ਹੂੰಲು ಮೂಲಸೌಲಭ್ಯ ಅಭಿವೃದ್ಧಿ ಕಂಪನಿ (ಕರ್ನಾಟಕ) ನಿಯಮಿತ रेल इन्फ्रास्ट्रक्चर डेवलपमेंट कंपनी (कर्नाटक) लिमिटेड Rail Infrastructure Development Company (Karnataka) Limited

<u>Yesvantpur – Channasandra and</u> <u>Baiyyappanahalli – Hosur Doubling Projects.</u>

BID DOCUMENT

<u>for</u>

"Manufacturing and Supplying of PSC Mono Block Wide Based Sleeper 60 kg"

Date :11.11.2020.

RAIL INFRASTRUCTURE DEVELOPMENT COMPANY (KARNATAKA) IMITED

MSIL House, 7th Floor, #36, Cunningham Road, Bangalore - 560052 Tel +91-80-22370582, Fax +91-80-22370581 Email: <u>md@kride.in</u>



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KRIDE

<u>Yesvantpur – Channasandra and</u> <u>Baiyyappanahalli – Hosur Doubling Projects</u> <u>in Bangalore Division of South Western Railway.</u>

BIDDING DOCUMENTS

For the work of

"Manufacture and Supply of PSC Mono Block Wide Based Sleeper 60 kg"

IFB No: K RIDE/Projects/63/2020

Date :11.11.2020.

Employer: K RIDE (Rail Infrastructure Development Company (Karnataka) Limited)

MSIL House, 7th Floor,

#36, Cunningham Road

Bangalore

Tel – (080) 22370582, Fax – (080) 22370581 E Mail – <u>md@kride.in</u>

NOTICE

FOR INVITATION FOR BIDS

(IFB)

Rail Infrastructure Development Company (Karnataka) Limited

INVITATION FOR BIDS

Bid Notice No. K RIDE/Projects/63/2020

Date : **11.11.2020.**

RAIL INFRASTRUCTURE DEVELOPMENT COMPANY (KARNATAKA) LIMITED (K RIDE), having its Corporate office at MSIL House, 7th Floor, #36, Cunningham Road Bangalore-560052, India which is a Joint Venture of Government of Karnataka and Ministry of Railways set up as a wholly owned Government Company under the provisions of Companies Act 2013, invites bids under single stage Two packet system for the following work:

SI.	Name of work	Estimated Cost of	Period of
No.		Project (in)	Completion
Ι	"Manufacture and Supply of PSC Mono Block Wide Based Sleeper 60 kg"	23,96.86,400/-	11 months

- Bidders are advised to note the eligibility and minimum qualifying criteria specified in the Instruction to Bidders "Evaluation and Qualification Criteria" of bid document.
- 2. Bids must be accompanied by a bid security as mentioned above in any one of the forms as specified in the bidding documents and shall have to be valid for 42 days beyond the validity of the bid.
- Bidding Documents can be downloaded free of cost from K RIDE website <u>www.kride.in</u> from <u>11.11.2020</u> and the bids can be submitted on the downloaded document.

Please note that drawings, if any, referred in the bid document, but not uploaded with the bidding document, can be viewed in this office on any working day.

It will be the responsibility of the bidder who is submitting the bid on downloaded bidding documents to check and see any Addendum/Corrigendum issued in this regard from the website from time to time and ensure submission of bid along with all Addendum/Corrigendum.

In case of any clarification the tenderer can visit the Rail Infrastructure Development Company (Karnataka) limited Corporate Office Bangalore at **MSIL House, 7th Floor, #36, Cunningham Road Bangalore – 560052**,

- 4. **Purchase Preference:** Shall not apply to Central Public Sector Enterprises, as per extant rules in force.
- 5. Date of Receipt and opening of Bids: The completed Bids must be dropped in the nominated tender box or delivered to the address below not later than 15.00 hrs on- 04.12.2020 and the same shall be opened at 15.30 hrs. in the same day in the presence of Bidders who choose to be present. K RIDE will not be responsible for any delays in receiving the Bidding documents by the Bidder or receipt of Bids by K RIDE.
- 6. Address for Communication: Interested eligible Bidders may obtain further information from the following address:

General Manager (Civil), Rail Infrastructure Development Company (Karnataka) Limited, MSIL House, 7th Floor, #36, Cunningham Road Bangalore – 560052

Tel: (080)22370582, Fax -22370581 E – Mail: <u>md@kride.in</u>

KRIDE

Contract Data

Contract Data

Conditions	Data
	Pail Infrastructure Development Company (Karnataka)
Employer's name and address	Limited
	(A Joint venture of GoK and MoR)
	MSIL House, /th Floor,
	Bangalore – 560052
	Tele: 91-80-22370582
	Fax: 91-80-22370581
Employer's Representative	General Manager (Civil), Rail Infrastructure Development Company (Karnataka) Limited
	MSIL House, 7th Floor,
	#36, Cunningham Road
	Bangalore – 560052
	Tele. 91-60-22370362 Fax: 01-80-22370581
	F = Mail: md@kride in
Engineer's name and address	Indian Railways
systems	Not permitted
Address for Communication to Employer	General Manager (Civil), Rail Infrastructure Development Company (Karnataka) Limited
	MSIL House, 7th Floor,
	#36, Cunningham Road Bangalore – 560052 Tele: 91-80-22370582
	Fax: 91-80-22370581
	E – Mail: md@kride.in
Governing Law	The Laws of Republic of India
Ruling language	English
Language for communications	English
State Capital Applicable	Bangalore.

Conditions	Data
Employers' Bank details for LC	
(a) Nodal Branch	(a) IDBI Bank, 11, First Cross, Gandhinagar, P B No. 9931, Bangalore 560009 IFSC Code – IBKL0000551
(b) Issuance/ reimbursing branch for LC	(b) Should be indicated later
Maximum Total Liability of the	Accepted Contract Amount
Contractor	
Jurisdiction of Courts	Bangalore
Bidding type	Normal Tender
Tender Notice No	KRIDE/Projects/63/2020 date : 11.11.2020.
Evaluation Criteria	Item wise / Consignee wise
Pre-Bid Conference	
Required	No
Tendering Section	STORES
Inspection Agency	Indian Railways
Procure From Approved	
Sources	Yes
Validity of Offer (Days)	240
Tender Doc. Cost (INR)	0.00
Contract Category	Stores / Expenditure
Tender Type	Open - Indigenous
Bidding System	Two Packet
Pre-Bid Conference Date	
Ilme Rubliching Date / Time	
	RUSU
Closing Date Time	04.12.2020, 15:00 hrs
Ranking Order for Bids	Lowest to Highest

Conditions	Data
Payment Terms	 90% of the price of each consignment will be paid after the PSC sleepers are inspected and passed by the Purchaser on execution of Indemnity Bond (as per enclosed proforma) (Annexure IV) for an equivalent amount by the contractor. In such cases of 90% advance payments, a copy of the Inspection Certificate shall be enclosed with the bills. The contractor may submit the Indemnity Bond for 90% of the contract value in one go in lieu of submitting several Indemnity Bonds for 90% of value of each inspected consignment. Balance 10% of the price of each consignment will be paid on proof of dispatch and on submission of Indemnity Bond (as per enclosed proforma) (Annexure V) for 25% of the value of stores supplied covering the warranty period as per warranty clause. The contractor may submit the Indemnity Bond for 25% value of the entire value of the contract in one go in lieu of submitting several Indemnity Bonds for 25% of each consignment. Consignor's Certificate shall be enclosed with 10% bills. In case, 90% payment as laid down in clause 15.2 above is not sought, 100% of the price of each consignment will be paid on proof of dispatch of stores and on
Statutory Variation Clause	Statutory Variation in taxes and duties, or fresh imposition of taxes and duties by State/ Central Governments in respect of the items stipulated in the contract (and not the raw materials thereof), within the original delivery period stipulated in the contract, or last unconditionally extended delivery period shall be to KRIDE account. Only such variation shall be admissible which takes place after the submission of bid. No claim on account of statutory variation in respect of existing tax/duty will be accepted unless the tenderer has clearly indicated in his offer the rate of tax/duty considered in his quoted rate. No claim on account of statutory variation shall be admissible on account of misclassification by the supplier/ contractor.

Conditions	Data
Option Clause	The purchaser shall be entitled to vary the order quantity upto +/- 30% anytime within the delivery period (including extended delivery period) on the same terms and conditions. The increase in quantity with respect to the tender quantity can be done even at the time of ordering and the tenderer shall be bound to accept the quantity so ordered on the basis of his original offer. The purchaser shall be entitled to exercise +/- 30% option clause in one or more than one instalment as long as the total variation in quantity does not exceed the limit of 30% of ordered quantity.
Standard Governing Conditions	IRS Specifications for PSC Sleepers – Pre – tensioned Type.

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Tender Conditions, Indian Railway Standard Condition of Contract, Annexure's & Schedule

INVITATION AND INSTRUCTIONS TO TENDERERS (KRIDE TENDER NO. KRIDE/Projects/63/2020 dated 11.11.2020)

MANANING DIRECTOR/ RAIL INFRASTRUCTURE DEVELOPMENT COMPANY (KARNATAKA) LIMITED, (HEREINAFTER REFERRED TO AS PURCHASER WHICH INCLUDES HIS SUCCESSOR AND ASSIGNEES) INVITES OPEN TENDERS) FOR MANUFACTURE AND SUPPLY OF PRESTRESSED MONO-BLOCK CONCRETE LINE SLEEPERS (RT-8527) (PRE-TENSIONED TYPE) FOR BROAD GAUGE (1673 MM) FROM RDSO CERTIFIED CONCRETE SLEEPER MANUFACTURING PLANTS,

1.0 General Instructions:

BEFORE FILLING UP THE TENDER FORM, PLEASE READ THE FOLLOWING:

- (A) INSTRUCTION TO TENDERES.
- (B) SPECIAL CONDITIONS OF CONTRACT,
- (C) IRS CONDITIONS OF CONTRACT.

These are available in the website <u>www.kride.in</u> The contract and supply will be governed by these conditions. Your signature and Tender form will be indicative that you have read and accepted all the conditions and undertake to abide by these conditions unless specifically denied/mentioned by you in your offer.

- **1.1** The Tender document consist of:
- (i) Instructions to Tenderers
- (ii) IRS Conditions of Contract
- (iii) IRS specification (T-39) for PSC sleepers pre-tensioned type
- (iv) Special Conditions of Contract
- (v) Schedule of Technical Requirement (STR) for PSC Sleepers
- (vi) RA formats including Financial rate page
- (vii) Proforma for Indemnity Bond for 90% payment
- (viii)Proforma for Indemnity Bond for balance 10% payment
- (ix) Proforma for financial credentials
- (x) Tenderer's address and communication Details
- (xi) Check List
- **1.2.** Manual offers shall be only accepted against Tenders even if they are submitted on firm's letter head/ any other form acquired or Downloaded and the same will be accepted.
- **1.3** Tenderer(s) have to download the Tender from the KRIDE website www.kride.in. Since tenders are downloaded online, the cost of the tender document need not be paid.

2.0 Filling of Tenders

- **2.1** Tenders should be duly filled in (On assigned space), duly signed Signature and submitted in KRIDE corporate office.
- 2.2. Tenderers must furnish all details in the Proforma for financial credentials, deviation statement, financial rate page, check list etc. of necessary documents defined in para -8 of ITT.
- 2.3. All the fields of the formats including Financial rate page (including applicable percentage of Goods & Service Tax (GST)) have to be filled up by the vendor.
- 2.4. On the basis of basic item rate on FOR loading point, the inter-se position shall be automatically generated by the system. Taxes etc shall not be taken in to account for evaluation of inter-se position of offers.
- 2.5 Any financial elements indicated in the remarks column will not be taken for ranking/ evaluation and will be summarily ignored. Tenderers are therefore advised not to enter any financial element in the remarks column available in the Financial Rate page.
- 2.6 Plant Location should invariably be mentioned against 'designated field' of financial rate page. A Firm owning more than one plant, is permitted to quote for more than one plant, for which separate offer sheet needs to be filled up for each plant by using the link "Submit Alternate Bid" duly mentioning the location of plant in designated field, which will be considered as separate offer.

In case a tenderer submits two offers for the same plant, in advertently, then the offer with lower rates shall only be considered.

- 2.7 The Tenderers are required to quote their rates in the space earmarked in the tender schedule. Any deviation in this regard will lead to summarily rejection of offer.
- 2.8 The individual(s) signing the tender or other documents connected therewith with the signature should satisfy the following:
- 2.8.1 In case of a Proprietorship firm, the signing individual should either be the Sole Proprietor or Attorney of the Sole Proprietor. Power of attorney duly attested should be attached with the offer if the tender document is signed by the attorney on behalf of sole proprietor.
- 2.8.2 In case of a registered Partnership firm, the signing individual(s) should either be partner(s) or their attorney (s) as per Constitution of Partnership Deed. A copy of partnership deed and power of attorney (whichever applicable) duly attested should be enclosed with the offer.
- **2.8.3** In case of a company, the signing individual(s) should be Director(s), Manager or Secretary of the company duly authorized by a resolution passed by the Board of Directors or in pursuance of the authority conferred by the Memorandum and Article of Association. **A copy**

of such resolution duly attested and certified copy of Memorandum and Article of Association and certificate of incorporation of the company should be enclosed with the offer.

- 2.8.4 In the case of a firm not registered under the Indian Partnership Act, all the partners or attorney duly authorized by all of them should sign all other connected documents. The original power of attorney or other documents empowering the individual or individuals to sign should be furnished to the purchaser for verification, if required.
- 2.9 Offers shall be as per terms and conditions given in the tender documents. However, deviations, if any, may be brought out in a separate "deviation form" provided with tender document, detailing clause number of the tender document, stipulation as per the clause and deviation asked for, otherwise the tenderer shall be deemed to have accepted all provisions of the tender documents. The purchaser, however reserves the right to accept or reject these deviations and Purchaser's decision thereon shall be final. Tenders with any kind of technical deviation will be summarily rejected.
- 2.10. The status of tenderer shall be reckoned as on the date of tender opening unless is a case of downgrading/ removal/suspension/banning.
- 2.11 Any offer with longer delivery period or not agreeing with the delivery schedule specified in the tender, will be summarily rejected.
- 2.12 Any offer with different PVC formula or quoting different base month or linkage with different indices or fixed rate etc. as compared to PVC formula provided in the tender or offers different formula/scheme for input tax credit as compared to provisions of SCC or different rate of reimbursement on freight on input materials as compared to provisions clause 14 of SCC, will be summarily rejected.

3.0 Earnest Money:

3.1 Tenderers intending to supply PSC line sleepers from their existing RDSO approved sleeper plants, can submit their tenders without earnest money.

4.0. Technical Information

- 4.1 Clarifications, if any, regarding specifications etc. may be obtained from the office of KRIDE
- **4.2** A copy of relevant specifications and drawings can be obtained on payment by the tenderers from the Director General (Track), RDSO, Manak Nagar, Lucknow. The relevant drawings and specifications can be seen in the office of KRIDE.

5.0 Effect and Validity of Offer:

5.1 The submission of any offer connected with this tender document shall constitute an agreement that the tenderer shall have no cause of action or claim against the

purchaser for rejection of his offer. The purchaser shall always be at liberty to reject or accept any offer or offers for part or whole of the quantity offered at its sole discretion and any such action shall not be called into question and the tenderer shall have no claim in that regard against the purchaser.

5.2 The offer shall be deemed to be under consideration immediately after they are opened and until such time the official intimation of award is made by the KRIDE to the tenderer. While the offers are under consideration, tenderers and or their representatives or other interested parties are advised to refrain from contacting the purchaser by any means. If necessary, the purchaser may obtain clarifications on the offers by requesting for such information from any or all the tenderers, either in writing or through personal contact, as may be considered necessary. Tenderers will not be permitted to change the substance of their offers after the offers have been opened.

5.3 The validity of offer should be for a minimum of 240 days effective from the date of opening of tender. Offers with validity less than 240 days shall be summarily rejected.

- **5.4** In exceptional circumstances, the purchaser may solicit the Bidders consent for extension of the period of validity. The request and the responses thereto shall be made in writings (or by cable or telex). A Bidder may refuse the request without forfeiting Bid security. A Bidder granting the request, will not be required nor permitted to modify his bid.
- **6.0 <u>Qualifying Requirements</u>:** The tenderer (plant) must, fulfill all the following conditions to be eligible for placement of regular orders against this tender:
- 6.1 Concrete Sleeper Plant should be RDSO certified for undertaking production of PSC Main Line sleepers for IR. For this purpose, the plants, which were given orders for supply of mainline sleepers against Board's previous contract CS-166/2013 or CS- 169/2016, will be considered RDSO certified.

All other plants will have to submit RDSO certification along with their tender document.

6.2 Existing manufacturers quoting for supply from a new location after shifting their existing plant should have prior approval for supply from new location as per instructions of Railway Board vide letter No. 2004/Tk-II/22/11/5 dated 22.02.2006.

Plants, which have already been permitted for shifting of location but have not shifted/started production from new location, even after lapse of one year or more from date of issue of permission letter, shall not be eligible to quote from old location. They will be eligible to quote from new location only if they have already obtained the RDSO certification of Plant at new location, before the date of tender opening.

6.3 Those plants will be considered "closed", which have not manufactured any type of sleepers (mainline, Turnout, special sleepers) for more than five years reckoning from the date of

tender opening. Such plants will not be eligible for tender.

- 6.4 Quoted quantity by a tenderer for a plant should not be less than tenderer quantity. one lakh.
- 6.5 The Firm should not be "black listed/suspended/banned" for business by Railway.
- **6.6** The tendering Firm should be financially solvent for at least Rs 1.5 Crore and original copy of certificate of this effect issued by a "Scheduled bank" shall be enclosed along with tender document. The date of issue of solvency certificate should not be older than 3 month from tender opening date.

7.0 **Quantity distribution methodology:**

Placement of orders to the plants for supply of PSC Main line Sleepers will be at the sole discretion of the purchaser. In view of wide geographical distribution of requirement of sleepers spread across length & breadth of country, capacity constraint of plants, the criticality of this safety item and different requirement of different Zonal Railways, as well as to minimize the transportation cost of sleepers, the tendered quantity will be distributed/split over all eligible plants. The quantity to be ordered on the plants shall be decided based on the Zonal Railway's sleeper requirement and past production performance of the plants as per the following methodology:-

(i) The "peak annual production" of mainline sleepers during last five financial years, will be the basis for deciding "Production Capability" of a plant for the two years of Delivery period as per following formula:-

"Production Capability" for two years = (1.3 x 2 x Peak annual production during 2013-14 to 2017-18)".

(ii) Quantity allotment to a particular CSP for two year period will not exceed the "quoted quantity" or the "production capability" as defined in para 7.0(i) above.

(iii) However, in case of eligible L-1 Tenderer, in addition to the quantity distribution worked out as above, an extra quantity of 25% (subject to maximum of 50000) will be further allotted by taking out the equivalent quantity from other CSPs of that Railway.

(iv) Purchaser reserves the right to allot lesser quantity than the quantity quoted by the tenderer at the same rate, terms and conditions which shall be binding on the tenderer.

(v) For RDSO certified plants, which do not meet the qualifying requirements defined in para 6.0 of ITT and therefore not eligible for regular order, may be considered for an educational order of 20000 sleepers, provided they submit solvency certificate as per para 6.6 of ITT.

8.0 Documents to be enclosed along with Bid:

Copy of the following documents should be enclosed along with the Bid **failing which the offer may be considered only on the basis of documents submitted**:

- (a) Proof of authority from Firm in favour of signatory of tender for signing and submitting the tender document as per para 2.1 above.
- (b) Proforma for financial credentials details as per Annexure VI.
- (c) Tenderer's address and communication details as per Annexure VII
- (d) Solvency certificate as per clause 6.6 of ITT

9.0 Bid Submission:

- a. Bid along with relevant document must be submitted duly signed by the tenderer.
- b. Tenderer(s) must look out for NIT as soon as it is available in the www. KRIDE. Bidders shall submit their offer in advance without waiting for the closing date and time, to avoid last minute hazles .KIDE is not responsible for non – Participation of vendors due to any reasons on the day of tender closing time
- c. Bids received before in the tender box available in KRIDE office is only acceptable.
- d. The procurement system does not permit submission of any offer after the closing date and time of that tender. Hence, there is no scope of any late or delayed offer in the offline bidding process

10.0 Tender Opening

- a. Tender Boxes will be opened only after stipulated closing date and time.
- b. Tender Boxes will be opened by minimum two authorized KRIDE officials.
- c. Vendor may be present in the KRIDE office for any tender opening process.
- d. KRIDE does not guarantee opening of the tenders immediately after the closing date and time due to reasons beyond its control and hence tenders can be opened after the due date and time also.
- e. Ttwo packet tendering system will be followed. Bidders shall be simultaneously required to submit a technical and commercial bid and initial price offer in separate sealed covers. Offers found eligible for regular order shall be categorized as qualified for bulk order for the purpose opening of price bid.
 - i. Offers not complying with essential technical & commercial requirements of the tender shall be declared as ineligible.
- ii. Initial Price Offer of only those bidders categorized as eligible for regular order shall be opened and tabulated separately..
- iii. Date and time of price Bid opening shall be communicated to qualified tenderers by the convener after evaluation of the technical bids.

- iv. During Reverse Auction process, bidders shall not be allowed to bid a rate higher than the lowest Initial Price Offer.
- v. Reverse Auction among bids categorized as Qualified shall be conducted in KRIDE Office. Bidders shall be advised through Post/fax/email
- vi. During auction period, identities of the participating tederers will be kept hidden.
- vii. Minimum admissible bid value will be last bid value minus minimum decrement as specified by the tendering authority before starting of reverse auction. Starting point for reverse auction shall be the lowest Initial Price Bid of the tenderer eligible for award of contract.
- viii. After close of the price bid opening, tabulation of last (minimum) bids received from all the tenderers will be tabulated and will be advised for participating in the tender .
- ix. Bidders will not be allowed to withdraw their last offer.
- x. L-1 will be defined as the lowest bid obtained after the closure of price bid opening ...
- xi. Vendor if willing can be present in the KRIDE Office. They can obtain totally transparent bid tabulation statement from the KRIDE office.
- xii. All the participating vendors who have submitted valid offers can obtain their offer details as well as the tender tabulation statement after tender opening.
- xiii. The purchaser does not guarantee opening of the tenders immediately after the closing date and time due to reasons beyond its control and hence tenders can be opened after the due date and time also. It will however, be ensured that no offers are submitted after tender closing date and time. Vendors cannot submit/ modify any offer file to it after the closing date and time as stipulated in the tender notice.
- xiv. The Purchaser or any officer authorized on behalf of the Purchaser does not bind himself to accept the lowest or any other offer and reserves the right to cancel, reduce or divide the contract on more than one source without assigning any reason for such action.

11.0 Acceptance of Tender:

- **11.1** The purchaser reserves the right to reject any or all of the tenders in part or full at his sole discretion without assigning any reasons.
- **11.2** KRIDE does not pledge itself to accept the lowest or any tender and reserves to itself the right of acceptance of the whole or any part of the quantity offered. The decision of

KRIDE with regard to allotment of quantity so as to ensure uninterrupted supply of sleepers will be final.

- **11.3** The acceptance of the tender will be communicated by letter of acceptance direct to the tenderer or through his authorized agents. In case where a counter offer is issued, the unconditional acceptance of counter offer will result in a validly concluded contract, though formal letter of acceptance may be forwarded to the contractor at a later date.
- **12.0** The Special Conditions of Contract are enclosed. The Special Conditions of the Contract will have precedence over the IRS conditions and instructions to tenderers.

General Manager/(Civil)/KRIDE Bangalore K RIDE: YPR-CSDR & BYPL-HSRA /DL/PSC Wide Based Sleeper

ENCLOSURE		
SI.NO	Description of Items	Annexure
1	Special Conditions of Contract	Annexure – I
2	IRS Specifications for PSC Sleepers – Pre-tensioned Type	Annexure – II
3	Schedule of Technical Requirement	Annexure – III
4	Indemnity Bond for 90% payment	Annexure – IV
5	Indemnity Bond for balance 10 % payment	Annexure – V
6	Proforma Form for financial Credentials	Annexure – VI
7	Tenderers' Address and Communication Details	Annexure – VII
8	Tender Schedule	Annexure – VIII

ANNEXURE -I

SPECIAL CONDITIONS OF CONTRACT

1. General

This contract will be governed by IRS Conditions of Contract as amended up to date as well as the Special Conditions of Contract mentioned herein. In case of conflict between the two, i.e. between IRS Conditions of Contract and Special Conditions of Contract, the provisions of Special Conditions of Contract shall prevail.

2. Rates

The supply of sleepers in accordance with the terms and conditions of this contract shall be effected at the accepted unit rate, subject to price variation in terms of Clause 13 of these conditions. In addition to the accepted rates, the cost of transportation of Inserts, HTS Wire and Cement shall be reimbursed extra as per Clause 14 of these conditions. In addition to the accepted rate and reimbursement of freight, the contractor will also retain CENVAT credits available on input materials on the date of opening of the tender. CENVAT shall be covered under Clause 13.3 of these conditions."

2.1. The **quoted** rate shall be inclusive of the cost of all labour and input materials like HTS Wire, Inserts, Cement and coarse and fine aggregates, Fuel and Power etc. including all handling charge and duties thereon except the following charges which shall be paid extra over and above the accepted rate and price variation as per PVC:

• Reimbursement of the cost of transportation of inserts, HTS Wire and cement in accordance with clause 14.

2.2. The **quoted** rate would also include the cost of transportation of finished sleepers to loading point and loading into the wagons/road vehicles at the FOR station in accordance with the approved drawing including the cost of handling involved in the process. The Cost of wooden packing as per drawings will be borne by the contractor.

2.3. The contract will remain current and valid for a stipulated delivery period including extensions if any, with effect from the date of acceptance of tender/counter offer, as the case may be. The Purchaser also has the right to defer deliveries (i.e. slow down supplies). The purchaser shall also have the right to enhance delivery period upto 6 months on the same rates, terms and conditions at its sole discretion. Further extension, beyond 6 months may be done with mutual consent of Supplier and Purchaser. The extension beyond 6 months will be done with the approval of MD/KRIDE.

2.4. For purpose of determining *inter-se* position, only the quoted basic ex- works rate per sleeper (excluding the taxes and charges mentioned in clause 2.1 and clause 3) shall be considered.

3. <u>TAXES</u>

- 3.1 The accepted rate would be exclusive of Taxes on sales of goods leviable under CGST/IGST/UTSGT/SGST Act(s), which will be paid extra as statutorily applicable on the date of supply. The purchaser will, however, not be responsible for the reimbursement of any Taxes/Levies paid by the contractor under misapprehension of law.
- 3.2 In addition to accepted rate and reimbursement of freight, the contractor will also retain/setoff Input Tax Credits (ITC) available under CGST/IGST/UTGST/SGST Act(s).
- 3.3 In the event of 'GST' input credit being extended by the Government of India to more items than those already covered on date of tender opening, the firm should advise the purchaser about the additional benefits accrued or any variation thereof, through a letter containing the following certificate.

"We hereby declare that additional set-offs/Input tax credit to the tune of Rs..... has accrued and accordingly the same is being passed on to the purchaser and to that effect the payable amount may be adjusted."

4. Raw Material, Machinery and Plants

The responsibility for procurement of all raw materials, machinery and plants required for the manufacture of goods shall rest entirely with the supplier.

- **4.1.** Cement shall be procured by the contractor from the nominated primary/secondary source and as per the rate, terms and conditions fixed by the KRIDE with cement suppliers. The contractor shall maintain a reserve buffer stock of cement adequate for 2 months sleeper production.
- **4.2.** HTS Wires shall be procured from the firms who are approved for manufacture of HTS Wire by Bureau of Indian Standards and possess a current valid BIS License for manufacture of the particular type of wire i.e. 3 x 3 mm strand, 7/7.5 mm plain wire or 9.5 mm dia strand as the case may be.
- 4.3. SGCI Inserts shall be procured from the firms, who are approved by RDSO for the manufacture of SGCI inserts and whose approval is current and valid. SGCI Inserts can also be procured from ISO certified firms as per guidelines issued vide RDSO's letter No. QA/CT/INSP/CI/Policy dated 25.08.2008.
- **4.4.** Aggregates shall be procured by the contractor from the RDSO approved sources.
- If crushed sand is being used as fine aggregate in design mix concrete, then it should not be byproduct of any other manufacturing process and should be in conformity to the provisions provided for crushed sand in IRS-T-39.
- 4.5. The cement content in the concrete mix shall not be more than 450 Kg/cum. This may necessitate use of plasticizer, which shall be procured by contractor as per requirements laid in clause 3.2.4 of IRS- T-39. Quoted rate shall be inclusive of cost of plasticizer/admixture.

5. Octroi and Entry Tax:

- (i) Octroi/Entry Tax, if statutorily leviable, on finished sleepers shall be paid by the purchaser.
- (ii)Octroi on input materials, namely, Cement, HTS Wire, SGCI Inserts, etc, if payable, will be borne by the contractor.

6. Inspection:

- **6.1.** Inspection of finished sleepers will be carried out by the Railway nominee of the concerned Zonal Railways at contractor's premises as per procedure and frequency decided by Railways.
- **6.2.** Necessary office accommodation for the inspecting staff at the factory will have to be made available by the contractor free of cost. Necessary transport facilities to and from the nearby railway station and rest house accommodation shall be provided free of cost to the inspecting staff by the contractor.
- **6.3.** The contractor shall be required to install and operate all necessary testing equipment required for testing the sleepers, test cubes, brickets etc. as stipulated in the IRS Specification for prestressed concrete sleepers (Pretension type). The testing equipment for the same must be available at factory site. In addition, the contractor shall arrange at his own cost for any further tests on materials, as may be indicated by the Engineer/Inspecting Officer, to be carried out at recognized Material Testing Centers/Institutes during the progress of manufacture of sleepers; even though, Test Certificates for such materials are available.
- **6.4** The passed sleepers, for which inspection certificates have duly been obtained, only shall be allowed to be taken for loading in railway.wagons/road vehicles. Any damage to the sleepers in the process of loading in wagons/vehicles or carrying to the loading sites from the contractor's premises shall be to contractor's account.

6.5 Mono-block concrete sleepers which are treated for surface defects as provided in the 'Standard Specification of PSC Line Sleepers' as amended up to date and provided at **Annexure-II** of this tender document shall be accepted and payment made @ 92.5% of the standard sleepers.

- **6.6** The testing of PSC line sleepers and their subsequent acceptance should be in accordance with the Standard Specifications of PSC line sleepers (IRS T-39) as amended up to date.
- 6.7 The supplier shall ensure that the necessary checks on supply of raw material eg cement, aggregate, HTS wire, SGCI insert, as well as plants, machinery, equipments, instruments such as moulds, weigh-batching plant, stressing system, mixing & vibration system, steam curing system, de-moulding and de-tensioning, water curing, product inspection and lab testing, sleeper testing and dispatch etc. are being done as per the checklists issued by Railways/Board/RDSO from time to time and record of same shall be maintained.

6.7.1 <u>Compliance to provisions of STR(Schedule of Technical Requirement):</u>

The production of PSC sleepers against this tender shall be permitted only when the Concrete Sleeper Plant has complied all the provisions of STR.

6.7.2 <u>Temporary suspension of production:</u>

During course of execution, the production of the concrete sleepers may be temporarily suspended by PCE of the Zonal Railway on the advice of its inspecting officials or RDSO in serious cases of non-adherence to Specifications/Schedule of Technical Requirement or large scale rejection of sleeper (>2%) or premature failure of sleepers in track. Railway may order for temporary suspension of the production in above cases and direct the manufacturer to identify the defects in the manufacturing process and rectify the same within a reasonable period. Production will be resumed once the manufacturer identifies and removes the defects and same is verified by the Zonal Railway and/or RDSO as the case may be. While allowing resumption of production, Railway/KRIDE may also order for higher scale of testing, till quality of production is stabilized in terms of provisions of IRS-T-39

- 6.7.3 The plants, which have not done any production for past more than one year (reckoning from issue of LOA), will be permitted to resume production only after re-validation/certification of plant by RDSO.
- 6.7.4 In cases, where contract of a CSP under previous contract, had to be cancelled/terminated on account of large scale rejection(>2%)/quality issues, the production will be allowed to be resumed only after re- validation/certification of plant by RDSO and initial 10,000 sleepers will be tested and passed by RDSO.
- **6.8** Sleepers used for tests, including abrasion test, and found as per specifications and drawings shall be paid for by the Purchaser at accepted rates. Such sleepers paid for shall remain the property of the Purchaser and will be disposed of in the manner prescribed by the Purchaser from time to time.
- 6.9 The rejected sleepers shall be permanently damaged by the contractor so as to make them unusable in addition to the provisions provided in para 6 of "Indian Railway specification for pre-tensioned prestressed concrete sleepers (serial no. T-39)". A certification that all rejected sleepers of previous batches have been permanently damaged and marked as per drawing, will be given by manufacturer before offering the next batch of fresh sleepers for inspection.
- 6.10 Regular inspection of SGCI inserts will be done by M/s RITES Ltd. at manufacturer's premises. RITES will charge only 0.90% & GST as applicable towards the inspection charges and the same will be borne by Supplier CSPs. Besides regular inspection by RITES, Railway officials will also conduct the inspections prescribed in Railway Board's letter no. 98/TK-II/22/11/17/Pt. Policy, dtd. 11.08.2003.
- 6.11 Regular inspection of HTS wire will be done by Inspecting authorities of the Zonal Railways (AIE/Sr. IE/XEN of plant) at manufacturer's premises in accordance with IS: 6006. In addition to this, periodical test checks by a JA grade officer to be stipulated by the Chief Engineer of the Zonal Railway and shall also be carried out.

7 Modification to Design:

In case purchaser, at any stage, during the currency of the contract, decide to make minor modifications to the design of PSC Sleeper, the supplier shall modify the moulds, manufacturing process, etc. to suit such minor modifications. The cost of such modifications will be negotiated and mutually settled and will be paid by the purchaser.

8 <u>Security Deposit (SD):</u>

- **8.1** The issue of LOA (letter of acceptance) shall form a binding contract. The contractor shall make deposit /submit security deposit with the KRIDE
- separately for each CSP, within Thirty days of communication of acceptance of offer by the purchaser, for an amount equal to 10% of the contract value subject to a maximum of Rs. 30 Lacs (Rupees Thirty Lacs only) in the form of the following:
- (i) Government securities at 5 per cent below the market value;
- (ii) Deposit Receipts, Pay orders, Demand Drafts of the State Banks of India or any of the Nationalized Banks.
- (iii) Irrevocable Guarantee Bonds of the State Bank of India or any of the Nationalized Banks.
- (iv) Deposit Receipts, Pay orders, Demand Drafts and irrevocable Guarantee Bonds issued by all Nationalized/Scheduled Commercial Banks. Bank Guarantee will be valid upto a minimum period of 6 months beyond the final date of delivery. The proforma for Bank Guarantee will be supplied by the FA&CAO of Paying Railway.
- (v) A deposit in the Post Office Saving Bank.
- **8.2** In case the supplier fails to make the security deposit by submitting the requisite bank guarantee within the above stipulated time limit, extension of time for submission of SD beyond 30 days and upto 60 days from the date of communication of acceptance of offer by the purchaser may be given by Zonal Railway (contract signing authority) for which, a penal interest of 15% per annum shall be charged for the delay beyond 30 days. In case the successful tenderer fail to submit requisite SD even after 60 days from the date of communication of acceptance of offer by the purchaser, contract shall be terminated and penalty equivalent to requisite SD of the contract shall be imposed and the same shall be recovered from the tenderer from its pending dues from anywhere on IR/PSUs/Other Govt. Organizations.
- **8.3** Security deposit should remain valid for a minimum period of 60 days beyond the date of completion/extended date of completion.
- 8.4 In case of any shortfall against ordered quantity on expiry of DP/extended DP save as provided in clause 10.5 or clause 17, full amount of Security Deposit will be forfeited besides imposition of due liquidated damages as per provisions of the special conditions of the contract. In terms of IRS clause no. 2403, Security Deposit against this contract may also be withheld/retained against the dues of other contracts. The security deposit, if not adjusted fully or partly towards any breach of contract or default on the part of supplier, will be released by the Zonal Railway/KRIDE after two months of the date of expiry of the delivery period after verification for due fulfillment of the supplies ordered. In case, the ordered quantity has been supplied during the extended D.P, the Security Deposit shall not be forfeited.

9 <u>Dispatch</u>

- 9.4 The consignee instructions and booking orders will be given by the KRIDE.
- **9.5** On placement of railway wagons or road vehicles as arranged by the purchaser at the works siding, the contractor will load the passed sleepers at his cost within the specified loading time. The loading pattern shall be as per drawing approved by the Purchaser. Hard wood battens of 50 x 50 mm section shall have to be provided free of cost by the contractor at both rail seats of each sleeper on every successive layers loaded in wagons or road vehicles, but contractor shall be at liberty to collect the wooden packing at destination at his own cost; and no claim of shortage or damage would be entertained by the purchaser.
- **9.6** The contractor shall arrange loading promptly and any payment of demurrage charges on account of delay in loading shall be to the contractor's account. A dispatch certificate indicating the number of sleepers taken over, their category and **batch number**, etc. of sleepers loaded into wagons/vehicles may be obtained from the consignor authorized by the Executive Director, Track(M), Ministry of Railways (Railway Board) or his nominee. Such certificate shall be admitted for the purpose of payments.
- **9.7** The responsibility for damages or losses en route will be to the account of the purchaser only for consignment booked against clear RRs or against certificates as per clause 9.3 above.

10 Delivery Schedule and extension to Delivery Period (DP)

10.4 The production shall commence within four months from the date of unconditional acceptance of counter offer. Thereafter, the ordered quantity shall be supplied during the delivery period (D.P) of two years maintaining a uniform schedule to be monitored over 6 month periods w.e.f. the date of commencement of supplies as per contract. The Purchaser however has the right to slow down the supplies (deferred delivery), and accordingly have the right to enhance delivery period unilaterally upto 6 months on the same rates, terms and conditions at its sole discretion.

Extension to delivery period, beyond 6 months may however be done only with mutual consent of Supplier and Purchaser. Any extension toD.P shall require approval by Railway Board.

10.5 Notwithstanding the uniform schedule of delivery, actual supplies will be regulated by the purchaser as per its actual requirement. The six monthly supply schedule can however be altered by slowing down the rate of production by the purchaser by giving 3 months notice to supplier. In

case the supplies are slowed down, the delivery period will be extended accordingly. Enhancement of the supplies in the agreed six monthly supply schedule will however be done with the mutual consent. Failure to make supplies as per the six monthly schedule fixed in advance will attract Liquidated Damages as per clause 11 below.

10.6 <u>Liquidated damages:</u> If the contractor fails to deliver the store within the delivery period as per contract or as extended or at any time repudiates the contract before the expiry of such period due to any circumstances whatsoever, save as provided in Clause 10.4, 10.5 and force majeure conditions defined in Clause 17, the purchaser reserves the right to cancel the

contract for the balance quantity in whole or in part and recover from him the liquidated damages as per Clause 12. If, however, the stores are accepted after the expiry of the period fixed for delivery, the purchaser may grant an extension of the delivery period at its sole discretion, subject to the following conditions:

- (a) That the purchaser has the right to recover from the contractor the liquidated damages in terms of clause 0702 of IRS Conditions of Contract on the stores, which the contractor has failed to deliver within the period fixed for delivery;
- (b) That no increase in price on account of any statutory increase in or fresh imposition of Customs Duty, Excise Duty, Sales Tax, Freight Charges or on any account of any other tax or duty leviable in respect of the stores specified in the contract, which takes place after the date of delivery period stipulated in the said Acceptance of Tender shall be admissible on such of the said stores as are delivered after said date;
- (c) That notwithstanding any stipulation in the contract for increase in price on any other grounds no such increase which takes place after the delivery date stipulated in the contract shall be admissible on such of the said as are delivered after the said date;
- (d) But nevertheless the purchaser shall be entitled to the benefit of any decrease in price on account of reduction in or remission of Customs Duty, Excise Duty, Sales Tax or on account of any other ground which takes place after the expiry of the above mentioned date namely the delivery date stipulated in the contract. The contractor shall allow the said benefit in his bills or in the absence thereof shall certify that no decrease in price on account of any of these factors has taken place.
- **10.7** Delay in dispatch of sleepers for want of supply of BFRs/Wagons/Trucks by Railway beyond 15 days of passing by the Inspecting Authority shall be considered a valid ground for the purpose of extension of delivery period by the KRIDE. Stacking of the sleepers beyond the stacking capacity of the plant will also be considered as valid ground for extensions of delivery period. In cases where production has been completed within DP, but dispatch is pending on account of Railway, the KRIDE can grant extension to delivery period upto 30 days, for enabling dispatch of such sleepers.

10.8 Supply Tolerance Clause

If unsupplied quantities at the expiry of DP/extended DP are within 5% of the contracted quantity, then the same will be treated as cancelled without financial repercussion on either side".

11 Liquidated Damages for slower supplies during "Monitoring Period":

The progress of supply will be evaluated after every six months (monitoring period). In case of failure on the part of the supplier to arrange supplies as per the schedule fixed in advance, save force majeure conditions and/or cases of delays attributable to the KRIDE, the purchaser reserves the right to cancel the quantity in deficit at the end of monitoring periods i.e. every six month and recover from the defaulting contractor a sum equivalent to five percent of the cost of sleepers which have remained unsupplied. The recovery of five percent as detailed above will be effected only when KRIDE cancel the quantities in deficit at the end

of monitoring period through a written order to this effect. In case, KRIDE do not cancel the quantities in deficit at the end of monitoring period, the supplier will be entitled to recoup the shortfall in subsequent monitoring period(s) and in such cases no LD shall be leviable.

12 <u>Liquidated Damages (LD) for Failure to Complete Supplies within Delivery Period or</u> LD after Termination of Contract

The Liquidated damages in pursuance of clause 0702 of IRS Conditions of Contract along with LD specified in para 11 above will be limited to a maximum of 5% of the cost of stores which the contractor fails to deliver within the period fixed for delivery in the contract or as extended, where delivery of the store is accepted after expiry of the aforesaid period. In case, the delivery of the store is not accepted by the purchaser after expiry of the period fixed for delivery in the contract or as extended or the contract is terminated before expiry of the contract due to failure of the contractor to execute the contract as per the agreed terms and conditions of the contract during its currency, the liquidated damages equivalent to 5% of the cost of sleepers undelivered/cancelled would be recovered from the contractor.

13 Price Variation Clause:

13.1 The accepted rate will vary in accordance with the price variation formula as detailed below in clause 13.2 to take into consideration variation in prices during execution of contract. Price variation will be worked out by taking into consideration the Indices/basic rates for the month of production.

13.2 Price Variation Formula

 $P_1 = (P_0 / 100) (5+17 I_1 / I_0 + 33 L_1 / L_0 + 10 D_1 / D_0 + 11 E_1 / E_0 + 3 N_1 / N_0 + 21 W_1 / W_0) + H_1 + C_1$

Where

P ₁	:	Updated cost of sleeper
Po	• •	Accepted cost net of input credit - (Ho + Co)
I ₁	:	WPI for Pig Iron during production Month as per Economic Advisor, Ministry of
		Industry web site http:// eaindustry.nic.in
I _o	:	WPI of Pig Iron for one month before tender opening month as per Economic
		Advisor, Ministry of Industry Web site http://eaindustry.nic.in
L ₁	:	All India Consumer Price Index of Industrial Labour during production Month,
		as per Labour Bureau, Ministry of Labour web site http://labourbureau.nic.in
Lo	:	All India Consumer Price Index for Industrial Labour for one month before
		tender opening month as per Labour Bureau, Ministry of Labour web site
D ₁	:	WPI for HSD during Production Month as per Economic Advisor, Ministry of
		Industry web site http:// eaindustry.nic. in
Do	:	WPI for HSD for one month before tender opening month as per Economic
		Advisor, Ministry of Industry web site http:// eaindustry.nic. in

Sleeper

K RIDE: YPR-CSDR & BYPL-HSRA /DL/PSC Wide Based

E ₁	:	WPI for Electricity during Production Month as per Economic Advisor, Ministry
		of industry web site http:// eaindustry.nic. in
EO	•	Economic Advisor, Ministry of Industry web site http:// eaindustry.nic. in
N1	:	WPI for Non-coking Coal during production Month as per Economic Advisor,
		Ministry of Industry web site http:// eaindustry.nic. in
No	:	WPI for Non-Coking Coal for one month before tender opening month as per
		Economic Advisor, Ministry of Industry web site http:// eaindustry.nic. in
W1	:	WPI for all commodities during production Month as per Economic Advisor,
		Ministry of Industry web site http:// eaindustry.nic. in
Wo	:	WPI for all commodities for one month before tender opening month, as per
		Economic Advisor, Ministry of Industry web site http:// eaindustry.nic. in
H1	:	8.71 X {basic price per Kg of Rashtriya Ispat Nigam Limited, Visakhapatnam,
		ex-Visakhapatnam for High Carbon Wire Rod as per <u>www.vizagsteel.com</u>
Ho	:	8.71 X {basic price per Kg of Rashtriya Ispat Nigam Limited, Visakhapatnam,
		ex-Visakhapatnam for High Carbon Wire Rod as per <u>www.vizagsteel.com</u>
		(RINL web site) (7.0 mm grade PC 115)}, for one month before tender
C1*	:	72.38 X (basic cement cost per Kg) during production month.
Co*	:	72.38 X (basic cement cost per Kg) for one month before tender opening
N ₁	:	WPI for Non-coking Coal during production Month as per Economic Advisor,
		Ministry of Industry web site http:// eaindustry.nic. in
No	:	WPI for Non-Coking Coal for one month before tender opening month as per
		Economic Advisor, Ministry of Industry web site http:// eaindustry.nic. in
W_1	:	WPI for all commodities during production Month as per Economic Advisor,
		Ministry of Industry web site http:// eaindustry.nic. in
Wo	:	WPI for all commodities for one month before tender opening month, as per
		Economic Advisor, Ministry of Industry web site http:// eaindustry.nic. in
H ₁	:	8.71 X {basic price per Kg of Rashtriya Ispat Nigam Limited, Visakhapatnam,
		ex-Visakhapatnam for High Carbon Wire Rod as per www.vizagsteel.com
		(RINL web site) (7.0 mm grade PC 115)}, during production Month.
Но	:	8.71 X (basic price per Kg of Rashtriya Ispat Nigam Limited, Visakhapatham,
		(PINI, web site) (7.0 mm grade PC 115)) for one month before tender enoning
		month
C ₁ *	:	72.38 X (basic cement cost per Kg) during production month.
Co*	:	72.38 X (basic cement cost per Kg) for one month before tender opening
		month.

* Note: Calculation of C_1 is based on cement content of 450 Kg per cum in concrete mix design. However, if the same is less than 450 Kg per cum in approved/actual mix design, the value of C_1 & Co will get reduced on pro-rata basis.

13.3. In order to avoid blockage of funds till final escalation is worked out and paid on the basis of indices for the month of production, the accepted price will be updated every six months as per the above formula for escalation. First updating shall be done on the basis of indices for the month of

acceptance of tender as soon as confirmed indices for the month of acceptance are available. Payment for the supplies made shall be done at 150% of relevant rail tariff or actual Road freight, whichever is lower.

14. Freight (Cement) =

14.1 Railway freight for rake/wagon load classification during the month of production from the nearest approved source of Cement as fixed by the Railway through the shortest possible rail route. In case special cement is transported by road, reimbursement shall be made maximum upto 150% of relevant rail tariff or actual Road freight, whichever is lower. Wherever, at destination, cement is required to be transported by road from the rail unloading point (cement booking station) to CSP and road lead is more than 5 Km, freight for this portion will also be reimbursed as per actual road freight or @ 150% of the corresponding rail freight for the distance between rail unloading point (nearest cement booking station) and CSP, whichever is lower.

14.2. For calculating freight under clause 14.1 above, following weight of input materials shall be considered:

a) Cement 72.38* kg per sleeper

* Note: Calculation of freight is based on cement content of 450 Kg per cum in concrete mix design. However, if the same is less than 450 kg per cum in approved/actual mix design, the quantity of cement per sleeper will get reduced on prorata basis.

- b). HTS Wire 7.91 kg per sleeper
- c). SGCI Inserts .79 kg per sleeper

14.2 Total freight as calculated above shall be added to the accepted rate immediately after the acceptance of tender on the basis of freight applicable **for the month of opening of tender**. Further change in freight shall be accounted for at the time of updating/escalation.

15.Payments:

- 15.1 The time to time interim payment towards supply of finished goods shall be made at the updated rate inclusive of freight. The final payment would be made as per Escalated/Deescalated rate worked out on the basis of Price Variation Clause (Clause 13) and Freight as per Clause 14. All payments will be made by the KRIDE on submission of bills in accordance with the procedure as detailed below:
- 15.2 90% of the price of each consignment will be paid after the PSC sleepers are inspected and passed by the Purchaser on execution of Indemnity Bond (as per enclosed proforma) (Annexure IV) for an equivalent amount by the contractor. In such cases of 90% advance payments, a copy of the Inspection Certificate shall be enclosed with the bills. The contractor may submit the Indemnity Bond for 90% of the contract value in one go in lieu of submitting several Indemnity Bonds for 90% of value of each inspected consignment.

- Sleeper 15.3 Balance 10% of the price of each consignment will be paid on proof of dispatch and on submission of Indemnity Bond (as per enclosed proforma) (Annexure V) for 25% of the value of stores supplied covering the warranty period as per warranty clause. The contractor may submit the Indemnity Bond for 25% value of the entire value of the contract in one go in lieu of submitting several Indemnity Bonds for 25% of each consignment. Consignor's Certificate shall be enclosed with 10% bills. In case, 90% payment as laid down in clause 15.2 above is not sought, 100% of the price of each consignment will be paid on proof of dispatch of stores and on submission of Indemnity Bond.
- 15.4 PSC mono-block concrete sleepers which are treated for surface defects as provided under Clause 4.7.3 of the 'Standard IRS Specification of PSC Line Sleepers' as amended up to date and provided at Annexure-II of this tender document shall be accepted and payment made @ 92.5% of the standard sleepers.
- 15.5 All payments shall be subject to the deduction of any amount for which the Contractor is liable under this contract or any other contract in respect of which the President of India is the Purchaser and any other deductions as are legally leviable as per Indian laws.
- 15.6 If the contractor opts for "Letter of Credit" option during bidding at IREPS, then payment will be released through a letter of credit (LC) arrangement as per guidelines issued vide RBA No. 10/2018 and RBA No. 48/2018.

16. Progress Report

The Contractor shall submit monthly progress report on production, supply, inspection, rejection and on stocks of principal raw materials to the Paying Railway as per proforma prescribed by Railway by 1st of the following month and also furnish stock position of principal raw materials and any other particulars relating to the contract when called for.

17.Force Majeure

In the event of any unforeseen event directly interfering with the supply of stores arising during the currency of the contract, such as war, insurrection, restraint imposed by the Government, act of legislature or other authority, explosion, accident, riots, strike, lockout, acts of public enemy, acts of God, the contractor shall within a week from the commencement thereof notify the same in writing to the purchaser with reasonable evidence thereof. If the force majeure condition(s) mentioned above be in force for a period of 90 days or more at any time, the purchaser shall have the option to terminate the contract on expiry of 90 days of commencement of such force majeure by giving 14 days notice to the contractor in writing. In case of such termination, no damages shall be claimed by either party against the other save and except those which had accrued under any other clause of this agreement prior to such termination.

18. Option for the variation of quantity of order

18.1 Without prejudice to purchaser's right as laid down in clause 10.3 and 11 above, the purchaser, at its sole discretion, reserves the right to vary the contract quantity by <u>+</u> 30% without assigning any reason at price, terms and conditions of the initial orders during the currency of the contract. This clause shall be operated with the approval of the PCE at the Zonal Railway's level with the concurrence of associate finance.

18.2 Quantity variation beyond (+) 30%:

Any increase in quantity beyond (+) 30% shall only be with the mutual consent of the supplier and purchaser. In case of default by any contractor in the form of shortfall in supplies by defaulting CSP/s, Zonal Railway, at its sole discretion may cancel the quantity of defaulting CSP/s and PCE of the Railway may approve commensurate increase in the contract quantity of performing CSP/s (i.e. those which have completed their original order), at mutually agreed reduced rate arrived through negotiations with other terms and conditions same as that of initial order during the currency of the contract. Negotiations will be conducted by a committee consisting of CE-TSP/CTE looking after the CSPs and associate FA&CAO. This increase would be in addition to 30% quantity referred to in clause 18.1 and would be limited to further 30% of the ordered quantity.

However if there are no defaulting CSPs over a particular Railway for commensurate reduction of quantity, then even for effecting 2^{nd} +30% variation to performing CSPs, the KRIDE after conducting the negotiation. In such cases, the final approval will be granted by KRIDE.

Quantity enhancement to a particular CSP beyond 60% of the initial order shall also be approved by KRIDE as per above procedure.

19. Guarantee

- **19.1** The contractor guarantees that the PSC Sleepers which he supplies shall be manufactured fully in accordance with specifications. In all cases, the contractor guarantees that its design shall strictly follow the "as made" detailed drawing with such modifications as are notified in respect of each type.
- 19.2 The contractor further guarantees that the PSC sleepers shall be free from defects in material and workmanship. The contractor shall be liable to arrange the necessary replacements of the defective sleepers free of any charge only to the extent that such replacements are attributable to or arise from faulty workmanship or material or design in the manufacture of the sleepers. All replacements shall be made free of cost at destination. If the contractor so desires, the replaced sleepers can be taken over by him for disposal as he deems fit, within a period of three months from the date of receipt of the replacement of defective sleepers by the purchaser. At the expiry of this period, no claim in this respect shall lie on the purchaser.
- 19.3 The guarantee herein contained shall not apply to any material which shall have been repaired or altered by the Purchaser, or on his behalf in any way so as to effect its strength, performance or reliability, or to any defect to any part due to misuse, negligence or accident.

Sleeper

- **19.4** The guarantee herein contained shall expire in respect of each sleeper on the expiry of five years from the date of the manufacturing / three years from date of placement in service, whichever is earlier, except in respect of defects notified to the contractor prior to the expiry of such date. Provisions of IRS T-39 in this regard shall also be applied.
- 19.5 All replacements that the purchaser shall call upon the contractor to deliver under this guarantee shall be delivered by the contractor within 60 days from the date of intimation of such rejection of defective sleepers. If the contractor fails to replace the defective sleepers within the said period, the cost of the said sleepers at the rate stipulated in the contract shall be recovered from the payments due to the contractor.
- **19.6** Any approval of acceptance by the purchaser of the sleepers or of the materials, incorporated therein shall not in any way limit the contractor's liability hereunder.
- **19.7** The decision of the purchaser in regard to contractor's liability under this guarantee shall be final and conclusive.

20. Book Examination

The book examination as per IRS condition shall apply in to. The purchaser reserves the right to carry out the book examination at its discretion at any stage during the currency of the contract. In case book examination clause is invoked, required facilities to the team conducting book examination will be provided by the contractor in his premises.

21. Licensing of Railway Land

- 21.1 Licensing of Railway land required either for setting up a factory or stacking of sleepers near to the siding to the extent available and surplus to Railway's requirement will be dealt with under normal Railway rules prevalent from time to time.
- **21.2** The land so licensed out to the contractor shall remain in his possession during the currency/extended currency of the contract. The contractor will not have the right to subject, assign or mortgage the land licensed to him.

22. Loading

Loading of concrete sleeper in railway wagon shall be permitted in goods sheds or other available sidings at works station. Wherever siding facilities are available, the same should be utilized for the purpose of loading of the sleepers by the contractor. If the siding facilities are not existing, the same would be provided by the KRIDE unless ordered otherwise to facilitate loading of sleepers to the extant considered necessary by the KRIDE. No placement for siding charges shall be leviable for such siding facilities in

both the cases. Necessary permission for erecting gentries adjacent to the sidings (other than good sheds) shall also be accorded by the KRIDE. Loading shall be arranged by the contractors at his own cost. Till siding is provided, contractor, at his own cost, shall arrange to load sleepers in road vehicles arranged by the purchaser as detailed in clause 9.2.

23. Laws Governing The Contract

- 23.1 This Contract shall be governed by the Laws of India being in force.
- **23.2** Irrespective of the place of delivery, the place of performance or the place of payment under the order, the order shall be deemed to have been made at the place from where the acceptance of tender has been issued.

24. Jurisdiction of Courts

The Courts of the place where the contract agreement has been signed shall have the jurisdiction to decide any disputes arising out of or in respect of the order. Indian Railways Standard Conditions of Contract as amended up-to-date, Indemnity Bond Proforma, Special Indemnity Bond proforma, Indian Railways Specifications T-39 for Prestressed Concrete Sleepers pre- tensioned type (Broad Gauge) as amended from time to time, Schedule of Technical Requirement as applicable from time to time, Drawings for wagon loading arrangements, IRS Specifications, IS:12269/1987 as amended from time to time for Special Cement and IS-1785 Pt.I, IS 6006/1983 for HTS Wire plain and strand and T-46/1996 for SGCI Inserts as amended up-to-date respectively will form part of the tender document to the extent they are not superseded by the above provisions.

- 25. Determination of Contract Owing To Default of supplier: If the supplier:
- (i) Fails to start production even after lapse of 12 months from the date of issue of DLOA, or
- (ii) Repeatedly fails to maintain the stipulated quality standards adequately, thereby resulting in large scale rejection of sleepers (>2%)/large scale pre- mature failure of sleepers in service, or
- (iii) Contravene any provision of the contract and fail to rectify/make good the same despite notice,

Then, the contract signing authority on behalf of the KRIDE may serve the supplier with a notice in writing highlighting the incidences of breach of contract/default(s), and if the Contractor does not within 15 days after the delivery to him of such notice proceed to make good his default in so far as the same is capable of being made good and fails to carry on the work or comply with such directions as aforesaid to the entire

satisfaction of the KRIDE.

Then, the KRIDE shall be entitled to rescind/cancel the contract as a whole or in part (as may be specified) after expiry of notice period. A final termination/cancellation notice will be issued to this effect detailing therein the Liquidated Damages levied.
Sleeper

GOVERNMENT OF INDIA MINISTRY OF RAILWAYS (RAILWAY BOARD)

INDIAN RAILWAY STANDARD SPECIFICATION FOR PRE-TENSIONED PRESTRESSED CONCRETE SLEEPERS FOR BROAD GAUGE AND METRE GAUGE

SERIAL NO. T-39

(FIFTH REVISION – February 2016)

RESEARCH DESIGNS AND STANDARDS ORGANISATION LUCKNOW – 226011

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INDIAN RAILWAY SPECIFICATION FOR FOR PRE-TENSIONED PRESTRESSED CONCRETE SLEEPERS (BROAD GAUGE AND METRE GAUGE)

SERIAL NO. T-39 (FIFTH REVISION –February 2016)

0. FOREWORD

0.1 This standard specification (First revision) was adopted by the Indian Railways in May 1985 after the draft was finalized by the Sub-committee of Track Standards Committee.

0.2 The last revision (Fourth Revision) was adopted by the Indian Railways in August 2011.

0.3 The present revision (Fifth Revision) has been taken up with a view to incorporate modifications found necessary as a result of use of the specification both by the manufacturer and user.

0.4 The significant modifications incorporated in this revision are as follows :-

0.4.1 Clauses for mix design as per relevant IS code has been added for both the cases of new mix design and revised mix design due to change of materials.

0.4.2 Additional relevant tests on aggregates have been added for use of crushed stone sand as fine aggregate.

0.4.3All Correction slips /Corrigendum (upto Corrigendum no. 1) issued till date have been incorporated.

0.4.4 Typical steam curing cycle has been added for guidance.

0.4.5 Guarantee Clause has been revised as per Corrigendum no. 1 dated 22.04.2013.

0.4.6 Clauses for sleeper testing SBT & MF have been modified.

0.4.7 Clause on rejected sleepers has been revised for destroying these permanently.

0.4.8 List of specifications needed for daily use and referred to in this specification has been updated in Annexure-VI.

1. <u>SCOPE</u>

1.0 This specification covers the manufacture and supply of pre- tensioned pre-stressed concrete sleepers for broad gauge and meter gauge. For production of PSC sleepers through long line method, some of the provisions of this Specification may not be implementable. In such cases, manufacturer shall approach RDSO for specific dispensations, wherever required and these dispensations will be considered by Track and Quality Assurance Directorate of RDSO.

2. <u>GENERAL</u>

2.1 The manufacture of sleepers shall be to the Purchaser's drawing or to drawings approved by the Purchaser and the production shall commence with the prior approval of the Inspecting Officer. Any subsequent change in material or production technique shall require prior approval of Inspecting Officer.

2.2 The reference to IRS specifications and drawings in this specification relates to the latest version of these standards as amended from time to time. The provisions of this specification shall override the corresponding provisions of IS: Specifications. Any special requirements given in the drawings of the sleepers will override the relevant provisions of the specification. Annexure-I shows the list of specifications required for manufacturing of sleepers.

3. MATERIALS

3.1 High Tensile Steel

3.1.1 High tensile steel in the form of plain wire or strand shall conform to IS: 1785 Part-I and IS: 6006 respectively. It shall be procured only from BIS approved manufacturers who shall furnish the proof of approval by BIS with the first consignment during the currency of approval and for each fresh approval. Each consignment of high tensile steel must be accompanied by a test certificate showing the serial no. of coils. Each coil shall carry a tag in accordance with the IS specifications mentioned above. In addition to the normal tests stipulated in the IS specifications for every consignment, results of "relaxation test" shall also be furnished once in six months. In case of change of source the first test certificate shall include "relaxation test" results also.

The steel shall be used for production only after ascertaining that it meets the provisions of relevant specifications.

3.1.2 Whenever directed by the Inspecting Officer, the manufacturer shall get the steel in stock tested at his own cost.

3.2 <u>Cement</u>

3.2.1 Cement shall conform to IS: 12269 -1987 with amendment No.6 of June 2000.

3.2.2 Each consignment of cement shall be covered by a test certificate. Each consignment shall be stocked separately, tested in the laboratory of the plant immediately for all relevant properties and shall be clearly identified. Cement more than 3 months old, if free from lumps, shall be tested for physical properties by an independent government approved laboratory or as directed by the Inspecting Officer and may be used after his approval.

3.2.2.1 The Inspecting Officer has the right to have the cement in stock tested at any time at the cost of manufacturer.

3.2.2.2 In case the source of supply of cement is changed, the mix design shall be reviewed and modified, if necessary, as per instructions given in para 3.6.3.1.

3.2.3 The cement content of the mix shall not be less than 350 kg/cu.m. and not more than 480 kg/cu.m. for M55 & 500 kg/cu.m. for M60.

3.3 Admixture

3.3.1 Super Plasticizer conforming to IS: 9103 may be used with the prior approval of RDSO. At this stage the revised concrete mix design shall also be submitted to RDSO for approval. However, following shall be observed:

3.3.2 Use of any admixture containing chloride in any form is prohibited.

3.3.3 Generally one admixture at a time should be used.

3.3.4 The admixture should be stored as per specified conditions by its manufacturer and its shelf life should be monitored continuously.

3.3.5 All containers should be correctly leveled. Reliable liquid dispenser for liquid admixtures should be used and calibrated.

3.3.6 The admixture containing CI and SO3 ions shall not be used. Admixtures containing nitrates shall also not be used. Admixture based on thiocynate shall be prohibited.

3.4 <u>Aggregates</u>

3.4.1 The aggregates shall conform to IS: 383 and shall, before use, be got tested through an approved testing institute, and results submitted in accordance with Appendix 'A' of IS: 383 to the Inspecting Officer for approval. These tests shall be got done at the manufacturer's cost once in a year or at the time of approval/review of mix design or as desired by inspecting official. The aggregates shall have maximum 30% abrasion and maximum 30% impact value suitable for wearing surfaces when tested in accordance with IS:2386 (Part-IV). The flakiness index and elongation index shall not exceed 30% when tested in accordance with IS: 2386 (Part-I).

3.4.2 Coarse and fine aggregates shall pass sodium or magnesium sulphate accelerated soundness test specified in IS: 2386 (part V)-1963.

3.4.3 Aggregates shall not contain harmful material such as pyrites, coal, lignite, mica shale or similar laminated material clay, alkali soft fragments, sea shells and organic impurities in such quantity as to affect the strength for reinforced concrete shall not contain any material liable to attack steel reinforcement. Maximum limit of deleterious material in aggregates should conform IS: 383 when tested in accordance with IS: 2386(Part- II) -1963.

3.4.4 Aggregates which are reactive with alkalies of cement are harmful as cracking of concrete may take place. Potential reactiveness of aggregates shall be tested as per IS:2386 (part VII)-1963.

3.4.5 Coarse aggregates shall be crushed stone, angular in shape and gravel shall not be used.

3.4.6 Different sizes of aggregates shall be stacked in different storage bins or stock piles on proper hard floor surface. The bins near batching plant must be located under a covered shed to avoid any

chance of raw material getting wet due to rains. Alternatively, auto sensors may be used to record the moisture content in the aggregate along with auto mechanism for adjusting water to be added to concrete in the weigh batcher.

3.4.7 If crushed stone sand is being used as fine aggregates then bond strength (pull out test) of concrete shall be tested as per IS: 2770 (Part I)-1967 (Re-affirmed 2012) during mix design approval and after production of every 5000 sleepers during regular production.

3.5 <u>Water</u>

3.5.1 Water to be used in making and for curing concrete shall conform to IS: 456. However use of sea water is prohibited.

3.5.2 If water needs any treatment before use, adequate storage of treated water for daily requirement shall be made. Facilities for testing treated water shall be provided in the plant. Treated water shall be tested daily or as directed by the Inspecting Officer.

3.5.3 The total water content per batch shall be regulated with conform with the ratio by weight of free water to cement required for the particular design mix as established by preliminary tests. The total water content of a batch includes :

- (a) Absorbed water in the aggregates;
- (b) Free water in the aggregates; and
- (c) Free water added to the mix.

3.5.3.1 The water to be mixed at the mixer shall be free water content required per batch less the amount of free water in the aggregates, if wet, or plus the amount of water the aggregates will absorb, if dry. Free moisture content shall be determined at least once a day.

3.6 Concrete

3.6.1 The concrete shall be of controlled quality with the nominal maximum size of aggregates limited to 20mm. Where wire spacing permits, aggregates upto 25mm may be used. The manufacturer shall get the concrete mix design along with the upper and lower limits of granulometric curves approved by the Inspecting Officer.

3.6.1.1 The granulometric curves shall be plotted on semilog graph once in a week and shall be between the approved limits.

3.6.1.2 Coarse and fine aggregates shall be batched separately.

3.6.2 The concrete shall satisfy the following design parameters:

i) Minimum release strength after 40 N/sq.mm (For Mix M-55) steam curing 40N/sq.mm (For Mix M-60)

ii) 15 days characteristic strength 55 N/sq.mm (For Mix M-55) after water curing 60 N/sq.mm (For Mix M-60)

- iii)Percentage of cubes with strength Not more than less than the characteristic strength 2.5% as per mix design/statistical analysis
- iv) Co-efficient of variation Less than 7%

3.6.3 Concrete mix shall be designed as per guidelines in IS:10262- 2009 (or latest version) and complying design parameters as per para 3.6.2 by the sleeper plant, checked by zonal railways and got approved from RDSO before start of the sleeper production. RDSO will check and verify the new mix design at the sleeper plant by testing of trial cubes as per para 3.6.4 and complying design parameters as per para 3.6.2.

3.6.3.1 Zonal railways shall review the concrete mix design themselves whenever the source of cement or water or admixture is changed as per guidelines in IS: 10262:2009 (or latest version) provided the quantity of cement is not reduced. All new ingredients must be got tested before hand from reputed laboratory to ascertain whether they are suitable to be used as per relevant standards/ specifications. The copy of test report of all ingredients, mix design calculations, record of trial cube testing and records of modification should be communicated to RDSO for information and should be available with zonal railway as well as with CSP, so that the same can be inspected during oversight inspection by RDSO official. However, if the source of aggregate changes, RDSO should be approached by the zonal railways for approval of the source and also for reviewing/revising the mix design.

Zonal Railway or RDSO will check and verify the revised mix design at the sleeper plant by testing of trial cubes as per para and complying design parameters as per para 3.6.2.

3.6.4 At the time of approval/review of mix design, 80 cubes shall be cast, using materials proposed for regular manufacture, in 10 batches of 8 cubes each, 4 for steam curing and 4 for water curing.

3.6.4.1 All the 40 cubes cured according to the proposed steam curing cycle shall attain the specified minimum release strength.

3.6.4.2 The statistical analysis of the compressive strength values of the 40 water cured cubes shall satisfy the design parameters of clause 3. 6.2 (ii), (iii) & (iv).

3.7 SGCI Inserts

3.7.1 SGCI inserts shall conform to IRS Specification No.T-46-1996 as amended up-to-date and will be procured only from RDSO approved manufacturers. Each consignment of SGCI inserts shall be accompanied by a test certificate from inspecting agency for inspection conducted prior to dispatch of consignment from supplier's premises.

3.7.2 Whenever directed by the inspecting official, the sleeper manufacturer shall get the SGCI inserts in stock tested at his own cost.

4. MANUFACTURE

4.1 Moulds

Moulds shall be of steel with minimum plate thickness of 10 mm in Rail seat area as well as for end plates. For other locations minimum plate thickness is to be 6 to 8 mm. Moulds shall be of rigid construction so as to prevent any in-service distortions. Moulds shall not allow any appreciable leakage of cement mortar in casting. The holes in the end plates shall be accurately drilled for correct placement of prestressing wires.

4.2 Stretching of wires

The prestressing wire shall be stretched either individually or collectively by an approved method. The tensioning force shall be as shown on the sleeper drawing. The final force to be adopted, duly considering the losses while stretching shall be approved by the Inspecting Officer. However, the stretching force shall in no case exceed 75% of the minimum specified UTS of the wire. The pretensioning force in the wire shall be applied by a tensioning device equipped with automatic load cut off unit along with measuring gauge. The final force shall also be verified by measuring the extension of the wire.

4.3 Mixing and consolidation of concrete

4.3.1 Manufacture of sleepers shall be done under a shed.

4.3.2 Batching of different ingredients shall be done by weight only. A modern, mechanized, or automatic weigh batcher shall be used for weighing aggregates and cement. The weigh batcher shall have an accuracy of +/-3%.

4.3.3 Modern high speed mixer, pan, turbine or any other suitable type, approved by the Inspecting Officer shall be used for mixing concrete. Concreting shall commence within 2 hours of stressing of wires, failing which the HTS wires shall be checked and re-tensioned, if necessary.

4.3.4 Concrete shall be thoroughly mixed and consolidated by means of vibrators of at least 9000<u>+</u>4% revolutions/minute. The vibrator should normally be fixed at the bottom of the mould, at least at two different locations for a sleeper. Any other vibration system should have prior approval of RDSO.

4.3.5 Freshly cast sleepers shall be protected during the first stage of hardening from adverse weather conditions.

4.4 <u>De-tensioning of wires</u>

Anchoring system shall provide a device for gradual de- tensioning of the wires. Back pulling of wires for releasing any wedge shall be strictly prohibited. De-tensioning of wires shall be undertaken only after the concrete has attained a compressive strength of 40 N/sq.mm.

4.5 Curing

4.5.1 Initial curing of concrete sleeper shall be done by steam at atmospheric pressure till the concrete attains a compressive strength of 40 N/sq.mm. Pre-steaming period shall not be less than the initial setting time of cement.

Typical steam curing cycle as per existing practice shall be of duration from 11 to 11.5 hours as under for guidance:

- i) Pre steaming period of 1.5 2.0 hrs but shall not be less than initial setting time of cement.
- ii) Rate of rise in temperature shall not be more than 20°C per hour. Normally duration is 2.5-3.0 hrs depending upon ambient temperature.
- iii)Maximum temperature shall be kept within 70 75 °C for atleast 4 hours.
- iv) Cooling of sleepers shall be gradual upto 10 15°C above the ambient temperature. Typical duration is 3 3.5 hrs.

The steam curing cycle which is proposed to be adopted shall have prior approval of the inspecting official.

4.5.2 After de-tensioning, the sleepers shall be cured for a further period of not less than 14 days (as per mix design) by submerging in water. Water used for curing should conform to the quality prescribed for water to be used for concrete mix.

4.5.3 Each steam chamber in stress bench method or production line in long line method shall be attached with a separate digital thermal sensor, temperature shall be recorded continuously and record shall be maintained.

4.6 Supervision

4.6.1 Suitably qualified persons as per Schedule of Technical Requirement shall be engaged by the manufacturer for supervising the following items at the works:

i) Placing and stressing of prestressing wire;

ii) Batching, mixing, placement and compaction of concrete. Checking of the steam curing arrangement for its adequacy.

iii) De-moulding of sleepers, water curing, stacking/ loading etc.

iv) Inserts shall be checked by suitable jigs before use by the manufacturer.

v) Testing of cement, cement mortar cubes, concrete cubes, concrete beams;

vi) Calibration of testing and measuring equipment and different gauges;

vii) Checking electrical resistance of sleepers.

4.6.2 Supervisor so engaged shall maintain records as directed by the Inspecting Officer and shall present them for scrutiny when demanded.

i) A site register shall be maintained in which inspecting officer shall record observations against which compliance will be recorded by the supervisor.

ii) Suitable records as per Schedule of Technical Requirement shall be maintained in such a manner that it can be correlated at a later date to the sleeper laid in field.

4.7 <u>Finish</u>

4.7.1 All sleepers shall be free from surface defects such as water retaining pockets, air holes or honey combed formations. The underside of the sleeper coming in contact with ballast shall be left rough but the unevenness shall not exceed 5mm. The ends of the prestressing wires shall be cut close to the surface of the sleeper in such a way that there is minimum damage to end plate and the wire in no case shall project more than 3 mm from the concrete surface. Two coats of suitable ISI mark anti corrosive paint, approved by Inspecting Officer, shall be applied at the ends of the sleepers in the following manner:

i) First coat of paint, sufficient thick to form impervious film of paint covering full surface of either ends of a sleeper shall be applied just after de-moulding from sleepers mould, and

ii) Second coat after taking out the sleepers from submerged water curing tank in the above manner, ensuring that surface to be painted is completely dry and clean of dirt etc.

4.7.2 No touching up or finishing by cement mortar etc. shall be permitted on concrete sleeper, after it is de-moulded, except as provided in clause 4.7.3.

4.7.3 Such sleepers which are not found acceptable due to surface defects, shall be accepted up to a ceiling of 1% of the supplies made any time during the currency of the contract provided such sleepers are adequately treated with epoxy compounds to the satisfaction of the Inspecting Officer. However, epoxy treatment of rail seat area is not acceptable. These sleepers shall be marked as shown in Drawing No.RDSO/T-2466 before dispatch. The rectified sleepers shall be paid for at the rates fixed by the Purchaser.

4.8 <u>Stacking</u>

After the sleepers have been cured in terms of clause 4.5.2 and checked both dimensionally and visually they shall be stacked at convenient place in lots. The stacking of sleepers shall be done on leveled and consolidated ground, one over another up to 25 layers. Each layer shall be separated by wooden/concrete battens of 50mm x 50mm size of suitable lengths to avoid any damage.

4.9 <u>Lots</u>

All sleepers cast in one shift shall form one lot.

5. INSPECTION AND TESTING

5.1 The manufacturer shall supply at his expense, all the sleepers required for tests and retests, samples of materials, labour, machine, tools, gauges, apparatus, forms of test reports etc. and any other item which may be necessary or required by the Inspecting Officer for carrying out any or all of the checks and tests mentioned in these specifications and shall render all reasonable assistance in conducting such checks and tests. All measuring and testing appliances shall be got checked and calibrated according to the schedule given in Annexure-I, through government approved agency or as directed by the Inspecting Officer. The calibration certificate shall be furnished to the Inspecting Officer. The cost of all such checks and calibrations shall be borne by the manufacturer.

5.2 Inspecting Officer and the Purchaser shall have free access at all reasonable times to the works in which the sleepers are manufactured. They shall be at liberty to inspect the manufacture of sleepers at any stage and to reject any material supplies not conforming to the terms of the specifications and to reject sleepers not manufactured according to approved manufacturing process. They shall be provided with necessary assistance for inspection by the manufacturer.

5.3 Checks and tests

5.3.1 In addition to the control checks exercised on the materials and manufacturing process specified above, the concrete and the finished sleepers shall be subjected to regular checks and tests, after 14 days submerged water curing, as detailed in clause 5.3.1.1.

5.3.1.1 Visual and Dimensional Check

Every sleeper shall be visually inspected for surface finish. No sleeper shall have surface defects except as provided in para 4.7.3.

Sleeper dimensions to be checked are listed below:

(i) Critical dimensions are toe gap, location of inserts, distance between inserts at rail seat, distance between outer most inserts and slope at rail seat.

(ii) General dimensions are depth of sleeper at centre, rail seat and end of sleeper; width of sleeper at top and bottom; length of sleeper, camber and wind at rail seat and position of high tensile steel wires at ends.

The sketch at Annexure-II shows the dimension checking arrangement. The dimensions, shown on the sleeper drawing, shall be checked by means of approved gauges, procured by the manufacturer. (Annexure II/A shows the gauge for measuring toe gap of rail seat).

(iii) Scale of check

a) Prior to stabilization of production technique*:- Scale of check per lot for critical dimension is 100% (hundred percent) and for general dimensions 10% (ten percent) of sleepers produced.

b) After stabilization of production technique* :- Scale of check per lot for critical dimensions is 10% (ten per cent) and for general dimension 1% (one percent), but the dimensions between outer inserts shall be checked 100%.

(a) Notwithstanding the provisions in (a) & (b) above the Inspecting Officer may decide to check the dimensions at scale higher than mentioned in para (a) & (b) above.

* Acceptance of minimum 10000 sleepers and achieving rejection rate less than 2% consistently, whichever is later, shall be one of the major criteria for deciding the stabilization of the manufacturing technique. After stabilization, the rejection rate shall be assessed after every 30000 numbers sleeper production and if it is found beyond 2%, then all the testing have to be done as per the frequency prescribed for pre-stabilized production. The additional cost of sleepers required for testing shall be borne by the firm.

5.3.2 Casting of cubes

15 cm size cubes shall be cast on a vibrating table conforming to IS:2514 (1963) from random samples spread over the entire lot, out of concrete used for casting sleepers for testing prior to transfer of prestress and 15 days.

5.3.3 <u>Method of testing</u>

The cubes shall be surface dry at the time of testing. The rate of loading shall be about 400 KN/minute.

5.3.4 Compressive strength of concrete at transfer (release) of prestress

These cubes shall be steam cured along with sleepers in the same manner and tested for transfer of prestress to concrete (at least one cube for every steam chamber/3 for each long line but not less than a total of 3 in any case).

5.3.5 Test for 15 day compressive strength of concrete

These cubes shall not be steamed but shall be water cured for 14 days after de-moulding. Three cubes per lot shall be tested for 15 days compressive strength of concrete. In case, average strength of concrete in three cubes is less than 48 N/mm² for M55 Grade of concrete and 55 N/mm² for M60 Grade of concrete, the lot shall be rejected and the mix design shall be reviewed.

5.3.6 Test for 15 day modulus of rupture of concrete

The test for 15 day modulus of rupture of concrete shall be carried out on concrete beams of 10 x 10 x 50 cm size as specified in IS:516. One specimen shall be tested daily prior to the stabilization of production technique, and once a week thereafter. If any value falls below 5.2 N/mm² for M55 and 5.5 N/mm² for M60, the mix design shall be reviewed.

5.3.7 Tests for static bending strength of sleepers

5.3.7.1 Method of testing

5.3.7.1.1 The tests shall be conducted in accordance with the arrangement shown in Annexure-III.

5.3.7.1.2 The sleepers shall be loaded gradually (30-40 KN/min) upto the specified load, which will be retained at this level for three minutes for observing cracks, if any. For the purpose, a crack is defined as one which is barely visible to the naked eye and is at least 15mm long from the tension edge of the sleeper. However, if crack appears at a load smaller than the specified load, that value shall be recorded.

5.3.7.1.3 In case of 'Moment of Resistance' (MR) test, the sleeper shall be deemed to have passed the test if it sustains the loads specified in Annexure-III or in relevant sleeper drawing without cracking. While loading, load can be applied upto 5KN in excess of specified load.

5.3.7.1.4 In case of 'Moment of failure' (MF) test, the sleeper shall be deemed to have passed the test if it is able to take load beyond the specified test load. The initial cracking loads shall also be recorded for rail seat bottom, centre top and / or centre bottom (as the case be) for further statistical analysis of data during MF test.

5.3.7.1.5 Sleepers for test shall be selected randomly by the inspecting officer.

5.3.7.2 Acceptance tests

5.3.7.2.1 Moment of failure (MF) test (for rail seat bottom)

Prior to stabilization of production technique, one sleeper for every 250 sleepers manufactured shall be tested. After the production technique gets stabilized the testing scale shall be reduced to one sleeper for every 2500 sleepers produced.

5.3.7.2.2 Moment of resistance (MR) test (Rail seat bottom, centre top, centre bottom)

Depending on 15 day cube strength of the lot as mentioned in para 5.3.5. The scale of testing for the lot shall be as follows :

i) Wherever minimum strength of the three cubes is 55 N/sq.mm and above for M55 & 60 N/sq.mm and above for M60 – one sleeper per lot

ii) For Mix M-55:- Wherever average strength of the three cubes is less than 55 N/sq.mm but up to 48 N/sq. mm – two sleepers per lot.

For Mix M-60:- Wherever average strength of the three cubes is less than 60 N/sq.mm but up to 55 N/sq. mm – two sleepers per lot.

a) Prior to stabilization of production technique: Sleeper to be tested shall be subjected to rail seat bottom, centre top and centre bottom tests.

b) After stabilization of production technique: Sleeper to be tested shall be subjected to rail seat bottom and centre top tests only.

iii) In case, 15 days average strength of concrete in three cubes for a lot is less than 48 N/mm² for M55 Grade and 55 N/mm² for M60 Grade, the lot shall be rejected and no testing for moment of resistance or moment of failure will be conducted.

NOTE:

(i) Test procedure has also been shown as a flow chart in Annexure IV.

(ii) Wherever MF test is to be conducted, it shall be performed on the first sleeper selected for testing under clause 5.3.7.2.2.

5.3.7.3 Acceptance of 'lots'

5.3.7.3.1 All sleepers tested in accordance with clause 5.3.7.1 should pass all the acceptance tests provided in clause 5.3.7.2 for the lot to be accepted. The specified values of Load for Centre Top, Centre bottom, Rails Seat cracking and MF test are as under :-

SLEEPER	CENTER	CENTER	RAIL SEAT BOTTOM	
	TOP (KN)	BOTTOM (KN)		
			(KN)	(KN)
BG	60	52.5	230	370
MG	25	40	150	250

5.3.7.3.2 If the sleeper fail in any of the tests conducted as per clause

5.3.7.2.2 (i), the lot shall be subjected to 'retest' as per clause 5.3.7.4.

5.3.7.4 <u>RETEST</u>

5.3.7.4.1 <u>MR</u>

For every sleeper failed in acceptance tests as per clause 5.3.7.2.2 (i), two more sleepers from the same lot shall be retested as per clause 5.3.7.2.2.

However, in case of testing of two sleepers as per clause 5.3.7.2.2(ii), if any of the sleepers fail, the lot shall be rejected.

5.3.7.4.2 <u>MF</u>

In case of failure of the sleeper in MF test as per clause 5.3.7.2.1, 2 more sleepers from the same lot shall be selected for testing in MF as per clause 5.3.7.2.1 and 5.3.7.2.2 and subjected to all relevant tests. However, if the sleeper has passed MF test and failed in some other test MF test need not be repeated on subsequent sleepers subjected to testing.

5.3.7.4.3 For acceptance of the lot, all the sleepers tested in 'retest' must pass all the tests conducted. However, sleepers failing in any static bending tests shall not be paid for.

Also final passing of the lot is a prerequisite condition for payment for any sleeper having passed all the relevant tests conducted on that sleepers.

Sleeper/sleepers tested for rail seat bottom failure test and passes the test, shall be paid by the purchaser, if that particular lot passes all the relevant retests.

NOTE:

In case where more than one test value is obtained in retests. The lowest value obtained will be taken as strength of the lot for deciding the result of the lot.

1

5.3.8 Measurement of electrical resistance

5.3.8.1 All sleepers shall be tested as per Annexure-V for electrical resistance for their fitness for use in track circuited area.

5.3.8.2 For inspection of concrete sleepers, officials having competency certificate issued after due test by RDSO/Chief Track Engineer only shall be posted.

6. STAMPING AND MARKING

6.1 All the sleepers shall have legible permanently inscribed and painted markings on the top as per drawing No.RDSO/T-2466.

6.2 The accepted sleepers shall bear the passing marks of the Inspecting Officer in indelible paints. Sleepers which have been subjected to static bending strength test up to cracking and accepted, shall in addition be marked on the top in indelible paint with the letter 'T'. MF tested and accepted sleepers shall bear the marking 'MF' in paint with yellow bands at ends.

6.3 All sleepers fit for use in track circuited area shall bear the mark 'FTC' at the center of the sleeper.

6.4 Rejected sleepers shall be stacked separately by the manufacturer so as to avoid their mixing with the accepted sleepers. Such rejected sleepers shall be marked in the way specified in drawing No.RDSO/T-2466.

The rejected sleepers shall be permanently damaged so as to render them un-useable and a certification that all rejected sleepers of previous batches have been permanently damaged will be given by manufacturer before offering next batch for inspection. The same shall be verified and ensured by inspecting officials/ SSE's and AIE before issuing the IC.

6.5 All markings mentioned in para 6.1 to 6.3 shall be done with enamel paint of ISI mark and shall be such as to last for at least 3 years under normal weather conditions. Colour and quality of the paint used shall be got approved by the Inspecting Officer. All such markings shall be done by the manufacturer at his cost.

7. LOADING AND DESPATCH

7.1 Only those sleepers which have been passed, properly marked and accepted by the Inspecting Officer shall be loaded for despatch.

7.2 The loading of the passed sleepers in wagon shall be done by the manufacturer at his cost as per the loading arrangement approved by the purchaser. The sleepers shall be properly secured to avoid movement and displacement during transit. The manufacturer shall be responsible to replace, free of cost, all the sleepers which are found damaged in transit on account of defective loading.

8. GUARANTEE

8.1 The sleepers as per RDSO Drawing no. T-2496 shall be guaranteed by the manufacturer for a period of five years from the date of manufacturing / 3 years from the date of placement in service (whichever is earlier). If during the guarantee period, sleepers in general are found to develop defects attributable to bad material and workmanship as established during investigation, leading to large scale withdrawal from service, the cost of sleepers and their replacement shall be borne by the manufacturer. The defective sleepers withdrawn from service can be taken over at site by the manufacturer for their disposal. The manufacturer shall make good the cost due within 60 days of advice of defects. The sleeper manufacturer will also be involved during inspection / investigation and his view will be considered by the Purchaser before taking decision. The decision of the purchaser shall be final and binding in this regard.

ANNEXURE-I

SCHEDULE FOR CALIBRATION OF VARIOUS GAUGES AND TESTING EQUIPMENTS IN THE CONCRETE SLEEPER PLANT

S.No.	Equipment	Frequency
1	15 cm concrete cube testing machine (2000 KN capacity)	Once in 3 months
2	Cement mortar cube testing machine (500 KN capacity)	Once in 6 months
3	Sleeper Static Bend Test Machine (500 KN capacity)	Once in 3 months or after testing 250 sleepers, whichever is earlier.
4	Pre tensioning Jacks (500 KN capacity)	Once a month or after casting 5000 sleepers whichever is earlier.
5	Pre-tensioning load cell	-do-
6	Concrete Beam Testing Machine (100 KN capacity)	Once in 6 months
7	Aggregate weight batcher	Once every week or after casting 2000 sleepers, whichever is earlier.
8	Cement weighing equipment	-do-
9	Water Meter	-do-
10	Master gauges for checking correctness of dimension measuring gauges	Once in 6 months
11	Dimension checking gauges	Once every 15 days or after inspecting 5000 sleepers, whichever is earlier.
12	Proving rings (2000 KN, 500 KN and 100 KN capacity)	Once in 18 months
13	Weights & Measures	By Weights & Measures Department as per extant rules.
14	Tachometer	Once a year

ANNEXURE-I (CONTD.)

Note:

- 1. The items referred at S.No.1 to 6 above should be calibrated by proving rings in the sleeper plant itself.
- 2. The items referred at S.No.7 & 8 should be calibrated by dead weights and item at S.No.9 by measuring cans which should be available in the plant.
- 3. The proving rings should be got calibrated from a reputed organization like the IITs, NCCBM or NPL etc.
- 4. The record of calibration of all the above equipments should be maintained in a manner that previous records can be easily connected.
- 5. The calibration can be done more frequently at the discretion of the Inspecting Official.



Annexure - IIA (Contd.)





NOTE:--THE VALUES MENTROLED IN ABOVE TESTING ARRANGEMENT, TABLE-1 & TABLE-2 ARE FOR URANING NO.RUSO, FT-2490 & 2486 ONLY FOR OD-ER ENGS. CORRESPONDING DRAFING SHALL & REFERED.

NOTE:

- 1. All dimensions are in millimeters.
- 2. The load 'P' will be applied at centre line of Rail Seat through pressure distributing M.S. Plate with 1 in 20 slope and size 130X25mm for 52kg rail and 145x25mm for 60kg rail, covering the full width of sleeper.
- 3. One rail seat bottom shall be tested at a time. It shall be ensured that the other end is not restrained in upward direction. The rate of loading is 30-40KN per minute.
- 4. Cracks shall not appear up to the load mentioned in column 2, 3 & 4 of table II when retained for one minute.
- 5. A coat of lime wash shall be applied on the sleeper surface before testing.



NOTATIONS & EXPLAINATORY NOTES:

- MR: MOMENT OF RESISTANCE TEST:
 - RAIL SEAT BOTTOM, CENTRE TOP & CENTRE BOTTOM (PRIOR TO STABILISATION)
 - RAIL SEAT BOTTOM & CENTRE TOP (AFTER STABILIZATION) MF:

MOMENT OF FAILURE TEST FOR RAIL SEAT BOTTOM



PASSES : SLEEPER PASSES RELEVANT TEST SUCCESSFULLY FAILS :

SLEEPER FAILS IN ANY OF THE RELEVANT TEST

- NOTE : (1) WHEN DUE, MF TEST SHALL BE CONDUCTED ON THE FIRST SLEEPER SELECTED FOR TESTING UNDER MR
 - (2) WHENEVER MF IS DONE, PASSING THIS TEST IS A PREREQUISITE FOR ACCEPTANCE OF THAT LOT UNDER 'A' OF FLOW CHART.
 - (3) IF THE FIRST SLEEPER HAS PASSED MF TEST BUT FAILED IN ANY OTHER TEST, MF TEST NEED NOT BE REPEATED ON SUBSEQUENT SLEEPERS SUBJECTED TO RE-TESTING.

ANNEXURE-V

PROCEDURE FOR CHECKING FITNESS OF CONCRETE SLEEPERS ON TRACK CIRCUITED STRENGTH (AT THE TIME OF INSPECTION IN THE CONCRETE SLEEPER MANUFACTURER'S PREMISES

- 1. All the sleepers shall be tested.
- 2. The sleeper shall be checked for electrical resistance at 230 volts AC supply. The circuitry to be followed will be shown in sketch at Annexure-V (Contd.).
- 3. The 230 volts AC supply will be passed through a not less than 300 W test lamp in series with the pairs of inserts being tested. For the sake of comparison, another comparator bulb of the same wattage directly connected to the 230 volts AC supply will be fitted along side.
- 4. Since the testing is being done at a higher voltage, removal of the rust layer by grinding shall not be necessary.
- 5. Resistance will be checked against 2 rail seats.
- 6. If the test lamp emits light dimmer than the comparator lamp in the sleeper, the sleeper shall be accepted and marked 'FTC' (Fit for Track circuit). If it emits light with the same brightness as the comparator lamp, the sleeper will be rejected and marked 'NFTC' (Not fit for track circuit). In case the test lamp does not emit light at all, it indicates that the circuitry is defective and should be rechecked.
- 7. In the event of doubts regarding comparison of brightness, such sleepers will not be marked. They will be retested with 1.5 V Avometer and marked for fitness, if found fit with 200 ohms resistance.
- 8. The 'NFTC' marked sleepers should be stacked separately. The FTC/NFTC marking shall be done on top of sleepers in middle portion, as shown on Drawing No.RDSO/T-2466.
- 9. As the testing is done at higher voltage, all precautions such as use of gloves in the hands, insulated boots and insulated chairs for operator and other necessary precautions shall be taken for the safety purpose.



LIST OF IRS & BIS CODES REFERRED TO

(Up-to-date version of Codes/Specifications with latest amendments/correction slips shall be followed)

S.No.	IRS/BIS No. &	Description		
	Year			
1	IS: 12269 - 1987	Specification for 53-S grade cement for		
	with amendment No.6	manufacture of concrete sleepers		
	of June 2000			
2	IS: 1343 - 1980	Code of Practice for Pre-stressed Concrete		
3	IS:383 - 1999	Specification for coarse and fine aggregates from natural sources for concrete (Second Revision)		
4	IS:456 - 2000	Code of practice for plain and reinforced concrete (Fourth Revision)		
5	IS:516 - 1959	Method of test for strength of concrete with amendment No.2		
6	IS: 650 - 1991	Specification for standard sand for testing of cement (First Revision with amendment No.3)		
7	IS:1785 - 1983 Pt.I	Specification for plain hard drawn steel wire for		
		prestressed concrete Part I Cold drawn stress relieved wire		
		(Second Revision with amendment No.1)		
8	IS: 2386 - 1963 Pt. I – VIII	Methods of tests for aggregate for concrete		
9	IS: 2430 - 1996	Methods for sampling of aggregate for concrete		
10	IS:2514 - 1963	Specification for concrete vibrating table		
11	IS:3536 - 1999	Methods of sampling hydraulic cements (First Revision)		
12	IS:4031 - 1999 Pt.I-XVI	Methods of physical tests for hydraulic cement		
13	Part II - 1999	Determination of fineness by specific surface by blaine air permeability method (First Revision)		
14	Part III - 1988	Determination of soundness (First Revision)		
15	Part IV - 1988	Determination of consistency of standard cement paste (First Revision)		
16	Part V - 1988	Determination of initial and final setting times (First Revision)		
17	Part VI - 1988	Determination of compressive strength of hydraulic cement (other than masonry cement) (First Revision)		
18	Part XIV - 1989	Determination of false set		
19	IS:4032 - 1985	Methods of chemical analysis of hydraulic cement (First Revision)		
20	IS:6006 - 1983	Specification for uncoated stress relieved strand for pre- stressed concrete (First Revision) with amendment No.2		
21	IS:9103 - 1999	Specification for Admixtures for concrete		
22	IS: 10262 - 2009	Concrete Mix Proportioning - Guidelines		
23	IRS: T-46 1996	Specification for Spheroidal Graphite Cast Iron inserts		
24	STR	Schedule of Technical Requirement for manufacture of PSC Sleepers as applicable from time to time.		

GOVERNMENT OF INDIA (MINISTRY OF RAILWAY) R.D.S.O. LUCKNOW

Corrigendum no. 1

<u>to</u>

"Specification for Pre-tensioned Pre-stressed concrete sleepers for BG and MG"

IRS-T-39 (Fifth Revision – Feb., 2016)

(RDSO Letter No. CT/SRC/Insp/Tender Dated 12.08.2016)

The existing clause 3.2.3 shall be replaced as under:

3.2.3 The cement content of the mix shall not be less than 350 kg/cu. m. and not more than 450 kg/cu.m.

The new clause 3.6.3.2 (in between 3.6.3.1 & 3.6.4) shall be added as under :

3.6.3.2 Workability of mix should be kept low i.e. compacting factor in range of 0.75-0.80 for stress bench method. For long line method, workability should be kept slightly higher with slump up to 25mm if required, for proper compaction of concrete, but not leading to segregation to constituents of concrete mix under vibrations.

GOVERNMENT OF INDIA (MINISTRY OF RAILWAY) R.D.S.O. LUCKNOW

Corrigendum no. 2

to

"Specification for Pre-tensioned Pre-stressed concrete sleepers for BG and MG"

IRS-T-39 (Fifth Revision – Feb., 2016)

(RDSO Letter No. CT/SRC/Insp/Tender Dated 23.05.2017)

- 1. The existing **clause 3.2.1** shall be replaced as under:
- 3.2.1 Cement shall be OPC 53S Grade confirming to IS:269 2015 (as amended upto date).
- 2. The existing clause 3.4.7 shall be replaced as under:
- 3.4.7 If crushed stone sand is being used as fine aggregates then bond strength (pull out test) of concrete shall be tested as per IS: 2770 (Part I)- 1967 (Re-affirmed 2012) during mix design approval and after production of every 5000 sleepers during regular production. Crushed stone sand being used should not be by-product of any other manufacturing process.
- 3. The existing Note No. 4 of Annexure-III shall be replaced as under:
- 3.2.1 Cracks shall not appear up to the load mentioned in column 2, 3 & 4 of Table-II when retained for three minute.
- 4. The existing list of IRS & BIS Codes as given in **Annexure-VI** is updated with change in S.No. 1,2,3 & 20 as under::

S.N	IRS/BIS	Description
Ο.	No. & Year	
1	IS:269 - 2015	Ordinary Portland Cement – Specification
		(including Specification for 53-S grade cement for
		manufacturing of concrete sleepers)
2	IS:1343 - 2012	Code of Practice for Pre-stressed Concrete
3	IS:383 - 2016	Specification for coarse and fine aggregates from
		natural resources for concrete (Third Revision)
4	IS:6006 - 2014	Specification for uncoated stress relieved strand for
		prestressed concrete (Second Revision)

GOVERNMENT OF INDIA (MINISTRY OF RAILWAY) R.D.S.O. LUCKNOW

Corriaendum no. 3

to

<u>"Specification for Pre-tensioned Pre-stressed concrete sleepers for BG and MG" IRS-T-</u> <u>39 (Fifth Revision – Feb., 2016)</u> (RDSO Letter No. CT/SRC/Insp/Tender Dated 20.11.2017)

- 1. The existing clause 3.2.1 shall be replaced as under :
 - 3.2.2 Cement shall be OPC 53-S conforming to IS:269-2015 (as amended upto date). However, upper limit of SO₃ and C₃A content in 53-S grade cement is revised as 3.3% & 9.0% respectively for improvement in quality of PSC sleepers on IR. Upper limit of initial setting time (IST) of 53-S grade cement is specified as 120 minutes preferably but not more than 150 minutes.
- 2. The existing clause 4.5.1 shall be replaced as under :
 - 4.5.1 Initial curing of concrete sleeper shall be done by steam at atmospheric pressure till the concrete attains a compressive strength of 40 N/sq.mm. Pre- steaming period shall not be less than the initial setting time of cement. Total steam curing cycle duration can vary from 10 to 12 hours depending on time taken in the steam curing stages e.g. presteaming, temperature rising (heating), constant temperature duration, cooling etc. Total cycle time depends on ambient temperature.
 - i) Normal pre-steaming period is recommended as 2 hours or initial setting time (IST) of cement whichever is greater.
 - ii) Temperature rising time is recommended as 2.0 to 2.5 hours keeping maximum rate of rise of temperature as 15°C per hour.
 - iii) Maximum steam curing temperature shall be not more than 60°C keeping constant temperature in range of 55 – 60°C. Constant temperature duration can be kept between 3.5 to 5.0 hours.
 - iv) Cooling of sleepers shall be gradual and cooling period is recommended in range of 2 to 3 hours with cooling rate not exceeding15°C per hour.

Extra one hour cooling of sleepers at ambient temperature before demoulding is desirable/recommended, if feasible keeping the total cycle time upto 12 hours to minimize difference in external and internal (inside) temperature of sleepers.

Mix design shall be revised, if minimum strength of 40 steam cured cubes is less than 40 N/mm² following the above mentioned stipulations on steam curing cycle. The steam curing cycle which is proposed to be adopted shall have prior approval of the inspecting official.

GOVERNMENT OF INDIA (MINISTRY OF RAILWAY) R.D.S.O. LUCKNOW

Corrigendum no. 4

to

<u>"Specification for Pre-tensioned Pre-stressed concrete sleepers for BG and MG" IRS-T-</u> <u>39 (Fifth Revision – Feb., 2016)</u>

(RDSO Letter No. CT/SRC/Insp/Tender Dated 03.04.2018)

3. The existing clause 5.3.5 shall be replaced as under :

5.3.5 Test for 15 day compressive strength of concrete

These cubes shall not be steamed but shall be water cured for 14 days after demoulding. Two number of samples per lot (one sample comprises of 3 cubes) shall be taken.

The samples should be spread over the entire period of concreting in a lot. Cubes of these samples shall be tested for 15 days compressive strength of concrete. The test result of a sample shall be the average of the strength of three cubes. Individual variation in cube strength in a sample should not be more than $\pm 15\%$ of the average. If variation is more than $\pm 15\%$, the test results of the sample is invalid and the lot shall be rejected.

Further, if mean of two test results of two samples is < f_{ck} and / or minimum of the two test results of two samples is < fck – 5 N/mm², the lot shall also be rejected. Where, f_{ck} is characteristic strength of concrete i.e. 55 N/mm² for M55 and 60 N/mm² for M60 grade of concrete.

Otherwise, the concrete is accepted for further testing of sleeper/s as per para 5.3.7.2.2.

4. The existing clause 5.3.7.2.2 shall be replaced as under :

5.3.7.2.2 Moment of resistance (MR) test (Rail seat bottom. centre top. centre bottom)

Depending on 15th day test results of samples of the lot as mentioned in para 5.3.5, the scale of testing of sleepers for the lot shall be as follows (as explained in Table -1):

i) Wherever mean of the two test results of two samples is $\ge f_{ck} + 3 \text{ N/mm}^2$ or $f_{ck} + 0.825 \text{ x}$ established standard deviation whichever is greater and minimum of the two test results of two samples is $\ge f_{ck} - 3 \text{ N/mm}^2$ and the lot is not rejected as per the criteria given in para 5.3.5– one sleeper per lot

- ii) Wherever mean of two test results of two samples is $f_{ck} + 3 \text{ N/mm}^2$ or $f_{ck} + 0.825 \text{ x}$ established standard deviation whichever is greater but $\geq f_{ck}$ or minimum of the of the two test results is $f_{ck} 3 \text{ N/mm}^2$ but $\geq f_{ck} 5 \text{ N/mm}^2$ or both and the lot is not rejected as per the criteria given in para 5.3.5 two sleeper per lot
- iii) In case, mean of two test results of two samples is < f_{ck} and /or minimum of the two test results of two samples is < f_{ck} 5 N/mm², the lot shall be rejected and no testing for moment of resistance or moment of failure will be conducted.

Note:

- c) Prior to stabilization of production technique: Sleeper to be tested shall be subjected to rail seat bottom, centre top and centre bottom tests.
- d) After stabilization of production technique: Sleeper to be tested shall be subjected to rail seat bottom and centre top tests only.

<u>Table -1</u>: Acceptance / Rejection Criteria of Concrete and No. of Sleepers for SBT Test per Lot

SN	First condition	Second Condition	Conditions to be complied	No. of sleeper per lot for test
Case 1	If average of test results of two samples is $\ge f_{ck} + 3$ N/mm ² or $\ge f_{ck} + 0.825 x$ established standard deviation, N/mm ² whichever is greater	If minimum of test results of two samples is $\ge f_{ck}$ - 3 N/mm ²	Both conditions are to be fulfilled and the lot is not rejected as per the criteria given in para 5.3.5.	Concrete is accepted and one sleeper will tested for SBT from the lot.
Case 2	If average of test results of two samples is < fck + 3 N/mm ² or < f_{ck} + 0.825 x established Standard deviation, N/mm ² whichever is greater but ≥ f_{ck} N/mm ²	If minimum of test results of two samples is $< f_{ck} - 3 \text{ N/mm}^2$ but $\ge f_{ck} - 5 \text{ N/mm}^2$	Any one of them or both conditions are fulfilled and the lot is not rejected as per the criteria given in para 5.3.5	Concrete is accepted but two sleepers will be tested for SBT from the lot.
Case 3	If average of test results of the two samples is < f _{ck} N/mm ²	If minimum of test results of two samples is $< f_{ck} - 5 \text{ N/mm}^2$	Any one of them or both condition are fulfilled.	Lot rejected without any further testing on sleepers of the lot.

5. The existing Annexure-IV on 'Flow chart for testing of Sleeper' shall be replaced as under:



GOVERNMENT OF INDIA (MINISTRY OF RAILWAY) R.D.S.O. LUCKNOW

<u>Corriaendum</u>

<u>no.5</u> to

<u>"Specification for Pre-tensioned Pre-stressed concrete sleepers for BG and MG"</u> <u>IRS-T-39 (Fifth Revision – Feb., 2016)</u>

(RDSO Letter No. CT/SRC/Insp/Tender Dated 11.06.2018)

1. The existing Annexure-I on 'SCHEDULE FOR CALIBRATION OF VARIOUS GAUGES AND TESTING EQUIPMENTS IN THE CONCRETE SLEEPER PLANT' shall be replaced as under:

SCHEDULE FOR CALIBRATION OF VARIOUS GAUGES AND TESTING EQUIPMENTS IN THE CONCRETE SLEEPER PLANT

S.No.	Equipment	Frequency
1	15 cm concrete cube testing machine (2000 KN capacity)	Once in 3 months
2	Cement mortar cube testing machine (500 KN capacity)	Once in 6 months
3	Sleeper Static Bend Test Machine (500 KN capacity for BG sleeper (RDSO/T-2496) & 1000 KN for wider sleeper (RDSO/T-8527))	Once in 3 months or after testing 250 sleepers, whichever is earlier.
4	Pre tensioning Jacks (500 KN capacity)	Once a month or after casting 5000 sleepers whichever is earlier.
5	Pre-tensioning load cell	-do-
6	Concrete Beam Testing Machine (100 KN capacity)	Once in 6 months
7	Aggregate weight batcher	Once every week or after casting 2000 sleepers, whichever is earlier.
8	Cement weighing equipment	-do-
9	Water Meter	-do-
10	Master gauges for checking correctness of dimension measuring gauges	Once in 6 months
11	Dimension checking gauges	Once every 15 days or after inspecting 5000 sleepers, whichever is earlier.
12	Proving rings (2000 KN, 500 KN, 1000 KN and 100 KN capacity)	Once in 18 months
13	Weights & Measures	By Weights & Measures Department as per extant rules.
14	Tachometer	Once a year

SCHEDULE OF TECHNICAL REQUIREMENT (2018) FOR MANUFACTFURE OF PSC SLEEPER

DETAILED INFORMATION

1. Name of Sleeper Plant :

- a) Location :
- b) Railway:
- c) Nearby Railway Station :
- d) Nearby Main Station :
- e) Distance from Main & Nearby Station :
- f) Telephone / Fax No. & Address :

i)	Office:
ii)	Factory :

g) Details of Production :

i)	Main Line Sleepers
ii)	1 in 8 ¹ / ₂ , Turnout Sleepers
iii)	1 in 12, Turnout Sleepers
iv)	Wider Sleeper

h) Whether Plant is approved for manufacturing any other type of sleeper:

2. Method of manufacture (Long line, Stress bench etc.)

3. Contract details :

S.No.	C. A. No.	Railway	Type of sleepers	Quantity	Delivery date

4	QUALITY ASSURANCE PLAN & ISO CERTIFICATION		
4.1	QAP Approved by RDSO (Yes / No)		
4.1	Date of approval of QAP by RDSO		
4.1	Remarks about implementation of		
4.1 .4	Whether Plant is having ISO: 9001- 2008 (Yes / No)		
4.1	ISO Certifying agency & Date of validity of ISO certificate		
	Whether Internal Quality Audit of plant		
4.1	is done by firm at frequency at least		
.6	once a year.		

5.0 ORGANISATION STRUCTURE

Typical organization structure chart of a Concrete Sleeper Plant is as given below -



5.1 Minimum Level of Technical Supervision

- 1. Overall Quality Control In-charge: At least One Graduate Engineer with Civil Engineering degree.
- 2. Shift In-charge for Production:
- (a)Minimum one supervisors with diploma in civil engineering for each shift per each casting shed.
- (b)Minimum one diploma engineer of mechanical/ electrical / electronic / IT /civil for maintenance of equipment's.
- 3. Quality Control Supervisor for Laboratory and testing: Minimum one supervisor with Diploma in Civil Engg./ BSc .

4. Supervisors & Mixture Machine In-charge should be suitably qualified and their competency shall be certified by the overall Quality Control In-charge of the plant.

5.2	DETAILS FOR LEVEL OF SUPERVISION				
SR NO	Item	Name	Qualificati on	Experien ce	
5.2.1	Nos. of Engineers				
5.2.2	Nos. of Technical Supervisors				
5.2.3	Name of separate Quality Control Supervisor for Laboratory				
5.2.4	Reason for any deficiency in manpower and planning of compliance.				

6.0	LAYOUT PLAN			
6.1.1	Owner Ship of land/ Lease Agreement with Railway.			
6.1.2	Notarized copy of agreement			
6.1.3	Remarks about deficiency , if any			
6.1.4	Whether Layout plan is fully with in land owned by plant and there is no unauthorized construction on railway property.			
6.1.5	Whether Layout plan is approved if yes then details of approving authority & reference			
6.2	LAYOUT REQUIREMENT			
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S.No.	ltem	Minimum Requirement	Existing	Remar ks
6.2.1	Cement Godown	Min. covered godown area = 400 sq.m. (Storage as per IS:4082- 1967)		
6.2.2	HTS Storage	Minimum area of covered godown with EOT for handling of HTS wire coils= 100 Sqm.		
6.2.3	Insert Godown	Minimum Area of covered godown = 100 sqm.		
6.2.4	Steam curing chambers	Minimum no. of chamber = (0.65*N/32)rounded off to next whole number, where 'N' is the proposed daily production capacity. Chambers shall be vertical type with continuous digital temperature recording facility connected with storage of data with servo control automatic steam control arrangement. CSPs having present arrangement of Horizontal steam chamber may continue with existing arrangement.		
6.2.5	Submerged water curing tanks	ed ng Minimum Submerged water curing capacity required (In no of sleeper) = (0.65 to 0.75)*N Where, 'N' is monthly production capacity. Capacity of one tank should be maximum 3 days production. Tank should have minimum 30 cm free board.		
6.2.6	Stacking Area for finished sleeper	Stacking Area for finished sleeper Minimum 2 month capacity. Maximum layers of sleepers in one stack should be 25. Minimum area=0.08*N sqm. Where N is monthly production capacity.		
6.2.7	Laboratory	General : Approximately 40 sqm Sleeper testing area: Approx. 30 sqm.The laboratory and sleeper testing area should be illuminated should have 100% power backup. The laboratory shall be provided with adequate air conditioners for temperature and humidity control.		
6.2.8	Inspecting Officials office	ng Minimum 14 sqm. Fully furnished with adequate communication facilities (Fax, Telephone etc.)		
6.2.9	Rest House	Minimum two room sets fully furnished with attached toilet and other amenities including cooking facility. Min. area 25 sqm.		
6.2.10	Platform for turnout sleepersAt least two platforms of 70mx6m with gantry arrangement for handling for inspection of two sets at a time.			

7.0 Minimum requirement of Plant and Machinery for Concrete Sleeper Plant: Production Line

S.N.	Particulars	Qty.
1.	Concrete mixer along with Automatic Batching Plant using Microprocessor based Weigh Batcher, Pneumatically operated Aggregate Bins, Water meter and automatic Cement feeding, Capacity of Concrete 5m ³ /hr. It should be capable of keeping digital record of ingredients used batch wise & data storage capability for one year production and should be capability of output in hard copy also.	1 no.
2.	Standard weights of 50 Kg or highest permissible denomination totaling 50kg & Small denominations capable of measurement to the least count of 1 kg for calibration of weigh batcher	
3.	Water measuring cans or automatic water meter for calibration of water meter	1,2,5,10&20 liters
4.	Concrete sleeper Mould should be made with plate thickness 6/8mm with suitable stiffening arrangement to avoid in service distortion of moulds. Rail seat area & end plates are to be made with 10 mm thick Steel plate. Rail seat area should also be made with adequate measures to ensure proper rail seat slope and surface finish.	240 nos.*
	*Minimum for a monthly production capacity of 5000 nos assuming one shift per day (For higher production capacity no of mould required for daily production plus 20 % for maintenance purpose)	
5	For Production by Stress Bench Method	
J.	Stool Stross Bonchos made of channel and with Jack Anchoring Bockets, for	
5.1	holding 4 sleeper moulds. Design of stress bench should be such so as to have minimum distortion on account of service stresses. *For a monthly production capacity of 5000 nos BG Line sleepers assuming	60 nos.*
	one shift per day however it may be increased in the multiples of the required production capacity.	
5.2	Hydraulically operated Pre-Stress Equipment with motorized unit, for 500KN jacks along with Pressure Gauges / pressure transducer with digital display and auto cut arrangement. The data should be displayed on monitor and should be stored for future analysis of past six months data.	2 Sets
5.3	Roller and Roller Stand	As per requirement
5.4	Trolleys for Transportation of stress benches	6 nos.
5.5	Steam curing chamber of adequate size and capacity to hold not more than eight benches containing four mould each. The steam curing should be with servo controlled valve with steam regulation with auto cut off arrangement following the steam curing cycle. The data of time vs temperature in each chamber should be digitally displayed and stored on and system should have sufficient memory to store at least on year's data with facility to take out print shift wise.	
6	For Production by long line method	A a b a c
	End support embedded in ground with device permitting transfer of pre stress	As per design

	Tensioning gun with digital pressure gauge, automatic cut off device and automatic elongation & force recording arrangement along with digital display and logging of data on computer with data storage & retrieval for at least six month.	02 nos
	Casting bed with moulds. No of mould should be 10 % more than required for daily production capacity.	As per design
	Tarpaulin hoods for covering casting beds for steam curing. With proper	For each
	drainage arrangement.	casting line
	The steam curing should be regulated through servo controlled valve with	For each
	auto cut off arrangement and regulation of steam to maintain the temperature	casting line
	as per steam curing cycle. The data of time vs temperature covering complete	
	casting line should be digitally displayed and stored. The system should have	
	sufficient memory to store at least on year's data with facility to take out print	
1.	Steam Boller, Coal /oil fired/electrically operated capacity 1000 kg/hr,	
	complete with valves, mountings and Chimney. The key parameters of boller	1 no
	such as steam pressure should be displayed. The boller & its operators	1110.
	certification from statutory authority should be ensured	
8.	Double Acting Hydraulic Jacks 1000KN Capacity	4 nos.
9.	concrete Bucket for carrying and pouring concrete in moulds by bottom	i no.
	controlled discharge on Monorali Hoist, Movement should be motorized and	
10	Uperator controlled. High Erggueney 0000 DDM $(1/49/3)$ Vibrator better fiving type. For DSC line	16 200
10.	High Frequency 9000 RPM (+/-4%) Vibrator boltom lixing type. For PSC line	to nos.
	sieepers and Turnout sieepers, vibrators of min 1.0 KW and 1.5KW capacity	
	and time of each operation RPM should be digitally displayed during	
	and time of each operation. REW should be digitally displayed during	
11	Techemeter 10000 DDM conseits	2000
11.		21105
12.	High Frequency Converter for Vibrators	2 nos.
13.	Vibrating Table for Cubes 15X 15 X 15, table 1mX 1m Electric Wolding Are Cutting M/e for HTS outting at do molding/ Abrasive	1 no.
14.	disc cutter	2 1105.
15	Trolley for transportation of Einished Sleeper	10 nos
10.		10 1103.
16.	Overhead Wire Rope Hoist 2 T capacity, Electrically driven, traveling on	2 nos.
	I Beam Section, One each for demoulding and curing tank	
17.	Overhead Wire Rope Hoist for Steam Curing Chambers 3 T capacity,	2 nos.
	traveling on I Beam Section (Excluding the structure)	
40	MO Contra Orong algorithmethy drivers with Overshard 1947 - Development 1977	0.4
18.	wis Gantry Grane electrically driven with Overnead Wire Rope Holst 4/5 I	2 nos.
	capacity for Loading of sleepers and for putting sleepers in water curing	
40	Idiliks.	1
19.	Dieser Generaling Sel 101 123KVA	T NO.

20	Workshop Equipments	
	 Lathe Machine Tower Drilling Machine AG-7 Angle Grinder Electric Welding Set Gas cutting Set Misc. tools and dies Misc. measuring tapes, scales 	At least one each.

8.0 Laboratory Equipment's:

S No	Equipment	Quantity
1	Compression Testing Machine, 2000KN capacity, motorized with 2 nos. of pressure gauges (2000KN & 500KN) with digital interface for real time recording of testing results. The system should have sufficient memory to store data of one year production with reporting facility in hard copy as per format mutually agreed.	1
2	Flexural Beam (Tension) Testing Machine with loading Jacks, 30 KN capacity . The machine should be capable of digital display and recording of data during testing with auto logging of time & date of testing. Data storage & retrieval capability should be for one year production .	1 no.
3	Motorized pumping unit with 1000KN capacity jacks, pressure gauge, rubber tubes and test frame complete for sleeper testing. The digital display of the load applied should be visible to observer simultaneously along with observation of crack. The data shall be recorded in computer with automatic date and time record with Batch no. and other detail for traceability of record.	1
4	15 cm cubes moulds confirming to IS:516	50
5	Beam moulds 10 x 10 x 50 cm size	2nos
6	Slump Tester/Vee Bee Testing Machine	1 no.
7	Electronic balance with 1gm least count (10 / 20 Kg. capacity) including weights.	1
8	Blain's air permeability apparatus	1
9	Vicat apparatus with dash pot and various needles	1
10	Stop watch	1
11	Le Chatelier mould for soundness test of cement	1
12	Steel trowels for mixing cement paste	2nos.
13	Cement mortar cube casting machine with motor and time switch complete	1
14	7.06 cm (50 cm ²)mortar cube moulds	
15	Metallic scoop, pan type container and china tray etc.	2 sets
16	Aggregate Impact testing machine	1
17	Aggregate crushing testing machine	1
18	Aggregate Abrasion testing machine	1

19	Electric thermostatic oven with display of temperature	1
20	Set of IS Sieves 40 mm and below up to 75 micron	1
21	Automatic electric sieve shaker	1
22	Proving rings of 2000 KN,1000 KN, 500 KN, and 100 KN capacity	1 each
23	1.5 Volt AVO meter	1
24	Glass cylinders and Beakers 50 - 500 cc capacity	1 set
25	Miscellaneous measuring gadgets like steel tape, Vernier, filler gauge etc.	2 sets
26	Inspection gauges for dimension checking of sleepers with digital display of parameters as approved by RDSO. (Optional)	2 sets
27	Master gauges for checking inspection gauges	1 set
28	Magnifying glass	1
29	Level table steel for checking gauges	1
30	pH meter & TDS meter (Digital)	1

- 1. This to certify that the information submitted above is correct.
- 2. Testing of raw material shall be carried out as per relevant specifications, the details of raw material used is as given in as Annexure-I.
- 3. Record shall be maintained as per periodicity mentioned in annexure-II and on formats mentioned therein.

SIGNATURE OF PROPRIETER NAME & SEAL

Raw material details

1.0	Source of raw materials	
1 1	Cement (Brand name)	
1.1	Location of cement plant	
1.2	HTS wire (BIS approved source)	
	Validity of BIS approval	
1.3	6 mm MS Bar (confirming to IS: 2265)	
1.4	Quarry name for CA1	
	Distance of quarry from the plant	
1.5	Quarry name for CA2	
	Distance of quarry from the plant	
1.6	Source name of Fine aggregates,	
	Distance of source from the plant	
1.7	SGCI Inserts Source	
	Validity of RDSO / ISO approval	
1.8	HDPE Dowel Source	
	Validity of RDSO approval	
1.9	Water source	
	Quality and quantity	
1.10	Details of Admixture being used	

2.0 Characteristics of raw materials :

	Coarse aggregate (as per Test report submitted at the time of approval of Mix design)	Coarse aggregates, CA1	Coarse aggregates, CA2
2.1	Specific gravity		
2.2	Impact Value		

2.3	Abrasion Value	
2.4	Crushing Value	
2.5	Flakiness Index	
2.6	Elongation Index	
2.7	Water absorption	

	Fine aggregate (as per Test report submitted at the time of approval of Mix	Fine aggregate river sand
2.8	Specific gravity	
2.9	Silt content	
2.10	Deleterious materials	
2.11	Zone	
2.12	Water absorption	
	High Tensile Steel	
	Conforming to IS: 6006 specification	
	Type (Plain, Strand): Nominal diameter	
2.13	Breaking Load & Elongation	
	0.2% Proof Stress	
	Young Modulus	
	Water	
2.14	Testing agency (Copy to be enclosed)	
	pH value =	
	Chloride content (mg/lit) =	
	Sulphate content (mg/lit) =	

	Inorganic Solids (mg/lit) =	
	Organic Solids (mg/lit) =	
	Suspended Solids (mg/lit) =	
	SGCI Inserts	
2.15	Name of Suppliers/ Whether supplier is borne on List of Approved vendors & the validity date of approval	
	Crosscheck Heat nos. with IC issued by Inspection authority (RITES)	
	BHN value =	
	Phosphorous content (%) =	
	Condition of storage in general	
	6 mm M S Bar	
	Conforming to IS: 226	
2.16	Nominal diameter	
	Breaking Load & Elongation	
	Yielding stress	
	Admixture	
2.17	Conforming to IS:	
	Properties	

MAINTENANCE OF RECORDS AND DOCUMENTATION :

Following records shall be maintained for scrutiny at future dates.

1.0 Inventory of Raw materials:

1.1 Aggregates:

- a) Coarse Aggregate (CA1) 20 to 10 mm
- b) Coarse Aggregate (CA2) 10 mm and down.
- Fine Aggregate (Sand)
 Details of Receipt, Source, Date of receipt, Truck Nos., Quantity, Balance, Remarks about quality and signature.

1.2 H.T.S. (IS: 6006) :

Date of Receipt, Truck No., Nos. of Coils, Serial No. of each coil, Source (Name of the firm), Details of test certificate, quantity, shift-wise consumption, balance and remarks whether test certificate is OK. Each lot shall bear a lot number and it should be mentioned in the production register to correlate, which HTS used in which sleeper.

1.3Special Cement (IRS:T-40):

Date of receipt, Source, quantity, Shift-wise consumption, balance, whether Test Certificate received, Details of Lab Tests done at site, Consistency, Initial & Final setting time, Fineness and 7 days mortar cube strength. Each lot shall bear a lot number and it should be mentioned in the production register to correlate which cement used in which sleeper.

1.4Inserts (IRS: T- 46):

Date of Receipt, Truck No., Quantity, Source (Name of manufacturer), Consumption, Balance etc shall be recorded. Each lot shall bear a lot number and it should be mentioned in the production register to correlate which insert used in which sleeper.

1.5 Admixture:

Date of receipt, Source & conformance to IS codes, approval by RDSO, quantity, Shift-wise consumption, balance, whether Test Certificate received shall be recorded. Each lot shall bear a lot number and it should be mentioned in the production register to correlate with production of PSC sleepers.

2.0 **Production Records:**

- **2.1Production Register:** Batch Nos., Nos. Cast in each shift, cumulative production, Bench Nos., Cubes and sleeper testing details, Summary of Rejected and Usable sleepers shall be recorded in the printed register Daily production register shall be maintained for each design of sleepers separately (As per format no. XIV).
- 2.2 Tension Register: (As per format no. XII).
- 2.3 Steam Curing Records: (As per format no. XIII).

3.0 Testing Records:

- a) Sieve analysis with combined granulometric analysis of aggregates. (As per format no. VI).
- b) Elongation and Flakiness indices test. (As per format no. VII).
- c) Moisture content and modified (adjusted) quantities. (As per format no. V).
- d) Records of Moulds and Benches and repairs.
- e) Details of Pressure Gauges, Proving Rings and calibration of Pressure gauges.
- f) Steam curing and Release cube testing.
- g) Dimensional checking. (As per format no. XV).
- h) Proforma for individual batch production records.
- i) Proforma for monthly progress Report.
- j) Standard deviation and characteristic strength of
 - i). Release cubes.
 - ii).15 days water cured cubes.
 - iii) Sleeper cracking loads / Rail Seat bottom and center top.
- k) Dispatch Register.

4.0 Statistical Analysis & Report to RDSO:

Statistical analysis along with calculations shall be submitted to RDSO every month in Format-XVII. The statistical analysis should be carried out for following parameters –

- i) Release cube strength
- ii) 15 days water cured cube strength
- iii) Flexural Beam strength
- iv) SBT results Similar analysis shall be carried out for each month and a consolidated report shall be submitted for a given financial year.

5.0. Calibration records:

The record shall be maintained as per Format-IX, X & XI for calibration of weigh batcher, Water meter, SBT machine, Concrete cube test machine, cement mortar cube testing machine, Beam testing machine and tensioning jacks. The schedule is given in Para 10.6 below.

6.0 CALIBRATION SCHEDULE:

Calibration of all the pressure gauges shall be done in the plant itself. Calibration of proving ring should be got done from a Govt. approved test house or a National Test House. The frequencies of all the pressure gauges and equipments are as follows:-

S. N.	Equipment	Frequency
1	15 cm concrete cube testing machine (2000 KN Capacity)	Once in 3 months
2	Cement mortar cube testing machine (500 KN Capacity)	Once in 6 months
3	Sleeper static Bend Test machine sleepers (1000 KN Capacity)	Once in 3 months or after testing 250 sleepers whichever is earlier.
4	Pre- tensioning Jacks (500 KN Capacity)	Once in a month or after casting 5000 sleepers, whichever is earlier.
5	Pre- tensioning Load cell	Once in a month or after casting 5000 sleepers, whichever is earlier.
6	Concrete beam testing machine (100 KN Capacity)	Once in 6 months
7	Aggregate weigh batcher	Once every week or after casting 2000 sleepers, whichever is earlier.
8	Cement Weighing Equipment	Once every week or after casting 2000 sleepers, whichever is earlier
9	Water Meter	Once every week or after casting 2000 sleepers, whichever is earlier
10	Master gauges for checking correctness of dimensions measuring gauges.	Once in 6 months

11	Dimension checking gauges.	Once every 15 days or after inspecting 5000 sleepers, whichever is earlier.
12	Proving Rings (All the Four- 2000 KN, 1000 KN, 500 KN, 100 KN)	Once in 18 months.
13	Weights & Measures	Once every year by weights & measures department.
14	Tachometer	Once a year

Note :-

- 1) The items referred at S. Nos. 1 to 6 above should be calibrated by proving ring the sleeper plant itself.
- The items referred at S. Nos. 7 & 8 should be calibrated by the dead weights and item at S. No. 9 by measuring cans that should be available in the plant.
- 3) The proving ring should be calibrated from a reputed organization like the IITs, NCCBM or NPL etc.
- 4) The record of calibration of the all the above equipments should be maintained in a manner that previous record can be easily connected.
- 5) The calibration can be done more frequently at the discretion of the inspecting Official.

This is to certify that the information given as above is correct and If the information is found to be false than firm will accept the action taken by KRIDE.

SIGNATURE OF PROPRIETER NAME

SEAL

FORMATS

This section contains different formats of recording results of various testing/measurements prescribed. The firm should have sufficient no of serially no Registers printed for each format at all times. The formats should only be filled up by the minimum authority mentioned in QAP. The relevant pages of registers pertaining to production of sleepers being inspected must be scrutinized and signed by KRIDE official responsible for inspecting the sleepers. In addition to following formats Registers required as per contract condition including Site order register, Officer's Inspection Register and Over Sight Inspection compliance Register should be promptly filled up and presented to KRIDE Officials during inspection.

FORMAT-I

Date

Consignment of Cement	=	
Room Temperature	=	0C
Weight of Sample taken	=	gms. Liquid falling time
of standard cement (Ts)	=	Seconds

Specific surface of the standard cement (Fs)=____cm² /gm

S. No.	Liquid falling time of sample cement	Average Time (T)	Remarks
1.			
2.			
3.			

Specific Surface of sample Cement (Fm)

=
$$Fs \sqrt{\frac{xcm^2}{T}} / gm$$

Τs

=____cm²/gm

□ Specific Surface =_____cm²/gm

 $> 3700 \text{ cm}^2 \text{ / gm. OK / } < 3700 \text{ cm}^2 \text{ / gm. NOT OK}$

Designation

Format -II

Date:	SPEC	NORM Norm	AL CONS E NT FOR [IS: 4031	ISTENCY INITIAL A (Part-III &	OF ND FINAL SE⁻ Part-IV)-198	FTING TIME 8]				
Consi	gnment of Ce	ement	:							
Room	n Temperatur	е	:			_oC				
Weigł	nt of Sample	taken	=			gms				
S N 0.	% of Water added	Volume of Water added in ml.	Time of adding water	Reading Time	Needle reading in mm from bottom of the mould	Normal consistency % (Minimum)	Remarks			
1.										
2.							Needle reading between 5 to 7 mm from bottom of the mould indicates			
3.							Consistency.			
4.										
⊡Norn	Image: Strain									

Quantity of water to be added for making paste of special cement for determination of initial and final setting time is 85 % of the normal consistency.

 \Box Quantity of water to be added = 85 % of _____ml = ____ml.

Signature of Railway Inspector Name Designation Signature of Lab In charge Name

Format -III

Date:

INITIAL AND FINAL SETTING OF SPECIAL CEMENT

[IS: 4031 (Part-V) -1999]



S. No.	Reading Time at	Reading of needle from bottom of the mould in mm	Spot of needle for final setting time	Remarks
1.				Initial Setting Time isminutes.
2.				> 60 minutes OK
				< 60 minutes NOT OK
3.				
4.				
5.				
6.				
7.				
8.				

0		Einal Satting Time
9.		is minutes
10		
10		< 600 minutes OK
11		> 600 minutes NOT OK
10		
12		
13		
11		
14		
15		
16		
10		
17		
18		
19		
20		

Initial Setting Time = ____minutes

Final Setting Time = ____minutes

Signature of Railway Inspector Name Designation Signature of Lab In charge Name

Date:

7 DAYS COMPRESSIVE STRENGTH OF

CEMENT MORTAR CUBES WITH STANDARD SAND

[IS: 4031(Part - VI) - 1999]

&

SOUND NESS OF CEMENT [IS: 4031-1968]

A: 7 Days Compressive Strength of Cement Mortar Cubes with Standard Cement

= (<u>P</u>+3) x 800

4 =_____ml

S.	Mortar c	ube	Mortar		Mortar		ube Mo		Load In KN	Strengt	Minimum	Remark
No.	casti	ng		cube		h in	Strength	5				
			te	esting		N/mm ²	in N/mm ²					
	Date	Time	Date	Time								
1												
2								< 37.5 N/mm ² NOT OK				
3								> 37.5				
4								N/mm ² OK.				

B: Soundness of cement

Expansion of Le Chatelier apparatus needles ------ (not more than 5 mm)

Signature of Railway Inspector Name Designation Signature of Lab In charge Name

MOISTURE ANALYSIS [IS: 383-1970]

Shift

S	Description	Units	CA1	CA2	FA	Remarks
INO.						
A.	Wt. of wet Sample	Gms.				
В.	Wt. of dried Sample	Gms.				
C.	Wt. of Moisture Sample (A - B)	%				
	Moisture					
D		%				
D.	= C x 100/B	/0				
E.	Absorption	%				
	Free Moisture					
F		%				
•••	= (D - E)	/0				
G.	Batch wt. (Dry)	Kgs.				
	Free Moisture					
H.	= G x F/100	Kgs.				
	Adjusted wt.					
	-	Kgs.				
	= (G + H)	5				
	Wt. Adopted	Kgs.				

W/C Ratio =

A/C Ratio =

If aggregates are wet, moisture content in coarse and fine aggregate is to be accounted for, so as to have total water as per approved mix design.

Signature of Railway Inspector Name Designation

Countersigned by AEN/XEN/CSP Name Designation Signature of Lab In charge Name COMBINED GRANULOMETRIC CURVE (M55/M60) [IS: 383-1970]

Date

Time

Next Due on

FORMAT -VI

	Wt. of CA1 (20 mm) = Wt. of CA2 (10 mm) =			Wt. of FA (Sand) =			Combined										
		gms.				gms				gr	ns.		Passing		ıg	Combir	Grading
Sieve Size	Wt. Retained grams	Cum. Wt. Retained	Cu m. % reta ined	Pas sing	Wt. Retaine d	Cum. Wt. Retain ed	Cum. % retaine d	Passi ng	Wt. Retained	Cum. Wt. Retain ed	Cum. % retained	% Passing	CA1 %	CA2 %	FA %	ed Passing %	Range
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
20 mm																	
10 mm																	
4.7 5 mm																	
2.3 6 mm																	
1.18 mm																	
600 mm																	
300 mm																	
150 mm																	
Signatu Name Designa	Signature of Railway Inspector Signature of Lab In charge Name Name Designation Name																
							Counte	rsigne	ed by AEI	N/XEN/	CSP						
	Name Designation																

Format –VII

A: DETERMINATION OF FLAKINESS INDEX [IS: 2386 (Part-I) – 1963) SAMPLE TAKEN : COARSE AGGREGATE

Retained on I.S. Sieve in (mm)	Weight of aggregate (consisting at least 200 Nos.) (gm)	Gauge Width (mm)	Weight of aggregate in each fraction in passing through thickness gauge (gm)	Remarks
1	2	3	4	5
20	W1=	13.50	w1=	
16	W2=	10.80	w2=	
12.5	W3=	8.55	w3=	
10	W4=	6.75	w4=	
6.3	W5=		w5	
	Total W=		w=	

Flakiness Index= w/Wx100=

x100=

%

As per IRS:T-39 the above result of flakiness index is less than 30%.

B: DETERMINATION OF ELONGATION INDEX

Retained on I.S. Sieve in (mm)	Weight of aggregate (consisting at least 200 Nos.) (gm)	Gauge length size (mm)	Weight of aggregate in each fraction retained on corresponding Gauge length (mm)	Remarks
1	2	3	4	5
20	W1=	40.50	w1=	
16	W2=	32.4	w2=	
12.5	W3=	25.6	w3=	
10	W4=	20.2	w4=	
6.3	W5=	14.7	w5	
	Total W=		w=	

Elongation Index= w/Wx100=

x100=

%

As per IRS:T-39 the above result of Elongation index is less than 30%.

Signature of Railway Inspector Name Designation

> Countersigned by AEN/XEN/CSP Name Designation

Signature of Lab In charge Name

FORMAT-VIII

A: DETERMINATION OF CRUSHING VALUE [IS :2386 (Part -IV) - 1963]

Aggregate crushing value = $(B/A) \times 100$

Where B= Weight of fraction passing appropriate sieve,

A= Weight of surface dry sample, when carried out as per provision of para : 2.4 IS 2386 (pt.IV)

Note:

1. For aggregates passing through 20mm sieve, 3.35mm sieve size for separating finer to be used.

2. For aggregates passing through 10mm sieve, 1.70mm sieve size for separating finer to be used.

B: DETERMINATION OF IMPACT VALUE [IS: 2386 (Part-IV) -1970]

Aggregate crushing value= (B/A) x100

Where, B= Weight of fraction passing 2.36mm IS sieve,

A= Weight of oven dry sample, when carried out as per provision of para: 4.4 IS:2386(Pt. IV)

C: DETERMINATION OF ABRASION VALUE [IS: 2386 (Part-IV) -1970]

Aggregate crushing value= (B/A) x100

Where, B= Weight of fraction passing 1.7mm IS sieve,

A= Weight of oven dry sample, when carried out as per provision of para: 5.2 of IS:2386(Pt. IV)

Signature of Railway Inspector Name Designation Signature of Lab In charge Name

PROFORMA FOR CALIBRATION OF MACHINES / EQUIPMENTS AT CONCRETE SLEEPER PLANT [IS: 516]

Calibration – I

Calibration of Weigh batcher by Standard Dead Weight

Date			Time		Next due on					
S.	Dead load		Observed	load	Average	Err or	% Variatio	Remarks		
No.	(Kg)	1	2	3	d load		n			
1	50									
2	100									
3	150									
4	200									
5	250									
6	300									
7	350									
8	400									
9	450									
10	500									

Signature of Railway Inspector Name Designation Signature of Quality control In charge Name

92

FORMAT - X

Calibration – II

Calibration of Water meter

Date		Time			Next Due on			
S.	Actual water content	Observed water content (in liters)			Average Observed water	Error	% Variation	Remarks
NO.	(in liters)	1	2	3	(in liters)			
1								
2								
3								
4								
5								
6								
7								
8								
9								
10								

Signature of Railway Inspector Name Designation

•

Signature of Quality control In charge Name

Calibration – III to VIII

Calibration of Static Bend Testing Machine, Concrete Cube Testing Machine, Tensioning Jacks and Cement Mortar Cube Testing Machine

PROVING RING NO	Date of Calibration	Valid
up to Calibration of M/c	Date & Time	Next

Due

Name of machine / equipment :												
S.	Proving Ring		0	bserv load	ed	Average observe	Err or	% Variation	Remarks			
No.	Deflection Reading		1	2	3	d load						
1												
2												
3												
4												
5												
6												
7												
8												
9												
10												

Signature of Railway Inspector Name Designation Signature of Quality control In charge Name

[IS: 6006 - 1983] For Stress Bench method

	Batch I	No. :		Shi	ft:					C	ate o	f Cast		No. of	Cast:		
S. N	Benc	Length of	Total cross	Young's Modulus	Initial Readin			Elor	ngatio	on in n	nm			Measure d	Pre- stressing	Total	
0.	h No.	Wire (section al area of HTS	of the Lot	g (KN)	Read	ding KN A) (r	at 2x2 N nm)	25	Final x 2	readii 43 KN (mm	ng at 2 N (B))	2	Elongation (B-A)	force based on measured	force= (P+50)KN	Rema rks
		mm	mm2	mm 2		Left	Side	Righ Side	nt e	Lef Side	t e	Righ Side	ht e	(mm)	from 50KN	than486 KN)	
						U		U		0	L	0			*P=E{(B- A)*a}/L		
															, ,		

*P=E{(B-A)*a}/L,

where P(KN), = pre stressing force (from 50KN to final pre stressing

value), (B-A)(mm),=measured elongation

a(mm2), = total cross sectional area of HTW wires

L (mm) = effective wire length (from wedge to wedge clear

length), E(KN/mm2)= Young's modulus (lot wise/IC wise)

Note: Breakage or slippage of HTS wire, if any shall be recorded.

Signature of Railway Inspector Name Designation Signature of Shift Production In charge Name

ion

TENSION REGISTER

Format –XII (B)

[IS: 6006 - 1983] For Long Line Method

								No	o. of Cast:
Lin HT Len	ngth Cross	Young's	Initial	Elongation	in mm	Measured	Pre-	Total	
e S o no. wire Wi no. (Be mi	of sectiona ire I area of ed) HTS im wire mm2	Modulus of the Lot KN/ mm2	Readin g (KN)	Reading at 3 KN (A) (mm)	Reading at 3 KN (A) (mm) (cm)		stressing force based on measured elongation *P=E{(B - A)*a}/L	prestres s force= (P+3)K N (Not less than27K N)	Remar ks
		Chiffe							

*P=E{(B-A)*a}/L, where, P= pre stressing force(KN), (B-A)=measured elongation (mm), a= total cross sectional area of HTW wires(mm2),

L= effective wire length for entire length of bed(from wedge to wedge clear length)(Meter.) E= Young's modulus (lot wise/IC wise) Note: Breakage or slippage of HTS wire, if any shall be recorded.

 Signature of Railway Inspector
 Signature of Shift Production

 In charge
 Name

 Name
 Name

 Designation
 Counter signed by AXEN/XEN/CSP

 Name
 Designation

STEAM CURING REGISTER

Format -XIII

xviii

Name of Plant:		Name of Boiler Attendant :						Batch No						
		S	hift: 1			Date:								
		S	hift: 2		_									
		S	hift: 3		_	Shift: Day / Night								
Chamber No.	1	2	3	4	5	6	7	8	9	10	11	12		
No. of Bench														
Last Bench Cast at														
Cube No.														
Time	Temper ature	Temper ature	Temper ature	Temper ature	Temper ature	Temper ature	Temper ature	Temper ature	Temper ature	Temper ature	Temper ature	Temper ature		
07.00														
07.30														
08.00														
08.30														
09.00														
09.30														
10.00														

10.30						
11.00						
11.30						
12.00						
12.30						
13.00						
13.30						
14.00						
14.30						
15.00						
15.30						
16.00						
16.30						

Signature of Railway Inspector Name Designation Signature of Shift Production In charge Name

Counter signed by AXEN/XEN/CSP

Name

Designation

Format-XIV

PRODUCTION REGISTER

On Date	
Monthly Production	
Cumulative	

Batch No. :

Date of Casting :

Shift :

Steam Chamb er No.	{1}	{2}	{3}	{4}	{5}	{6}	{7}	{8}	{9}	{1 0}
Bench No.										
Time										
of										
L.B.C										

RELEASE CUBE STRENGTH (STEAM CURED) to be tested by Lab in charge and Railway Supervisor.

Cube No.	Date of Testing	Time (in Hrs.)	Age (in rs.)	Weight (in Kgs)	Load (in KN)	N/mm 2	Remarks

WATER CUBE STRENGTH (WATER CURING)

Cube No.	Date of Testing	Time (in Hrs.)	Age (in day s)	Weight (in Kgs)	Load (in KN)	N/mm 2	Remarks

Beam	Date of	Age	Load	Strength	Remarks		
No.	Testing	(in days)	(in KN)	(in N/mm ²)			

STATIC BENDING TEST

Sleeper No.	Date of Testing	CE	ENTRE		MR		IF			
		Тор	Bottom	I	П	Ι	П	Remarks	Initial	
		(KN)	(KN)	(KN)	(KN)	(KN)	(KN)			

Cement	Source	IC NO	Week No
HTS	Source .	IC NO	Heat No/s
SGCI Insert	Source	IC NO	Heat No/s
HDPE Dowel	Source	IC NO	Batch No
Rejection Details of Sleepe	rs	IC No	Date of Issue

Total Rejected

No. of Sleepers passed as usables

Signature of Railway Inspector Name Designation

Signature of AXEN/XEN/CSP Name Designation Signature of Shift Production In charge Name

Signature of Quality Control In charge Designation

Format -XV

DIMENSION REGISTER

Date of Casting :_____

No. of Cast : _____

Offered for inspection : _____

Batch No. :_____

Nos. of useable sleepers :

Date for inspection : _____

Sleep er No.		Rail Seat			Тое	Gap			Height Gauge			Slope		Wind Gauge			
	Outer Gauge	Firm	Firm	RT	Firm	side	RT	side	Surface defects	Find	Rail	Contro	Firm	RT	Firm	RT	FTO
		side	side	Outer	Inner	Outer	Inner		End	Seat	Centre	side	Side	side	Side	FIC	ĸs
1A																	
1B																	
1C																	
1D																	
2A																	
2B																	
2C																	
2D																	
ЗA																	
3B																	
3C																	

Nos. of Rejected =_____, Nos. of Usable =_____, Nos. of MF tested =_____

Note: 1. It should be ensured that the rejected (Red Marked) and MF tested (Yellow Marked) sleepers should not be dispatched.

2. Manager/(Civil)/KRIDE to do Dimension check as and when possible.

Signature of Railway Inspector Name Designation

Signature of AXEN/XEN/CSPO Name Designation Signature of Shift Production In charge Name

Signature of Quality Control In charge Designation

SGCI Insert : DIMENSIONAL & WEIGHT CHECK LIST

Format -XVI

Description: SGCI insert to RDSO/T-381 Alt.8 & specification IRS/T-46 (1996)

SGCI Supplier:_____ RDSO Approval of supplier valid up to: ____

Gauge Employed: Gauge and fixtures conforming to RDSO/T-

454 Alt.9 IC no. and date (As issued by RITES/Inspecting

authority)

S. Heat No No.	Pattern No.	Jig			Length of head	Thickness of stem 20/25±2/1	Hole dia 22±1/0	Width of head 67±1/0.5	Top radius	Gating position	Square gauge	Wt in Kg. 1.55-	Soundness through hammer	
			G	G1	G2	73±1							3%	1031

No. of inserts Checked_____, No. of inserts passed_____,

No. of inserts rejected _____, Rejection Rate :

Note:

- 1. KRIDE Inspector will check 1% inserts on random basis.
- 2. Manager/(Civil)/KRIDE will check at least 20 inserts, once in 2 weeks on random basis. He will also ensure that tests prescribed for Rly Inspectors are being conducted.
- 3. Other Instructions contained in Board's letter no. 98/TK-II/22/11/17/Pt. Policy, dtd. 11.08.2003 are to be adhered to.

Signature of Railway Inspector Name Designation

Signature of Quality Control In charge Designation

Signature of AXEN/XEN/CSP Name Designation

Format -XVII

STATISTICAL ANALYSIS OF CONCRETE STRENGTH AND STATIC BENDING ON PSC SLEEPERS

i). Name of the Firm ______ Location of Plant ______Railway _____ ii). TYPE OF SLEEPERS (MBC, TURNOUT & OTHER) TO DRG. NO RDSO/ T - 2496 OR Drg. No.

iii). Mix design approved by RDSO Vide letter

iv). Compliance of last Over site inspection pending if any

v). Last inspection of KRIDE official on

No. of Range No. of observations No. of batches Charact Remarks Standard Batch No. Mean Cubes N/mm² Coefficient below the Deviation eristic ic From Value minimum of value N/ specified variation More То SD (N/mm^2) mm CV (%) values Double than 2 (N/mm²) Max Min) i.e. 55/ 60 Testing double (N/mm^2) testing Steam cube (Release strength) Water cube (15 days strength)

ii. FLEXURAL STRENGTH OF CONCRETE BEAM:

S. No.	Batch No.	Load (P) (KN)	Flexural strength (N/ mm ²)

i. CUBE STRENGTH :

Format – XVII Contd..

iii. STATIC BEND RESULTS UPTO CRACKING LOAD OF MBC, TURNOUT, OTHER SLEEPER.:

Description	Batch No.	No. of sleepers tested	Range (KN)	Mean value (KN)	Standard Deviation (KN)	Characteristic Strength (KN)	Coefficient of variation %	No. of observations below the min. specified values	No. of sleepers & No. of batches		Up to date No. of sleepers	
			Min	Max					Sleeper	Batch	Sleeper	Batch
Center top												
Rail Seat Bottom												
iv.CONCRETE MIX DESIGN USED DURING THE PERIOD: FROMTo												
1.	A/	C Ratio			_2. W/C	ratio II	3	. Mix Proportio	n CA- <u>I</u>		% (CA-
		%, FA		%								
	v.SOU	RCE OF	CEME	NT USE	ED DURI	NG THE PEI	RIOD:					
vI.MEASURES TAKEN TO IMPROVE UPON THE DEFICIENCIES OBSERVED IN ABOVE TEST:												
Note:	Note: 1 Separate analysis shall be submitted for MBC. Turnout and other sleepers											

2. The analysis should be for one calendar month.

3. Indicate change of source of raw materials, water etc, if any furnish a photocopy of their test report (s)

Signature of Railway Inspector Name Designation Signature of Quality Control In charge Designation

Signature of AXEN/XEN/CSP Name Designation Counter Signature of Dy.CE/CSP/HQ Name

Format -XVIII

YEARLY STATISTICAL ANALYSIS OF CONCRETE STRENGTH AND STATIC BENDING STRENGTH OF PSC SLEEPERS

SLEEPERS FOR THE PERIOD: FROM_____TO ____

- Name of The Firm : _____ a)
- Location of Plant : b)
- Railway : C)
- Type of Sleepers (MBC, Turnout & Other) To Drg. No RDSO/T -2496 or Drg. No. d)

	C	Concrete St	rength Wat	s	BT(Rail S		MF						
Month	Nos. of cubes	Max	Min	cs	сv	Мах	Min	cs	сv	Мах	Min	CS	сv
April													
Мау													
June													
July													
Aug													
Sep													
Oct													
Nov													
Dec													
Jan													
Feb													
Mar													

Signature of Railway Inspector Name Designation

Signature of AXEN/XEN/CSP Name Designation

Signature of Quality Control In charge Designation

Counter Signature of Dy.CE/CSP/HQ Name
Format -XIX

HTS Inspection Summary

Source:

IC No.

Date of supply:

BIS approval validity:

SI. No.	Description	
1	Lay length	
2	Weight/meter	
3	Breaking load	
4	% elongation	
5	0.2% proof stress	
6	Sulphur & phosphorus content	
7	Coil dia	
8	Packing condition	
9	Sealing of coils	
10.	Any sign of rusting of HTS wires	

Note

1. Item 1-5 are to be recorded from the Tests conducted at HTS factory and recorded in Original IC.

- 2. Item 6 is to be recorded from the Manufacturer's test certificate.
- 3. Item 7-10 are to be tested at CSP.

Signature of Railway Inspector Name Designation Signature of Quality Control In charge Designation

Signature of AXEN/XEN/CSP Name Designation

	Mix Design parameters :						
1	→ Mix Design	M-55	M-60				
	RDSO Authority of approval						
	Date of approval						
	Cement	Kg	Kg				
	Coarse aggregates, CA1	Kg	Kg				
	Coarse aggregates, CA2	Kg	Kg				
	Fine aggregates	Kg	Kg				
	Water	Liters	Liters				
	A/C Ratio						
	W/C Ratio						
	Sand : CA1 : CA2 ratio						

11.0 Granulometric limits for combined aggregates: To be prepared for each Design mix separately as below:

<u>Sieve Size</u>	<u>%Limits (lower – higher)</u>	<u>Limits %</u> passing.
20 mm		
10 mm		
4.75 mm		
2.36 mm		
1.18 mm		
0.60 mm		
0.30 mm		
0.15 mm		



12.0 Steam Curing Cycle: The steam curing cycle for winter season and summer seasons, if varies may be given separately. The following cycle is approved as follows:

- 1. Pre steaming = hrs. [> IST of cement]
- 2. Rise in temperature = hrs.
- 3. Constant Temp. = hrs.
- 4. Cooling time = hrs. -----Total = hrs.

13.0 Submerged water curing: days.14 / 21 days compressive strength on the basis of 40 nos. of submerged water cubes & 40 nos. of steam cured cube analysis is found N/mm² and N/mm² respectively.

14.0 Statistical Analysis of Steam cured and water cured cubes: following details shall be submitted

S. No.	R	Μ	SD	CS	CV	Remarks
1	Steam cured cubes					
2	Submerged water cured cubes					

Statistical analysis is done to assess the variation in test results. This analysis contains standard deviation, range of maximum & minimum, coefficient of variation (Cv). By knowing the standard deviation, one can obtain characteristic value of corresponding item. Statistical analysis brings out overall health of the concrete sleeper plants. If the testing for working out statistical analysis is not done correctly the basic purpose of doing this whole exercise would be defeated. Formulae are given below to calculate the mean value, standard deviation & coefficient of variation.

SAMPLE CALCULATION OF STATISTICAL ANALYSIS

6	Compressive	Fre	quency				
S. No.	Strength (x) in N/mm ²		(f)	F*x	ABS(X- Xmean)	f * ABS(x- xmean) ²	Remarks
1	52.00	1	I	52.00	5.82	33.87	
2	53.33	2	11	106.66	4.49	40.32	 Nos. of observations, N = 40 nos.
3	55.56	2	II	111.12	2.26	10.22	2) Mean, Xmean = f*x / N = 2312.91 / 40 = 57.82 N/mm ²
4	56.00	3		168.00	1.82	9.94	3) Standard DeviationSD = SQRT{f * ABS(x-xmean) ² /N} =1.9598
5	56.89	2	11	113.78	0.93	1.73	
6	57.33	5		286.65	0.49	1.20	4) Characteristic Strength, CS Fck = (Xmean – 1.96 * SD)
7	57.78	6	11111	346.68	0.04	0.00	5) Coefficient of Variation, Cv = (SD x 100) / Xmean
8	58.22	2	II	116.44	0.40	0.32	6) Range = 8.44 N/mm ² (from 52.00 to 60.44)
9	58.67	6	11111	352.02	0.85	4.34	
10	59.56	4	1111	238.24	1.74	12.11	
11	60.00	4	1111	140.00	2.18	19.00	
12	60.44	3	111	181.32	2.62	20.59	
13							
14							
15							
16							
17							
18							
19							
20							
21							

22				
23				
24				-
25				
				-
	Total		153.64	

Signature of Railway Inspector Name Designation Signature of Quality Control In charge Designation

Signature of AXEN/XEN/CSP Name Designation

ANNEXURE-IV

ANNEXURE-IV OF TENDER DOCUMENT

INDEMNITY BOND

Managing Director Rail Infrastructure Development Company (Karnataka) Limited

THIS INDENTURE made on this day______by M/s. (Duly registered under the Indian Co. Act. 1956) and having its registered office at_____

hereinafter called the contractor (which expression shall include its successors) in favour of the Rail Infrastructure Development Company (Karnataka) Limited ,Bangalore hereinafter called the Purchaser (which expression shall include his successors and assignees).

WHERE AS under the formal order/contract specified in schedule, I/We have agreed to supply mono block concrete sleepers to the KRIDE (hereinafter called the Purchaser) at the time and place and in the manner detailed there in.

WHERE AS purchaser agreed to accommodate the contractor in case in which the purchaser thinks fit by making 90% payment of value of Mono block PSC Concrete Sleepers which have been inspected and passed by the Purchaser or his nominee.

In consideration of such payment I/We am/are hereby is/are expressly prepared to accept certain liabilities as herein after set out but such liabilities shall not affect the passing of the sleepers concerned to the purchaser.

NOW, I/We hereby agree, declare and undertake as follows:

(i) I/We shall remain absolutely responsible for the safe custody and protection of sleepers, which were inspected and passed by the Railway Authority by IC No.

dated_____, but could not be dispatched due to non-availability of wagons against all risk whatsoever, till those are dispatched under the above mentioned contract and duly delivered. The President of India, however, shall be kept indemnified against any losses and/or damage to the said sleepers. The said sleepers shall however, be at all-time open to the inspection by officer who may be authorized on behalf, by the purchaser or his nominee.

(ii) Details of quantity which will be loaded in my/our siding as per challan will be submitted by me/us to the consignee direct and if any discrepancy is noticed on receipt of Mono block Concrete Sleepers at the destination, the cost of quantity in deficit will be realized from my/our 10% bills. (iii) The said number of sleepers shall be loaded and dispatched correctly as per the inspection note and that no broken or un-passed sleepers, not conforming to the specification/drawings mentioned in the formal contract shall be dispatched and then in such case we shall be liable for the entire loss or damage that purchaser may sustain due to the dispatch of such broken/un-passed sleepers and I/We undertake to indemnify the purchaser against all such loss and damage and shall replace at my/our cost any of such broken/un-passed sleepers as may be dispatched by us aforesaid.

(iv) In the event of any loss or damage as aforesaid the assessment of such loss or damage and assessment of the compensation therefore would be made by the KRIDE or his authorized nominee from our 10% bills and the said assessment shall be final and binding upon us.

(v)Provided always that notwithstanding anything contained in the formal, order/contract, the Managing Director/KRIDE will be fully entitled to realize all dues against me/ us under orders/contracts specified in the schedule or other contracts between myself/ourselves and the Managing Director/KRIDE without prejudice due by any other lawful means.

THE SECHEDULE

KRIDE acceptance letter No.	(dated	_ and
	KRIDE contract	Agreement No	
dated	_for manufacture and supply of N	Iono block PSC Concrete Slee	pers.
Witness:		*Signature of the C	ontractor
/supplier:			
		Address:	
		Dated:	
Name:			
Address:			
Dated:			

ANNEXURE -V

ANNEXURE -V OF TENDER DOCUMENT

INDEMNITY BOND

2. ------WHEREAS – The Contractor has agreed with the purchaser to manufacture and supply PSC WIDE Base Line Sleepers to the KRIDE Administration in pursuant to and in terms of a contract evidenced by the KRIDE and the instructions of the Managing Director ,KRIDE acting through General Manager of KRIDE.

3. AND WHEREAS pursuant to the said contract, the contractor(s) commenced dispatches of sleepers on _______and completed dispatches by ______

4. AND WHEREAS under <u>clause 15.3</u> of the said contract for the supply of PSC Wide Base Line Sleepers payment for the delivery of stores was/is to be made as follows:

Balance 10% of the price of each consignment will be paid on proof of dispatch and on submission of a Bond for 25% of the value of Stores supplied covering the warranty period as per warranty clause. Consigner's certificate shall be enclosed with 10% bills. In case 90% payment as laid down in <u>clause</u> **15.2** above is not sought, 100% of price of each consignment will be paid on proof of dispatch of Stores and on submission of Indemnity Bond.

5. AND WHEREAS 90% payment in respect of the Stores inspected has already been paid by the KRIDE to the contractor, vide Cheque No.______dated______Rs.____.

 the 10% (i.e. balance amount) of the value in respect of stores dispatched by him through Railway Wagon No. ------ booking under RR No. ------ to the consignee thereof namely the _____.

7. AND WHEREAS the Purchaser has agreed to pay the amount of Rs _____(in words) ______being the 10%/100% of the said bill No.------ upon the Contractor subject to execute an indemnity bond in the manner hereafter provided in the **para 15.3** of the contract.

8. NOW THEREFORE through this indenture, the Contractor hereby covenants with the Purchaser that the Contractor shall at all times hereinafter well and sufficiently indemnify and keep indemnified the Purchaser, his successors and assignee for an amount -----------(25% of the value of stores supplied) from and against such damages, loss and costs, charges and expenses, whatsoever that may be caused and incurred by the said KRIDE on account of the short or non-receipt of the said stores said to have been dispatched by the said wagon No. ----------- to the said Consignee or on account of the said goods if delivered in whole or in part not being according to the specification and requirements of the said contract and in the event of such short or non-delivery or delivery of the goods in whole or in the part being not in accordance with the specifications and requirements of the contract, the Contractor shall pay to the purchaser on intimation to the amount as may be equal to the price of the said goods so short received or not being according to the specifications or requirements as aforesaid and also all other loss that the Purchaser may incur or suffer on account thereof the decision of KRIDE as to the exact amount of such loss including the price of the goods short delivered or of the goods but not in accordance with the specifications or requirements of the said contract as aforesaid being final and binding on the Contractor together with all costs, charges and expenses that the Purchaser may incur for the recovery of the said amount and loss.

AND IT IS HEREBY guaranteed by the contractor that PSC Sleepers which the contractor has supplied have been manufactured fully in accordance with the specifications and its design shall strictly follow the "as made" detailed drawing with such specifications as are notified in respect of each type. The contractor further guarantees that the PSC Sleeper shall befree from defects in material and workmanship. The contractor shall be liable to arrange the necessary replacements of the defective sleepers free of any charge only to the extent that such replacements are attributable to or arise from faulty workmanship or material or design in the manufacture of the sleepers. All replacements shall be made free of cost at destination. If the contractor so desires, the replaced sleepers can be taken over by him for disposal as he deems fit, within a period of three months from the date of receipt of the replacement of defective sleepers by the purchaser. At the expiry of this period, no claim in this respect shall lie on the purchaser.

IT IS AGREED that any approval or acceptance by the purchaser of the sleepers or of the materials incorporated therein shall not in any way limit the contractor's liability hereunder. The decision of the purchaser in regard to contractor's liability under this guarantee shall be final and conclusive. All replacements that the purchaser shall call upon the contractor to deliver under this guarantee shall be delivered by the contractor within three months from the date of intimation of such rejection of defective sleepers. If the contractor fails to replace the defective sleepers within the said period, the

cost of the said sleepers at the rate stipulated in the contract shall be recovered from the payments due to the contractor.

WHEREAS IT IS AGREED that the guarantee herein contains shall expire in respect of each sleeper on the expiry of 5 years from the date of the delivery or 3 years from the date of its placing in service whichever is earlier except in respect of defects notified to the contractor prior to the expiry of such date.

9. AND IT IS HEREBY agreed between the parties hereto that the Purchaser shall be entitled to recover or adjust the cost of such replacements as aforesaid or the guaranteed amount ------ (25% of the price of stores supplied) whichever is less out of or from the moneys, if any, payable to the Contractor in respect of the said Contract or any other contracts subsisting between the Contractor and the purchaser.

10. IN WITNESS WHEREOF the contractor has put his seal on ------

IS HEREINTO affixed pursuant to a resolution, dated passed by the Board of Directors of the said Company in the presence of:

1. Shri	
---------	--

2. Shri _____

Signature of the Contractor Firm's Name: M/s.

Witness: 1)

(Stamp)

2)

General Manager/(Civil)KRIDE

----- KRIDE

Annexure- VII

Annexure- VII OF TENDER DOCUMENT

Tenderer's Address and Communication Details

1.	Name of the Firm/Company:	-
2.	Registered Address:	
3.	Address of Plant (CSP): (if tenderer is quoting for more than one plant, address of all plants to be given separately duly mentioning their tender id)	:0
(i)	Fender id :	_
	Plant Address :	
	(Similarly for other plants)	
(ii)	Fender id	
	Plant Address	
4.	Complete Postal Address for Communication:	
	Fax NoTelephone No	_
	E-mail Id :	
5.	Name of Contact Person/Incharge of work:	_
	Address:	-
	Phone No	-
	AX No	_

(Signature of the Tenderer)

Name: Address:

Annexure- VIII

/Projects/63/2020 dat	ed. 11.11.2020.
	/Projects/63/2020 date

Description of Item	Qua Tendered	ntity Offered Qty by the Tenderer	Monthly Delivery Schedule from the date of issue of LOA
1	2	3	4
Manufacture and Supply of Mono- Block pre-stressed wide based concrete Line Sleeper for RDSO Drg.No. T-8527.	1,10,150 Nos	Nos	1 st month Nos 2 nd month Nos 3 rd month Nos 4 th month Nos 5 th month Nos 6 th month Nos 7th month Nos 8 th month Nos 8 th month Nos 9 th month Nos 10 th month Nos 10 th month Nos 11 th month Nos

Description of Item	Basic rate	Freight	GST	All in cost
Manufacture and Supply of Mono- Block pre-stressed				In Words
wide based concrete Line Sleeper for RDSO Drg.No. T- 8527 .				In Fig

1)	Delivery Period	Eleven Months from the date of issue of Purchase Order.
2)	Price Variation Clause	As per the tender schedule