibility of the contractor to see that there is no detention and interruption to the movement of the trains. No claim will be admissible towards loss of time, wastage of labour employed etc. that may be incurred by the contractor due to movement of train. The rate quoted shall cover all such contingencies.
11. The Railway administration will not be responsible for the safety of contractor's labour engaged for this work.
12. The Railway materials viz., rails, wooden sleepers, CST-9 sleepers, fastenings etc, to be supplied to the contractor by the Railway free of cost shall be delivered against security money 2% of the Agreement value



or Rs.50,000/- whichever is less in the form of cash. The value of the materials will be restricted to the extent of cash remitted.

13. The Railway shall not be liable for any loss or damage caused to the materials while in the custody of the contractor. If the breakage is more than 2% of the sleeper issued a penalty will be imposed at the rate of Rs.10/- per each sleeper, damaged by the contractor. However, the broken sleepers is the property of the Railway only.
14. Dip lorry required for the work will be supplied by Railway free of cost. The same will be supplied at the Headquarters of the SSE/P.WAY or at any other place convenient to the Railway Administration and the contractor has to make his own arrangements to transport the same to the site of work. The contractor is responsible for the safe custody of the dip lorry and the same would be returned in good condition on completion of the work.
15. The work must be supervised by at least a JE/P.way
16. It is very necessary that safety of track is ensured by the SSE/P.way In charge supervising the work.
17. The contractor should employ retired SSE/P.way, Permanent Way Maistries who are experienced in such works and who are capable for maintaining safety of not only the track and work that is being done but should also be responsible for the safety of men that are employed in such work.
18. It should also be ensured that the labours employed by the contractor are medically fit with good eye sight so that they can safeguard themselves.
19. It must be ensured that no work is carried out by the contractor unless SSE/P.way In charge of the work is at site. The SSE/P.WAY shall not leave the site till the work is completed for the day and the track is safe to pass the trains at the registered speed prescribed.
20. If by any chance, the SSE/P.WAY in charge is not available at site the contractor should not be allowed to take up the work.
21. The site should be protected by Flagman with protective equipment who will work under the direction of the SSE/P.WAY-in-Charge.

#### **SPECIAL CONDITIONS OF CONTRACT FOR TRACK WORKS:**

01. The contract shall be governed by the South Western Railway's General Conditions of contract. Indian Railways P.Way Manual, Indian Railway Track Manual, Schedule of Dimensions and the Standard Specifications for track works. In case of Contradictions the clause under these special conditions shall prevail.
02. The Tenderer in his own interest should visit the site of work with the concerned Section Engineer(P.Way)/Assistant Divisional Engineer or with their authorized representative after fixing up an appointment with them in advance and ascertain the nature and quantum of work, site conditions, availability of approach road, availability of labour, water, electricity, land for camps etc.,.
03. The Contractor shall not start any work on the track under traffic condition without the presence of the Railway's Supervisor at site. In case the Contractor or his representative starts any work in the absence of the Supervisor, it shall be treated as unauthorized and illegal tampering with the track and shall be liable for action under the Indian Railway's Act.
04. In case any train is detained at the approach of work spot on account of its passage being considered unsafe by the Railway's supervisor on account of bad workmanship by the Contractor or the track parameters being unsatisfactory for safe passage of trains or due to the Contractor leaving the work unfinished or due to work being delayed by the Contractor, the Railway shall be entitled to recover detention charges from Contractor's bills or security Deposit or any other dues at the rate of Rs. 5000/- per hour of detention or part thereof. Detention to trains as determined by the Railway shall

05. Notwithstanding the provisions of clause 62 of General Conditions of Contract, the Railway reserves the right to terminate the contract with immediate effect if the Contractor is found responsible for any breach of rule which affects the safe running of trains without giving any notice to the Contractor.
06. In case an accident occurs at the work spot, the findings of the Enquiry Committee set up by the Railway to investigate the cause of the accident shall be final and binding on the Contractor. If the Contractor is held responsible for the accident, the contract is liable to be terminated forthwith not with standing the provision of clause 62 of the GCC.
07. Irrespective of the provisions of the clause 62 of GCC or otherwise, penalty up to an upper limit of 10% of the total cost of work/the actual cost of making good the damage whichever is higher may be imposed in case an accident occurs due to Contractors negligence as decided by the Railways and Railways decision shall be final and binding on the Contractor. The Contractor is also liable for prosecution if loss of life is involved.
08. Traffic blocks as required to carry out certain track works will be arranged by the Railways. Actual availability of block would depend on flow of traffic and there may be variations in availability of block vis-à-vis these planned. The wastage of labour, if any, occurring on account of non-availability of block would not be paid for. No claim on such account shall be considered.
09. The Contractor shall proceed with the work in a systematic manner so as to ensure that the stretch of track under speed restriction and its duration is kept to a minimum. The decision of the Engineer in this respect shall be final and binding.
10. On deep screening sites, the Contractor may be required to handle additional ballast which might have been dumped during the intervening period. Nothing extra shall be paid for handling the additional ballast in all such cases.
11. The work shall be so carried out that there is no infringement to the Railways Schedule of Dimensions.
12. The Railway shall arrange for protection of Track(s) by their staff. In addition, the Contractor may arrange for 'Lookout Man' for protection to warn his workers of any approaching train. No compensation will be paid by the Railway in case of injury or death to the Contractors Labour and the Contractor shall indemnified the Railway's of any responsibility in this regard. The Contractor may obtain Group insurance in respect of his workers.
13. At each site of work, the Contractor shall employ and post one Technical Supervisor who should have adequate experience in execution of track works. The name, technical qualification the details of experience of the technical supervisor as employed shall be advised to the Section Engineer/In- charge. If in the opinion of the Section Engineer/In-charge, this Supervisor is not fit to be in charge of the work, he shall be forthwith replaced. In this matter, the decision of the Engineer-in- charge shall be final and binding on the Contractor.
14. The Contractor's Technical Supervisor shall be present at the site at all times when the work is being executed. The Contractor shall employ adequate number of works to give consistent and desired progress every day.
15. For executing the work, the Contractor has to arrange his own tools & plant and equipment, unless otherwise stated in the Schedule, Railway shall provide equipment which are specifically mentioned

in the description/specification of items in the Schedule. In all the other cases, hire charges for the tools, plants and sleepers will be recovered from his bills security deposit (as per extant rules) or any other dues.

16. The Contractor shall arrange for safe custody of the materials supplied/hired to him. In case of loss of Railway Materials, the Railway will recover the cost as per extant rules.
17. In case of loading/unloading from the Railway wagons all commercial formalities shall be observed. All demurrage/ wharf age charges accruing due to neglect of Contractor will be recovered from his bills.
18. No ballast shall be wasted on the slopes of banks or in cuttings while taking up ballasting/deep screening works.
19. Provision of temporary speed restriction boards and their lighting etc., will be arranged by the Railway.

**NON-COMPLIANCE WITH THE INSTRUCTIONS / DIRECTIVES OF THE ENGINEER'S REPRESENTATIVE.**

20) The Contractor shall always comply with the instructions/directives issued by the Engineer's representative from time to time. In the event of Non-compliance with the instructions/directives, apart from and in addition to other remedies available to the Railways as specified herein above, the Engineer's representative may employ at the work site the required number of workers to provide the requisite conditions for the safe and unhampered movement of Railway traffic. The decision of the Engineer's Representative in regard to the need, appropriateness and adequacy of the deployment of the required workers with necessary equipment shall be final and conclusive. The number of workers so deployed by the Railway shall be intimated in writing by the Engineer's representative to the Contractor, after such deployment.

21) When the required workers with necessary equipment are deployed in the above manner, recovery at the following rates shall be made from the Contractor's dues under this contract or from any other means of the Contractor available with the Rail way under any other contract. The recovery for the above total man hour so deployed at the worksite for the above purpose shall be made at the rates of Rs. 20/-(Rs. Twenty only) per man hour. The aggregate period of the man hours for the above recoveries shall be reckoned from the time the workers are actually deployed at the work site till the work is completed to the satisfaction of the Engineer's Representative whose decision in this regard shall be final conclusive and binding on the Contractor. Recovery for the deployment of equipment shall be made at a rate twice the hire charges as per extant rules.

**PERSISTENT NON-COMPLIANCE WITH INSTRUCTIONS/DIRECTIVES OF ENGINEER'S REPRESENTATIVE.**

22) If the Contractor does with the instructions/directives of the Engineer's representative, apart from and in addition to the remedies available to the Railway as specified herein above without prejudice to the Railways rights in this regard, the Engineers representative which for the purpose of this cause shall include the inspector of Civil Engg Dept. appointed by the Railway can suspend the Contractors works till the Engineers representative is satisfied that the Contractor has taken necessary steps to comply with the instructions/directives issued by the Engineers representative.

23) The decision of the Engineers representative in this regard shall be final, conclusive and binding on the Contractor. The Contractor shall not have any claim whatsoever against the Railway for such suspension of work.

24) During such period of suspension of work, the Contractor shall not in any manner attempt to carry out the work at the worksite. Any such attempt on the part of the Contractor shall amount to tampering of the Railway track to which the Contractor shall be liable for appropriate action under the relevant provisions of the Indian Railway Act.

**SPECIAL CONDITIONS OF CONTRACT FOR MOVEMENT OF VEHICLES NEAR RAILWAY TRACK  
(SAFETY PRECAUTIONS)**

25. No lorry or road vehicle shall be operated so as to affect the safety of trains. They should be allowed to work well outside the moving dimensions. At each of the locations where lorries are working, an authorized responsible Railway Official should be posted as in charge to ensure that lorries do not infringe the scheduled moving dimensions any time and protect the track in case of emergency. To facilitate the driver to whistle, a whistle board will have to be provided at the appropriate place.

26. All vulnerable locations, where construction activity is progress adjacent to existing Railway lines, should be cordoned off with proper barricades. The most vulnerable locations shall be barricaded with rail barricades projecting at least 1 M above the ground. At all other locations, barricades of not less than 1.5 M height consisting of bamboo, casuarinas poles and supported horizontally by similar bamboo/casuarinas poles should be provided.

27. All the barricades are to be painted or stuck on with red luminous paint/strips at suitable intervals on the barricades.

28. The entry to new banks, which run alongside the existing track should be protected by barriers, which can be closed and opened whenever necessary.

29. At locations, which are not vulnerable, provisions of barricade can also be with:

- a) 0.6 M wide and 0.3 M deep trenches, OR
- b) Stones of minimum size 30 cm x 15 cm at 1 metre intervals and projecting 0.3 m above ground level and painted white.

30. Barriers shall also be provided in the case of doublings, particularly at the existing level crossings where there is every possibility of road vehicles entering the finished formation. These barriers are to be opened only for the movement of Railway Contractors authorized vehicle or other Railway Vehicle.

31. Road vehicles employed by the Railway 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.

32. Wherever the work requires the movement of road vehicles within a distance of 3.5M to 6M from the center line of the nearest track, such work shall be done only in the presence of Railway employees authorized by the Engineer in charge. No part of the road vehicle will be allowed at less than 3.5M from track center. Cost of such Railway Employee shall be borne by the Railway.

33. The driver of the vehicle shall always face the track, when reversing the vehicles and whenever he cannot face the track for whatever reason, he should invariably assisted by a helper with a whistle who should guide him and ensure safety.

34. All work sites shall be supervised by the Contractors Representative as also a representative of the Railway Organization. Whenever work of plying road vehicles with 6m zone is actually in progress Look-

out men should invariably be available. Look out men will have to be provided by the Contractor, from out of the list of persons who are authorized to carry out these duties. Authorization will be issued to the individuals, by the representative of the Engineer-in-Charge. One supervisor who shall be permanent staff(Gangman) will monitor the availability and alertness of Look-out men. In case of non-availability of Look-out men, this Railway's Supervisor shall stop further activities of plying of road vehicles. Even if not, work is executed in the night, lookout men shall patrol the beat as identified by the representative of the Engineer-in-charge to ensure the safety of the running trains, especially from any infringement.

35. Working alongside the track during night hours is normally prohibited. But work can be done in the night only with the written permission of the Engineer-in-charge of the construction activity. Where night work is remitted, lighting of the work site as required should be done.

36. The Contractor shall be fully responsible against loss or damage arising from working of lorries, adjacent to the running track and making track and making the Contractor solely responsible for any loss or damage which the Railway may suffer.

37. The Contractor shall be fully responsible for ensuring safety at all time and shall bear the cost of all such damages in cases of accidents/unusual occurrences resulting in damages to Railway property and passengers.

38. The Railway Administration has right to utilize the vehicles and equipment of the Contractor in the case of accidents/natural calamities involving human lives.

### TECHNICAL SPECIFICATIONS FOR EARTH WORK

- 1) The Earth work for Railway formation in cutting and embankment is to be carried out comprehensive guidelines and specifications for Railway formation, specification no RDSO/2020/GE:IRS-0004 with latest correction slips.
- 2) Trees in the Railway limits shall not be cut by the Contractor or his men without the permission of the Engineer-in-charge.
- 3) 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 equipment in the presence of Railway Engineer-in-charge.
- 4) After site clearance, all pocket and depressions, if any, left in the ground shall be made good and compacted.
- 5) The filling over arches and pipe culverts shall be made up simultaneously from both sides. Water proofing treatment done over these culverts must be kept undamaged and intact during the filling operations.
- 6) 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.
- 7) 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.
- 8) 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.
- 9) 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.
- 10) 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.
- 11) 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.
- 12) The tenderer should furnish the list of earthwork equipment 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 equipment are in good working conditions.
- 13) 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.
- 14) 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.

- 15) 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 signalling 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.
- 16) 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.
- 17) 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 equipment 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.
- 18) 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.
- 19) 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.
- 20) 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.
- 21) 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.
- 22) 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.
- 23) 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.

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 earth 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 upto 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 metalliferous 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.

**List of Manuals/Specification are attached in Tender Documents are as follows:**

- 1. Indian Railway Permanent Manual (IRPWM-2024),**
- 2. Specification for track ballast IS/RDSO-GE/0001:2023 February 2023**
- 3. Comprehensive guidelines and specifications for Railway formation, specification no RDSO/2020/GE:IRS-0004**

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

##### **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 90 days 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.

**a. SECURITY DEPOSIT**

- 1) 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.
- 2) 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.
- 3) The Irrevocable Bank Guarantee submitted towards Security deposit shall be initially valid up to the
- 4) 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.
- 5) 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) Refund of Security Deposit: Security Deposit mentioned in sub clause (1) above shall be returned to the Contractor along with or after, the following:
- 7) Final Payment of the Contract as per clause 51.(1) and
- 8) Execution of Final Supplementary Agreement or Certification by Engineer that Railway has No Claim on Contractor and
- 9) Maintenance Certificate issued, on expiry of the maintenance period as per clause 50.(1), in case applicable.

- 10) 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.
- 11) 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.
- 12) 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.

**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:
- 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.
  - 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.
  - The Contract being determined or rescinded under clause 62 of IRGCC.

**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	11 to 25	Rs.717/-
contractor including contractor	26 to 50	Rs.1044/-
awarded by stores dept.	51 to 100	Rs.1402/-
c. Coal handling ash pit cleaning	101 to 200	Rs.1760/-
contractor	201 to 300	Rs.2118/-
d. Railway siding used by the	301 to 750	Rs.2445/-
contractor	751 to 1500	Rs.4918/-
e. Contractor supplying water to	1501 to 3000	Rs.9839/-
engines	3000 and above	Rs.19,653/-

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

- 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.
- The substitution of proper and suitable materials, and
- 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.
- 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.

**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.

**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.

- 16. 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.

#### **Minimum Wages Act**

**(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.

**(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.

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

**(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.

**(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.

**(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.

**(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.

**(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.

**(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.

**(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."

**(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.

**INSPECTION AND MAINTENANCE OF SITE:**

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.

he 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.

**WATER AND ELECTRICITY FOR WORKS:**

Water: The Contractor shall make his own arrangements within his quoted rates for necessary water required for the performance of the contract.

(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.

#### **PROGRAMME OF WORK :**

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.

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.

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.

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 FIXING MILESTONES:**

The concerned Engineer-in-charge of the work will fix appropriate milestone and monitor the progress from time to time.

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

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

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).

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 Chief Project Manager, Gati Shakti Unit \_\_\_\_\_ 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.

The decision of the Chief Project Manager, Gati Shakti Unit \_\_\_\_\_ 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.

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

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. 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 MAJUEURE 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.

**ENGAGEMENT OF TECHNICAL STAFF BY THE CONTRACTOR**

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 Dy.CPM/GSU in charge of the project along with the programme chart and approval of Engineer to be obtained for engaging them for work.

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.

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 Dy.CPM/GSU 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 Dy.CPM/GSU 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.

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.

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.

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.

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

- 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.

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, 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.

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.

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.

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

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.

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.

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.

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

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

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

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.

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

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.

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

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

**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:

**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.

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

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

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

**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.

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 contractor.

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

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

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

Safe practices at all times and non infringement to moving trains shall be ensured. Road vehicles, material trolleys, dollies 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

All equipmentlike 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

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.

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.

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.

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

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.

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.

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.

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.

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 'I' 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.

**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 or employees, in relation to the Letter of Credit (LC). All sums payable/borne by Railways on this account shall be considered as reasonable compensation and paid by contractor.
  - f) The LC terms and conditions shall inter-alia provide that Railways will issue a Document of 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.

## **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 Dy.CPM/GSU 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.

**I) 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.

**) 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 with out 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.

**) 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.

**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.

) ***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.

I) ***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**  
**I.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.

#### **I . 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 agreement 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.

#### **I . 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 it 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.

**V . 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.

#### **V I. 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 Dy.CPM/GSU 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

#### D) **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.

## ***I) 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.

## ***V) 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 IRS Concrete 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 manufacturers 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.

#### **) *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 with in 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 cut out.

#### **I) *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.

## **II) 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  $\pm 5/0$  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.

## **I) 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. At least 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

### ***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.

**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

**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

**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

**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.

**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.

**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. 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.
- viii. Mechanical vibrators used shall be of appropriate specifications, type and capacity and as directed by the Engineer-in-charge.

) **Equipment & machinery for concreting**

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

- i. For smaller works, equipments 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.

***I) 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.

## **II) *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.

) ***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 Dy.CPM/GSU/ DEN is final in this regard.

***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.

) ***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 / Dy.CPM/GSU 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 Dy.CPM/GSU.

***I)******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	7 days
(1) Spanning up to 4.5m	14 days
(2) Spanning over 4.5 m	
e) Props to beams and arches:	14 days
(1) Spanning up to 6m	21 days
(2) Spanning over 6m	

- iii. Where the shape of the element is such that the form work has re entrant angles, the form work shall beremoved 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 withoutrequiring 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.

## **II) 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 Dy.CPM/GSUis 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 o the instruction of the engineer in charge, be repaired as per the approved procedures. The complete cost of such repairs shall be borne b 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) 25 mm in member. 2) 10 mm in reinforcement
2	Deviation from plumb or variation 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	+ 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	+ 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	+ 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	+ 5 mm
14	Centre to centre distance of pier bearings across span	+ 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.

V)

#### **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.

)

#### **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 (m <sup>3</sup> )	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 50m <sup>3</sup> or part thereof.

**I) 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 carry out 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, equipment 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 the required 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 2021 and the CPWD specification -2023 and corrected up to date where ever applicable.**