

## **Master Document for Special conditons in Bridge Works**

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**SPECIAL CONDITIONS FOR REBUILDING OF BRIDGES, CONSTRUCTION OF RUBs BY OPEN CUT METHOD, AND BRIDGE REPAIRS WORKS.**

- 1.1 When it is required to operate machinery as per IRUSSOR or any other Plant in the Rly. Land, the contractor must take prior written permission from the Engineering Official concerned.
- 1.2 All the required RCC boxes should be cast either at bridge site or at suitable location as directed by Engineer-In-Charge and be shifted to the predetermined location at least one day in advance of the block. No separate payment will be made for transportation/shifting of RCC boxes/slabs to the Bridge/RUB location.
- 1.3 Casting of RCC boxes should be so planned that the RCC boxes can be lifted and transported to the predetermined location by contractor's cranes/ trailer without infringing the assembled track, released materials etc.

**2.0 Modus operandi for rebuilding of bridges, new RUBs by open cut method Pre-block activities:**

- 2.1 The existing rails in track should be suitably cut and fish plated under traffic condition so that, during the block, track can be lifted with contractor's cranes and kept aside in one attempt to avoid time loss. Crib and shoulder ballast should be removed from track and filled in bags for using them during block.
- 2.2 All Cranes, equipment's, Breakers mentioned in corresponding item should be in good working condition along with spare operators, technician/mechanic, crane supervisor etc.

**During-block activities:**

- 2.3 Fish plates should be removed and secured at nominated locations.
- 2.4 Remove the isolated track panel, steel girders if any and stack them at nominated location.
- 2.5 Remove the ballast by Hitachi, up to the formation level and stack it at nominated location. Mild blasting of stone/concrete masonry should be done, if required, using the predrilled charged holes (necessary protection covering an area up to 50 sq.m with contractors planks etc should be arranged to avoid probable splashing of the splinters/broken pieces).
- 2.6 Remove the existing RCC pipe/slab/STC/masonry debris with the help of Hitachi up to the required level/depth. Keep debris away from the working area and bridge vent way. Provide the soling stone to the required level, if required as per drawing.
- 2.7 Place the precast RCC base slabs.
- 2.8 Using cranes, place the precast RCC boxes over precast RCC base slabs.
- 2.9 Fill the space between the RCC boxes and the formation with soil and

ram it. Then dump ballast uniformly on the box top, place the released track panel, do kutchha packing to rectify cross levels/alignment.

### **3.0 Concrete / Masonry works:**

- 3.1 Cement:** The cement should conform to I.S. specification 12269 for 53 Grade & to IS 8112 in case of 43 grade. Before executing the work, the agency should submit a test certificate for Standard Properties as well as indicating the source of supply and brand of the cement. Contractor shall use only approved brands as per hq lr No.SCR-HQOENGG(SORy1r2O2o-Dy.CE,t ORKS/SC, 24.05.2022 (copy enclosed ). PPC should not be used.
- 3.2 Reinforcement Steel:** The reinforcement steel to be used shall be of grade Fe-500D or more of approved brands/makes. The agency shall produce necessary vouchers in original in support of the purchase of steel and cement from the suppliers along with certificates to relevant standards from the manufacturers before the commencement of work. The contractor is required to safe guard the steel brought to site and to use the same on the work in accordance with actual requirement as indicated in the relevant Drawings or specifications.
- 3.3** Water to be used should be IRUSSR & DSR -2021 (works & Materials). Water shall be got tested by the contractor at his own cost to ensure its suitability. Approval of Engineer in charge shall be obtained on the report before commencing the work. Approved test report should be kept at site office. The contractor should keep all relevant records required like cement test report, steel test report, cube test report etc., in the site office.
- 3.4** The shuttering should be IRUSSR & DSR -2021 (works & Materials).
- 3.5** Execution of all concrete works, supply of cement and steel, all ingredients of concrete shall be as per relevant specifications of Indian Railways Unified Standard Specifications (works & materials) – 2021. Before starting the work the agency shall indicate & get approval for the source of supply of materials viz. coarse aggregate, fine aggregate. The agency shall submit samples of coarse/fine aggregate along with necessary cement required for mix design. The agency shall arrange for mix design as per the requirement of Railways, at their own cost including movement of materials to approved laboratory, as approved by Engineer-in-charge. The design shall be further checked by trial mixes at site as per relevant specifications. If the results of test cubes does not confirm to the required standard, Railways shall ask the contractor to get the mix designed again. During the course of the work, samples of concrete will be taken and tested at regular intervals from representative portions of the works. All costs of such testing shall be borne by the contractor.

- 3.6 The work locations in this agreement come under 'moderate' environment condition. The following are the extracts of IRS concrete bridge code 2014.

TABLE (a) Maximum water cement ratio:

Environment	Plain concrete(PCC)	Reinforced concrete(RCC)
Moderate	0.50	0.45
Severe	0.45	0.40
Extreme	0.40	0.35

TABLE (b) Minimum grade of concrete

Environment	Plain concrete(PCC)	Reinforced concrete(RCC)
Moderate	M-15	M-20
Severe	M-20	M-25
Extreme	M-25	M-30

TABLE ( c ) Minimum cementations material content

Environment	Plain concrete(PCC)	Reinforced concrete(RCC)
Moderate	240	300
Severe	250	350
Extreme	300	400

Max cementitious material content shall be limited to 500kg/cum.

*Note: For Underwater Concrete 10% extra cement should be added over and above the normal cement content of the concrete mix specified above.*

- 3.7 **Laboratory at site:** Site laboratory Establishment by contractor should be as per Hqs letter No W.496/Policy/Vol.IX Dated 28.12.2021 (copy enclosed)

Category	Value of work	Penalty per month in Rs
A	Works costing upto Rs 2.0 Crs	No penalty
B	Works costing above Rs 2.0 Crs and upto 5.0 Crs	25,000/-
c	Works costing above Rs 5.0 Crs	50,000/-

**Works costing above Rs 2.0 Crs and upto 5.0 Crs**

Sl.No	Details	Nos
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1	Full set of IS sieves for testing of materials for Coarse aggregate, Fine aggregate, soil and Blanket Materials as per IS code and as per RDSO guidelines with sieve shaker and brushes	1 Nos
2	Balance	
	a. Pan balance-10kg capacity (with 1.0gm least count)	1 Nos
	b. Electronic/Digital balance 10 kg capacity (with 1.0gm least count)	1 Nos
3	Concrete cube testing machine -200Tonne capacity	1 Nos
4	Slump testing apparatus with tamping rod	2 Nos
5	Concrete cube moulds 150X 150X150mm	12 Nos
6	Leveling instrument with tripod & 2 Nos. of 4m high leveling staff	1 Nos
7	Weigh batch mixing unit	1 Nos
8	Screw gauge, Vernier caliper, Spirit level, Measuring tapes, etc	1 Nos

#### Works costing above Rs 5.0 Crs

Sl.No	Details	Nos
1	Full set of IS sieves for testing of materials for Coarse aggregate, Fine aggregate, soil and Blanket Materials as per IS code and as per RDSO guidelines with sieve shaker and brushes	1 Nos
2	Balance	
	a. Pan balance-10kg capacity (with 1.0gm least count)	1 Nos
	b. Electronic/Digital balance 10 kg capacity (with 1.0gm least count)	1 Nos
3	Concrete cube testing machine -200Tonne capacity	1 Nos
4	Slump testing apparatus with tamping rod	2 Nos
5	Concrete cube moulds 150X 150X150mm	12 Nos
6	Leveling instrument with tripod & 2 Nos. of 6m high leveling staff	1 Nos
7	Set of Soil testing equipment's as per IS codes	1 Nos
8	Set of Cement testing equipment's as per IS codes	1 Nos
9	Weigh batch mixing unit	1 Nos
10	Screw gauge, Vernier caliper, Spirit level, Measuring tapes, etc	1 Nos
11	Rebound hammer apparatus	1 Nos
12	Digital Camera	1 Nos

#### **4.0 Supply of materials by Railways:**

- 4.1 RH Girders, CC Cribs of size 600 x 600 x 1800mm will be supplied by the railways. Transportation of RH girder to the site will be paid separately under relevant item.
- 4.2 The contractor has to make his own arrangements for making staging arrangements as required. In case the Railway materials are available and can be spared, the Railways may supply the following materials on hire charges subject to availability as per rules in force, on request. The Railway materials shall be supplied at nearest Stores depot or any depot within S.C. Railway and the tenderers/contractors shall transport these materials at their cost to the site of work and they shall be returned back to the same depot or as advised by the Engineer-in-charge after completion of work. The discretion of Railway with regard to sparing of Railway materials on hire charges is final and the contractor shall have no further claim on this account. The contractor has to make his own arrangements for any other materials required other than those supplied by Railway on hire charges.
- 4.3 **The hire charges are as follows or as per revised rates:**

<b>Description of material</b>		<b>Hire charges per day</b>
i)	Steel cribs of size 2'x2'x6'	-- Rs. 5.55 per day per each crib
ii)	Second hand rails, RSJs etc.	-- Rs.16.00 per day per MT
iii)	Dip lorries 15 MT capacity	-- Rs. 40.00 per day per each
iv)	Wooden sleepers	-- Rs.0.57 Ps. per day per each

- 4.4 The hire charges will be levied for the period from the day of issue of Railway material to the handing over date of material at the Depot (both days inclusive).
- 4.5 Materials issued by the Railway shall be used solely and economically for the purpose of the work covered by this contract. Loss or damage of such materials in any manner shall be totally avoided. If any loss or damage is caused to the Railway materials, Recovery will be made as per extant rules in force.
- 4.6 It shall be the responsibility of the contractor to keep Railway materials, plant or equipment issued for the work in safe custody. The contractor shall at his own expenses provide suitable temporary shed/sheds for this purpose on the Railway land made available by the Railway free of rent and shall remove the shed/sheds when no longer required, in terms of Clause 30 of General Conditions of Contract.
- 4.7 If due to any reason the Railway is not in a position to make available the Railway land, the Railway Engineer-in-charge of the work may permit the contractor to erect at his own cost shed/sheds or secure private accommodation outside the Railway premises. In

such a case, the contractor may be permitted to take the Railway materials required for the work outside the Railway premises and to store them in the shed erected on private accommodation so secured. It shall be the responsibility of the contractor to keep the Railway materials in safe custody. The railway material should be kept entirely separate from the contractor's materials. The Railway shall have liberty to inspect the same from time to time.

**5.0 Service roads:**

- 5.1 The contractor will be permitted to make use of existing service roads, if any, free of cost. New service roads required by the contractor in connection with the work either near the work site elsewhere whether within or outside Railway limits for carriage of materials or for any other purpose whatsoever will have to be constructed and maintained by the contractor at his cost. For the purpose of construction of Service Roads on Railway land, permission will be given to the contractor by Railways.
- 5.2 If any land other than Railway land is necessary to be acquired or to be entered upon for the purpose such land acquisition or permission to enter upon the land have to be arranged for by the contractor at his cost. The contractor will, however, indemnify the Railway against all claims for all damages whatsoever in this account. Railway however reserves the right to make use of such service roads without any charges.

**6.0 Jungle clearance:**

- 6.1 Before the work is started the contractor shall clear the area of construction of all trees, grass, shrub, bushes etc., No extra payment will be made for the clearance of jungle shrubs, bushes, trees etc., The rates quoted for excavation are deemed to include the charges for the clearance of jungle, shrubs, trees etc.,

**7.0 Stage payment:**

- 7.1 After RCC boxes are cast, 70% of the cost of RCC boxes (i.e. relevant USSR items of Steel, Concrete, cement) will be paid. Remaining 30% will be paid upon launching the boxes.

**8.0 Arrangement of traffic block & penalty clause:**

- 8.1 Information regarding the line block will be given to contractor three days in advance. Contractor should bring all the required machinery, in good working condition, to the site at least one day in advance of the block. Spare operator, technician/mechanic with spare parts should be available at site. Due to exigencies of traffic, if the programmed blocks are not granted, no compensation of any kind will be paid to the contractor
- 8.2 The work--removal of existing slab/masonry/earth work, placing

boxes, back filling, filling up ballast, assembling and linking track, through packing—should be completed within the permitted block period, failing which liquidated damages will be recovered @ Rs.500/- (rupees five hundred) per minute of block burst from on-account bills. The reason for bursting the block will be decided by an enquiry committee consisting of railway SSEs and contractor/his representative. Findings of the enquiry committee will be final and binding on the contractor.

- 8.3 The following machinery shall be arranged by the contractor in advance (at least 1 day in advance) as per directions of Engineer-In-Charge at bridge site.

Gas cutting equipment along with gas cylinder, gas cutter etc	2 sets
Bernco jacks of 15MT capacity along with operators	2nos
Crow bars, beaters, shovel, mortar pans etc	30each
Masons along with Khalasis and required equipment must be available for preparing PCC bed without any delay for levelling	6sets
Men mazdoor along with necessary tools for slewing the track as necessary	30men
Blacksmith with 2khalasis for removal of fish plates/bolts etc, for linking track	2sets

NOTE: Above list is indicative only. The contractor should ensure adequate manpower, tools, and machinery to complete the work within the allotted time.



## SPECIAL CONDITIONS FOR BOX PUSHING METHOD

### 1.0 SITE

#### GENERAL FEATURES:

2.1 The Tender is for construction of a RCC box by box pushing method and the following works would form part of this contract as per the approved General arrangement drawings.

- a. Procurement/Fabrication of necessary plant and equipment like jacking line jacks, hydraulic pumps and other plant and equipment required for execution of this work.
- b. Casting of thrust bed and RCC box and box pushing including shoring or any other arrangement required to protect the earth slopes from sides or Railway embankment to the satisfaction of Engineer in charge and disposal of the excavated earth in the nearby available Railway land within maximum lead of 1 KM. The disposable earth will be utilized to improve cess work, widen the Railway embankment or to develop the circulating area.
- c. Necessary provision of opening in the roof of boxes for bentonite pumping if required and pushing of boxes.
- d. Manufacturing and fabrication of the front end frame/cutting shield and intermediate jacking stations.
- e. Pre-casting and curing of RCC box units including fixing of front end frame/cutting Shield, fixing of drag sheet with all fabrication (cutting shield and drag sheet will remain as the property of contractor after completion of the work).
- f. Jacking of pre-cast boxes to form the opening under running Railway traffic conditions. The maximum allowable deviation of the pre-cast boxes at any time from the theoretical alignment will be limited to 100 mm horizontal and 50 mm in vertical direction. Box pushing work shall be done in the presence of Railway's P. Way supervisor not below the rank of P. Way Mistry. The contractor will further ensure such rate of box pushing as that will not disturb the Railway tracks above and will be personally responsible for the safety of Railway traffic. Maintenance of track to the required geometry will be the responsibility of the contractor and the contractor is required to ensure this with labour trained in attending p-way with all tools and plant under the supervision of Railway supervisor.
- g. Grouting of gaps with epoxy having adequate structural strength at intermediate Jacking stations after completion of pushing so that no leakage occur from the joints at intermediate jacking station during the service of the bridge.
- h. Providing 150mm thick M 25 C.C wearing coat on the floor of the box with design camber. Providing longitudinal drainage arrangements within the RCC boxes with minimum 100 mm depth and 200 mm wide drains with provision of catch water drains at the approaches to the boxes, with the arrangement to be approved by the Railway.
- i. Necessary provision of OHE/Portal/Signal foundation as directed by the Engineer-in-charge on RCC boxes shall be provided, if necessary, as per site conditions.
- j. Drag sheet shall be provided by the Contractor to minimize drag and disturbance of the soil cushion on the boxes during box pushing operations. Maximum number of drag sheets as directed by Engineer-in charge shall be Provided based on structural safety of

box during pushing and all arrangements required in connection with drag sheet shall be provided free of cost and nothing extra will be paid. Drag sheet will remain as the property of the agency after completion of work.

- k During the execution of work if any sub-soil water is met with, the contractor will make their own arrangements to bail out/pump out such water from the site, free of cost. Any unforeseen accumulated rainwater, during the progress of work, shall be bailed out/pumped out by the contractor free of cost and the rates quoted should include all these elements.
- l This is an important project which shall be completed well within the stipulated period as mentioned in tender booklet as it is related to safety ..

#### **SPECIAL CONDITIONS AND SPECIFICATIONS OF CONTRACT:**

NOTE: These special conditions supplement the condition of Tender and contracts, General conditions of contract and notes appearing under the relevant chapters and sub-chapters of the Standard Schedule of Rates of S.C.Railway & DSR 2021 and should be considered as part of the Tender papers wherever the provisions of the special conditions are at variance with the General Conditions of the contract and other documents mentioned above these special conditions shall prevail.

- 3.0 The scope of work covered by this Tender is defined in Para 2.0 of General features under particulars of work.

#### **4.0 CODE AND SPECIFICATIONS:**

- 4.1 The Design and Construction of the superstructures shall be carried out in terms of Specifications of latest editions of IRS (Indian Railway Standard), B.I.S. (Bureau of Indian Standard) and I.R.C. (Indian Road congress). When there is any conflict the agency should bring it to the notice of Engineer-in-charge for decision. The decision of Engineer in-charge shall be final and binding in the interpretation of the clauses of the codes of practice and specifications under the Special conditions regarding site, date and specifications of this tender. No claim whatsoever shall be entertained on this account by Railways. Any difference of opinion between Engineer's representative and contractor shall be referred to Engineer-in charge. The appeal against decision of Engineer-in charge shall lie with Chief Engineer whose decision shall be final and binding. Such items under this scope shall be deemed to be "Excepted Matters". Apart from the basic data specifications etc., all items of work shall be covered by the Following Codes as revised, corrected, and amended up to the time of submission of the price bids / revised price bids for acceptance.
  - I. S.C. Railway Engineering Department - General conditions of contract and regulation and instructions to tenderers.
  - II. Notes appearing under the relevant chapters and sub-chapters of Standard Schedule of Rates 2021 of S.C.Railway.
  - III. Indian Railways Unified Standard specification 2021.
  - IV. IS Code of practice for plain and reinforced concrete for general building construction (I.S. 456) - 2000 (Fourth revision).
  - V. IS Code of practice for use of structural steel in plain and reinforced concrete for general building construction (I.S.800 - 1984).
  - VI. IRS Code of practice for electric welding of mild steel structures

- VII. IRS Code of practice for plain concrete construction, 2014
- VIII. Indian Railway code of practice of Plain, reinforced and pre stressed concrete for general/bridge construction (Concrete bridge code adopted in 1935 revised 2014.)
- IX. Design superstructure and substructure of bridges including Chapter-VII of the rule for the opening of Railway adopted 1941-Revised-August, 1982.
- X. Indian Railways Standard (IIB) Bridge substructure and foundations code- code of practice for the design of the sub-structure and foundation of Bridges adopted 1936 -Revised-1985 (hereinafter referred to as sub-structure code).
- XI. I.S. 226 specification for structural steel standard quantity
- XII. IS.875-1994 code of practice for structural safety of building and loading (Part1 to 4).
- XIII. I.S 1892 - 1975 Criteria to Earthquakes resistant design of structure ( 3<sup>rd</sup> revision 1976).
- XIV. Indian Road Congress code for items not specifically covered by any code or provision mentioned in these documents.
- XV. U.T.C.772 - Bearing for Railway Bridges.
- XVI. Criteria for Design of OHE Mast provided on the superstructure.
- XVII. Indian Railway Schedule of dimensions for Broad Gauge.
- XVIII. I.S. Specifications for fine and coarse aggregates from natural source for concrete IS-383- and IS-515
- XIX. IS Methods on testing of Soil I.S. 2720 (Part-II) of 1973.
- XX. IS Methods on testing of soil I.S. 2720 (Part VIII) of 1983.
- XXI. SP-33 of Indian Road Congress, New Delhi.
- XXII. SP-36 - (Part-I & II of BIS).

Note: 1.The latest editions including all correction slips as up todate of submission of price 2. The list given above is by no means exhaustive. All B.I.S. and I.R.S. Codes pertaining to work shall be applicable. Copies of plans and additional information required may be had by tenderers from DRM (works) S.C. Railway/ Secunderabad on any working day during office hours.

5.0 Setting out of the work:

5.1 The center line of the proposed span of RCC box will be initially set out by the Engineer or his representative. The contractor shall thereafter set out the work and every part thereto fully. The contractor shall be responsible for the accuracy of the lines, levels and dimensions of work in accordance with the drawings, further drawings, directions or instructions supplied time to time to him and every facility shall be given to the Engineer for inspection of the same. The contractor shall also alter or amend any error in the dimensions, lines or levels or work set out or constructed by him to the specifications of the Engineer.

5.2 The work shall be set out to the satisfaction of the Engineer, but his approval there for shall not, nor shall his joining with the contractor in setting out the work relieve the contractor from his entire and sole responsibility therefor.

5.3 The contractor shall also provide, fix and be responsible for the maintenance of all stakes, templates, profiles, level marks, points etc., and must take all necessary precautions to prevent their being removed, altered or disturbed and

will be held responsible for the consequences of such removal, alterations or disturbance should the same take place and for their efficient reinstatement.

**6.0 EXECUTION OF WORK:**

**6.1 Service Roads/Jungle Clearance:**

- i. The contractor will be permitted to make use of existing service roads if any free of cost. New service roads required by the contractor in connection with the work either near the work site or elsewhere whether within or outside Railway limits for carriage of materials or for any other purpose whatsoever will have to be constructed and maintained by the contractor at his cost. For the purpose of construction of service Roads on Railway land, permission will be given to the contractor at Railway's discretion. If any land other than Railway land is necessary to be acquired or to be entered upon for the purpose, such land acquisition or permission to enter upon the land has to be arranged for by the contractor at his cost. The contractor will however indemnify the Railway against all claims for all damages whatsoever in this account. Railway however reserves the right to make use of such service roads without any charges.
- ii. Before the work is started the contractor shall clear the area of construction of all trees, grass, shrub, bushes etc., No extra payment will be made for the clearance of jungle shrubs, bushes, trees etc., The jungle and trees cleared thus shall be given to the contractor free of cost. The rates quoted for excavation are deemed to include the charges for the clearance of jungle, shrubs, trees etc.,

**6.2 OPEN EXCAVATION:**

- i. Open excavation done for foundations may be executed with sloping sides with or without timbering or may be excavated with vertical sides properly timbered and shored from ground level up to the bottom of the excavation and the work should be efficiently carried out in such a way so as to ensure its own stability as well as the safety of adjoining lands, structures, moving rail/road traffic and labour working thereon and also in such a way as will prevent them from being in any way detrimentally effected. However temporary shoring with timbering is to be provided if necessary to protect the track and road embankment from slipping for which the contractor will have to use his timbers. No extra rate will be paid for and the rates quoted for excavation will include the same.
- ii. The excavation must also be kept free from water at all times during the progress of the work by means of bailing or pumping out, leading water away from the excavation as well as diversion of water to prevent its increase in the foundations, or otherwise till the work below water level is completed in all respects. No extra rate will be paid for and the rates quoted for excavation will include the same.
- iii. Any unforeseen, under lying cables, pipelines etc., if met with during execution, care should be taken to either safeguard or divert the same with the approval of departments Concerned. All necessary administrative help will be given in this matter. However, Escalation over the original agreement rates will not be entertained on account of delays in such clearances.
- iv. Payment for open excavation: The quantity for excavation will be determined by multiplying the plan area of the open foundations as per the approved plans with the depth from ground level to the excavated level. The quantity of

excavation if any done for side slopes of foundations will not be paid for. Any extra excavations made for provision of working space strutting and other supports also will not be paid for. The rates quoted for excavation of foundation shall include the cost of all such work.

- v. The excavated soil should not be left out in heaps causing obstruction after the work is completed in all respects. All excavated soil should be lead out to the places indicated by the Engineer with a maximum lead of 1KM.

6.3 Concrete works with contractor's cement:

- 6.3.1 Concrete required for all works shall be machine mixed only. Hand mixing of concrete will not be permitted except at the discretion of the Engineer in charge. The Concrete must also be properly vibrated with mechanical vibrators. The materials proposed to be used for the work should pass tests/analysis as prescribed by the specifications. Any approval given by the Railway in consequence of such tests or analysis shall in no way limit or interfere with the absolute right of the Railway to reject the whole or portions of such materials supplied which in the judgement of the Railway do not comply with the specifications. The decision of the railway in this regard shall be final and conclusive for all purposes.

- 6.3.2 The contractor shall prepare nine C.C. Cubes per set at his own cost, standard test cubes of concrete at suitable intervals during concreting operations under the supervision of the Engineer or his authorized representatives and submit the same to the Railway for testing and approval.

- 6.3.3 While executing all concrete works below sub-soil water level, the foundation pit must be kept free of all water by bailing or pumping or in any other manner. The rates quoted for concrete items below bed/ground level shall include the charges for all such type works for which no extra payment will be made separately.

- 6.3.4 The contractor shall along with the bill of purchase of cement should also obtain a test certificate issued by the manufacturer and shall submit the copies of the same to the Railway for verification and record.

- 6.3.5 The contractor shall make his own arrangements for storage of cement and other materials and see that no damage take place during the storage. The contractor shall take all precautions to effectively use the cement between the period of procurement and the period of usage.

- 6.3.6 The concrete mix for the item of Schedule- 'C' shall be designed by conducting tests on raw materials such as aggregate, sand and cement on strength criteria only. The design concrete mix shall contain minimum quantity of cement specified in the schedule. These design mixes shall be approved by Engineer-in-charge before commencement of concrete works.

- 6.3.7 The Railway reserves the right to inspect the storage accommodation of the contractor where the cement is stored and to reject in the event of any clogged cement is noticed or any other cement which is not suitable for usage in works and not conforming to specifications.

6.4 STEEL REINFORCEMENT:

- 6.4.1 The steel to be used in reinforcement shall be TMT bars and shall conform to IS

Specifications No: IS-1786 (grade Fe 500 or more). The reinforcement steel to be used in work shall be from TISCO, SAIL, and VIZAG Steel plant

- 6.4.2 The Railway reserves the right to inspect the storage yard of the contractor, where the steel materials are stored and take samples wherever considered necessary, get them tested by any agency and the same if found unsuitable or not as per specifications as specified under Clause 6.4.1 shall be rejected. The contractor cannot claim in such event the losses, damages, expenditure incurred by him and Railway shall not entertain any claim on this account.

7.0 **SPECIFICATIONS FOR CONCRETE WORK:**

- 7.1 These specifications shall be read in conjunction with any other specifications for concreting work given also where in tender documents.

7.2 **AGGREGATE FOR CONCRETING:**

7.2.1 **COARSE AGGREGATE:**

Coarse aggregates shall be only crushed quarry rock and shall conform to requirement of IS 382, 1343, 456, and IS 515.

7.2.2 **FINE AGGREGATE:**

Fine aggregate shall be of approved quality and grading conforming to IS 383, IS 456 and IS 1343 standards. It shall be free from impurities/organic matter and deleterious substances.

The decision of Engineer-in charge shall be final regarding approval of the coarse and fine aggregates for the concreting works. The Contractor shall be required to carry out weighing and sieving of aggregates, if directed by Engineer-in charge and all costs for the same shall be borne by the contractor.

7.2.3 **STORAGE OF AGGREGATES:**

Coarse aggregates shall be delivered at site and stored in separate sizes as ordered by the Engineer-in charge. The Engineer-in charge shall decide and direct the contractor to bring, stack and store aggregates of different sizes separately as he deems necessary for proper quality control. Aggregates shall be stored or stock piled in such a manner that segregation of fine and coarse sizes will be avoided and also that the various sizes will not become intermixed before proportioning. They shall be stored, stock piled and handled in such a manner that will prevent contamination by foreign deleterious materials. In the case of fine aggregates they shall be deposited at the site for not less than 8 hours before use and should be got tested and approved by the Engineer.

7.2.4 **WATER:**

Clause 4.3 of IS: 456-1987 shall be applicable in place of clause 4.4 of IRS concrete Bridge Code. However, in case of pre stressed concrete work the permissible limits of solids must satisfy IS 1343.

7.2.5 **STORAGE OF CEMENT:**

Cement shall be stored above the ground level in perfectly dry and watertight sheds and shall be stacked not more than eight bags high. Wherever Bulk storage containers are used, their capacity should be sufficient to cater to the requirements at site and should be cleared at least once every 3 to 4 months.

7.3 FORMED SURFACES AND FINISH:

7.3.1 The formwork for RCC shall be of steel and be lined with a material approved by the Engineer-in-charge so as to provide a smooth finish and uniform texture and appearance. This material shall leave no stain on the concrete and joined and fixed to its backing so as not to impart any blemishes. It shall be of the same type and obtained from only one source throughout for construction of any one structure.

The thickness of steel plates for form work, their sizes and bracing shall be got approved by the Engineer-in-charge and shall be such as to produce uniform texture and even surfaces and produce no local bulging or leakage of mortar at joints. The contractor shall make good any imperfections in the resulting finish as required by the Engineer. Internal ties and embedded metal parts will be allowed only with the specific approval of the Engineer.

7.3.2. Preparation of form work before concreting:

All form work shall conform to I.R.C. Guide lines for the design and erection of false work for Road Bridge (IRC-7-1984)

7.4 REINFORCEMENT:

7.4.1 The contractor will furnish a bar bending schedule on the basis of approved drawing and actual length of bar available including indicating the position of laps and splices and will get the same approved by the Engineer before commencing placing of reinforcement.

7.4.2 All reinforcing bars shall be accurately placed in exact position as shown on the drawings and shall be securely held in position during placing of concrete by binding wire not less than 1 mm on size and conforming to IS 200 and by using stays, blocks of metal chairs, spacers metal hangers, supporting wire of other approved devices at sufficiently close intervals. Bars will not be allowed to sag between supports nor displaced during concreting or any other operation over the work. All devices used for positioning shall be made of non-corrosive material. Metal supports will not extend to the surface of concrete, except where shown on the drawings. Placing bars on layers of freshly laid concrete as the work progresses for adjusting bad spacing will not be allowed. Pieces of broken stone, brick and wooden blocks shall not be used as cover to concrete or as separators for bars. Layers of bars shall be separated by spacer bars, pre-cast mortar blocks or other approved devices.

7.4.3. Reinforcement after being placed in position shall be maintained in a clean condition until completely embedded in concrete. Special care shall be exercised to prevent any displacement of reinforcement in the concrete already placed.

7.4.4 In case of columns and walls, vertical bars shall be kept in normal position with timber templates having slots accurately cut in for bar position, such templates shall be removed after the concreting has progressed up to a level just below them. Bars crossing each other, where required, shall be secured by binding wire of size not less than 1 mm and conforming to IS 280 in such a manner that bars do not slip over each other at the time of fixing and concreting.

- 7.4.5. As far as possible, overlapping of bars shall be done as directed by the Engineer. Over lapping bars shall be bound with annealed steel wire, not less than 1 mm diameter twisted tight. The overlaps shall be staggered for different bars and located at points along the span where neither shear nor bending movement is maximum.
- 7.4.6. Placing bars on layers of fresh concrete as work progresses and major adjustment of bars during the placing of concrete will not be permitted.
- 7.4.7. The minimum spacing of parallel bars shall be 2 1/2 times the diameter of the bar but in no case shall the clear distance between the bars be less than 1 1/2 times the maximum size of the coarse aggregate used. Middle bars shall be tied together at not more than 2 meters centers.
- 7.4.8. Mesh reinforcement shall be rolled flat before placing concrete unless otherwise shown on the drawings or ordered by the Engineer. It shall be held firmly in place against vertical or horizontal movement by means of devices found satisfactory by the Engineer. Tack welding of mesh reinforcement to bar reinforcement will not be permitted.
- 7.4.9. Grouping of bars.
- 7.4.9.1. Splicing of reinforcing bars shall be by lapping or approved type couplings, which shall be arranged by contractor at his own cost.
- 7.4.9.2. Reinforcing bars may be continuous at locations where splices are shown on the drawings at the option of the Contractor. The location of splice except where shown on the drawings shall be determined by the Contractor as practicable subject to the approval by Engineer.
- 7.5. **ADMIXTURES:**
- 7.5.1. No admixtures shall in general be allowed. Railway may however permit or direct admixtures for specific purpose for which specifications will be drawn and approved in advance. Nothing extra shall be payable for the admixtures and the cost of the same shall be deemed to have been catered for lump sum quoted rates.
- 7.5.2. To improve the workability of concrete and cement grout, admixtures conforming to IS: 6925 and IS 9103 may be permitted/directed by Engineer-in-charge subject to satisfactory previous use. The decision of Engineer-in-charge shall be final in this case. Admixtures generating hydrogen, nitrogen etc., shall not be used.
- 7.6. Manufacture, placement and curing of concrete:
- 7.6 .1. Mixing of concrete shall conform to requirements in Clause 9.3.1 of I.S: 456.
- 7.6.2. Mixing of concrete for controlled concrete and pre-stressed concrete works shall be done, unless otherwise agreed by Engineer-in charge, by batch type mixer, which shall comply with IS 1791, IS 4935 or other such type as Engineer-in charge may approve.
- 7.6.3. Batch mixers will be tested for their performance in accordance with IS 4634 or such other tests as the Engineer-in charge may require.
- 7.6.4. Mixer which has been put out of use for more than 30 minutes shall be thoroughly cleaned before putting the new batch. Unless otherwise agreed to



by the Engineer, the first batch of concrete from the mixer shall contain only two-thirds of the normal quantity. Coarse aggregate within the plant shall be thoroughly cleaned and removed before changing from one type of mix/cement to another.

7.6.5 During the hot weather the contractor shall ensure that the constituent materials are sufficiently cool to prevent the concrete from stiffening in the interval between its discharge from the mixer and its final position and compaction.

7.6.6 Concrete shall be mixed for a period neither less than 2 minutes nor more than 5 minutes from the time all constituents have been introduced into the mixer and till all materials are uniformly mixed.

#### 7.6.2 PLACING

7.6.2.1 All concrete members shall be compacted by vibration. Generally internal vibrator shall be used on all sections that are sufficiently large to admit them. Vibrator shall have operating frequency of at least 380 impulses per minute. Vibrators having frequency up to twice the minimum are preferred.

7.6.2.2 The following technique shall be followed for the vibrations.

- i Vibrator insertion points shall be distributed so that the concrete becomes uniformly dense and plastic mass.
- ii. Vibrators shall be used for compaction only and not for moving concrete horizontally along the form.
- iii. For horizontal and vertical operations of form vibrators, the spacing of points of vibration shall be such that the zone of influence overlaps.
- iv. For concrete deposited in layers the vibrators shall be inserted vertically and allowed to sink due to its own weight to the bottom of the layer and be slowly withdrawn. For next layer, the vibrator shall penetrate the surface of the previous layer. Compaction shall be according to clause 12.3 of IS 456.

#### 7.6.3. CURING:

All concrete work in cement, mortar, plaster, pointing etc., shall be continuously cured for the prescribed period as per direction of the Engineer. Curing shall be done by covering the newly laid concrete with gunny bags and keeping them wet constantly. If it is found that the contractor is not properly observing these instructions, the Engineer may undertake the curing through another agency/labour without any notice to the contractor at the cost of the contractor. The cost incurred along with incidental charges @ 2% and along with supervision charges @ 12.5% of the cost will be debited to the contractor. Intimation of the employment of another agency for curing will be given to the contractor as soon as possible.

This intimation in writing to the contractor under the head or the Engineer-in-charge of the work shall be conclusive evidence of the employment of another agency.

#### **7.6.4 QUALITY CONTROL:**

7.6.4.1 The contractor laboratory shall be open for use and inspection by Railways at any time. The contractor shall be required to have the gauges and equipment calibrated from a reputed lab as and when directed by Engineer but at least once in six months. The laboratory shall be equipped with following minimum equipment.

- (1) Sieve analysis for coarse and fine aggregates with suitable weight balance.
- (2) Slump test apparatus and compaction factor test apparatus.
- (3) Cube testing machine.
- (4) Concrete permeability testing apparatus.

7.6.4.2 The contractor shall submit concrete mix design for the concrete strength greater than M 20. The design shall be further checked by trial mixes as per relevant IS Code. Cement for trial mixes shall be issued on cost recovery basis. The mix design shall be as per IS code procedures and shall be subject to approval by the Railways.

#### **8.0 Preliminary site testing:**

8.1 Contractor will be required to carry out tests on cement and steel as per provision in the relevant IS Codes. Nothing extra shall be paid on this account. Preliminary work test cubes shall be made and tested for all classes of concrete to be used and for all proposed variations of quality of source of the aggregates, of cement and if either the 7 days or 28 days test cubes fall below the specified strength and the failure is confirmed by testing the balance cubes, the contractor shall make such changes to the mix design, aggregate source, aggregate grading, cement, water, method of mixing or type of mixer and shall produce a satisfactory concrete. All cubes shall be properly marked so that they can be easily identified.

8.2 Works strength tests for Controlled and ordinary concrete.

8.2.1 During the course of the work, samples of concrete will be taken and tested at regular intervals and from representative portions of the works. A sampling and testing programme will be established by the Engineer, in consultation with contractor before any concrete is placed. The establishment of this programme will not preclude the Engineer from obtaining samples and testing of any concrete at any time. The sampling and testing will be carried out in accordance with IS 516-1959. One set of six cubes will normally be taken from each batch to be sampled, but the Engineer may direct additional cubes to be taken. Three cubes will be tested at 7 days and three at 28 days.

8.3 Should any of the cubes fall below the specified strength the contractor shall on the Engineer's instructions, either alter the mix design, the method of making the concrete or carry out appropriate remedial measures. If in the opinion of the Engineer the results are such as to jeopardise the stability function or durability of the structure, he may order all concrete be replaced at contractor's expenses. Where no 7 days concrete strength is specified it should be taken to be 65% of the 28 days strength in the case of ordinary cement and 75% in the case of rapid hardening cements. The Engineer may order the contractor to cut out defective concrete due to bad workmanship from the work even though the test cubes for that batch are satisfactory.

- 8.4 Pre-cast Box units will be allowed to be jacked in place after 14 days of casting only if 7 days test conforms to 2/3rd value of the specified 28 days test strength.
- 9.0 Earth Drilling on foundation trenches behind abutments:
- 9.1 Foundation trenches:  
The space between the sides of the foundation trenches and the masonry is to be filled with sound material well framed, in not exceeding 15cm layers. Each layer should be watered, rammed and consolidated before the next layer is laid. Earth shall be rammed with iron rammers/plate vibrators where feasible. Earth used for filling shall be free from salts, organic or other foreign matter. All clods of earth shall be broken or removed.
- 9.2 Where there is likely hood of rain, the earth filling may closely follow the masonry until ground level is reached but the contractor shall only do this after obtaining the written permission of the Engineer.
- 9.3 Where concrete foundations are brought up in reducing off set it will be necessary to bring the earth filling up with the form walls but in such cases special care shall be taken that no earth is allowed to fall on the concrete surface, on which further concrete is to be laid.
- 10.0 PLAIN CEMENT CONCRETE/ REINFORCED CEMENT CONCRETE IN FOUNDATION:**
- 10.1 All concrete works whether plain or R.C.C. should conform to IRS Code of practice for plain, reinforced and pre-stressed concrete for general bridge construction (concrete bridge code and/or the relevant Indian Standard Specifications as directed by the Engineer.)
- 10.2 The test for the strength of mix shall be conducted in accordance with IS 19262-1982 and SP36. In case, tests fail to show the strength required according to IS Code of reinforced concrete, the portion of the construction with that concrete shall be dismantled and no extra payment will be made for either dismantling or for the sub-standard work done. No extra payment shall be made for making the test cubes.
- 10.3 All concrete shall be mixed in an approved type of concrete mixing machine. Also such cement concrete should be vibrated by use of mechanical vibrators and nothing extra over and above the approved rates for mass concrete/RCC will be payable for these operations.
- 10.4 Butt joints are to be provided at places at the directions of the Engineer and 12 mm thick plaster shall be done on one of the surface of the concrete. Neither extra payment for this plaster nor any deduction in the quantities of concrete will be made nor will the rates for mass cement concrete be inclusive of this plastering.
- 10.5 Welding of reinforcement will not generally be permitted except in special circumstances under the written approval of the Engineer in accordance with the relevant IS Codes. The exposed surface of mass cement concrete and RCC work shall be rendered to leave the surface smooth and even. Nothing extra will be payable for rendering the exposed surface, the cost of which will be considered as having been included in the lump sum rates quoted in the schedule of items, quantities and rates.

**11.0 Setting up of field laboratory by contractors.**

- 11.1 The contractor shall set up a field laboratory of his own cost at work site, which should be opened for use and inspection by the Railway at any time. The laboratory shall be equipped with necessary equipment to carry out the various tests such as sieve analysis, cube testing, slump test, workability test etc., on aggregate, cement, water and concrete required for ensuring the required quality and standard conforming to codal provisions and special specifications.
- 11.2 All the testing equipment of the laboratory shall be got checked/calibrated regularly as directed by the Engineer and the necessary certificates to be furnished to the Engineer by the contractor.
- 11.3 The contractor shall render all reasonable assistance and help in making the checks and test. All the equipment, machinery etc., shall be kept in good working condition.
- 11.4 The cost of setting up the laboratory, equipping the same, maintaining and conducting all tests on materials and cubes shall be borne by the contractor and shall be deemed to have been included in the lump sum rates.
- 11.5 All tests required, as per relevant IS Codes on cement and steel will be done by the contractor from Reputed Institutions/Test Houses. Nothing extra shall be paid for this.

**12.0 GENERAL RESPONSIBILITY OF CONTRACTOR:**

Contractor shall be responsible for all structural and decorative damage to property or injury caused by work or his workmen to persons, animals or things and shall indemnify the Railway in respect thereof and shall be held entire responsible for all works carried out by him until it is finally taken over by the Railways and he will be liable to be called to make good any damage or loss which may occur to the bridge work by inclement weather, floods etc., or due to any other cause during entire period until the work is taken over.

**13.0 SITE FACILITIES:**

- 13.1 The site of construction is adjacent to existing Road and land available by the sides of the track is limited. The contractors are advised to acquaint themselves well with the site conditions before quoting the rates.

**14.0 LAND:**

- 14.1 Limited land is available for the project. The same can be used for Construction of site offices etc., by the contractor subject to availability and approval by the Engineer-in-charge. However contractor should make his own arrangements for Private land for requirements in excess of the above for his workshops, construction equipment stacking yards and camps. No claim on this account shall be entertained by the Railways.

**15.0 CONSTRUCTION EQUIPMENTS:**

- 15.1 The contractor shall arrange and operate at his own cost, all necessary tools, plants, machinery and equipment necessary for successful and timely completion of the work.
- 15.2 If, in the opinion of the Engineer, equipment/plants brought by the contractor are not suitable for the work concerned, the Engineer shall have the right to order the contractor to replace them by suitable plants/equipment. In the

interest of public convenience, the Engineer may insist on a specific way of execution of this work.

15.3 The contractor shall be required to give a trial run of the equipment for establishing their capability to achieve the laid down specifications and tolerance to the entire satisfaction of the Engineer before commencement of any work.

15.4 All equipment provided shall be of proven efficiency and shall be operated and maintained at all times in a manner acceptable to Engineer-in-charge.

15.5 No equipment or personnel shall be removed from site without permission of Engineer- in-charge.

**16 .0 PROGRAMMES FOR COMPLETION OF WORK:**

a) The whole work shall be completed within the stipulated period as mentioned in the tender booklet from the date of issue of acceptance letter including finishing work.

b) The tenderer shall submit detailed programme for the execution of work within the specified period in the form of bar chart as well as CPM chart with details of all resources required for each important stages/milestone of the work. The necessary details of the plant and equipment, manpower and similar works carried out and tendered shall be given in annexures.

c) The time schedule will form a part of the contract and any deviation from the accepted time schedule shall be with the prior approval of the Railways. In the event of failure on the part of the contractor maintaining the through / commensurate progress with reference to time limit given in the contract. The Railway reserves the right to terminate the contract

**17.0 MAINTAINING RECORD OF CONSTRUCTION WORK:**

a) The contractor is required to make arrangements to maintain the progress of the work up to date and documental evidence to be produced as and when required for which necessary plants and tools such as Digital camera and maintained up to date at site of work.

**Additional Note for box pushing**

1. The payment for this item shall be made for clear inner cross section area of the parent RCC Box/Boxes and barrel length”

2. The rate in this item includes excavation for main RCC Box within formation, thrust bed and approaches also”.

3. The unit per Sqm/RM is for cross sectional area of inner dimensions of the RCC box for single vent way and cross sectional area of inner dimensions between outer walls including central wall in case of Twin Box excluding thickness of wearing coat.

4. Maximum water cement ratio and minimum cementitious material content shall be as per correction slip. No 12 dt 2-6-2009 to IRC CBC clause 5.4.3 table 4(a) and clause 5.4.5.

Table 4(c) respectively.

5. Work shall be executed with least disturbance to the Railways tracks and without causing any infringements to running tracks.

6. The rate includes slewing of disturbed BG track to correct alignment, lifting/lowering of track under traffic condition if required arising out of pushing of RCC box and maintenance of track to required standards during the entire period of box pushing.

7. The rate is inclusive of necessary protection needed for safe passage of road traffic In case of Box pushing under road including provision of road traffic signals. If required, self-flickering solar charged traffic lights for guidance of road traffic shall be provided.

8. Necessary precautions to be taken to safeguard and avoid damage to signaling/communication/electrical/water pipeline or any other utility though the same will be shifted by the concerned authorities.

9. Proper safety precautions and if required corrective measures are to be taken in case of damage to embankments including slopes during the execution of works for both railway and Road formation as applicable. In specific cases, if required, CBE office guidance may be taken as per specific site condition.

10. In case of box pushing of twin RCC boxes without common monolithic web, and pushed independently, payment as per inside cross sectional area of each RCC box will be made excluding wearing coat thickness.

11. In case of Ready Mixed Concrete (RMC) is likely to be used for casting of RCC Box/boxes/thrust bed, the same to be approved by Divisional Engineer/Sr.Divisional Engineer/Dy. Chief Engineer, in-charge of work. No separate payment will be made for using RMC concrete.

12. Normally blasting is not permitted during box pushing. Rate is inclusive of using non-blasting methods like chiseling / rock breaking by expansive mortars etc. as required and/or as approved by Engineer-in -charge.

**Note: -1) before starting box pushing, kutcha drain excavation to be completed  
2) Drag sheet must be provided before starting pushing work.**

### **Special Conditions for Air pushing of the box**

- i.e., 1) designing, casting of thrust bed  
2) Casting and air pushing of the box

Note: - RCC box should be casted as per designed grade of concrete

1. The unit per CUM is for cross sectional area multiplied by length of inner dimensions of the RCC box for single vent way and cross-sectional area multiplied by length of inner dimensions between outer walls including central wall in case of Twin Box excluding thickness of wearing coat.
2. Maximum water cement ratio and minimum cementitious material content shall be as per IRC CBC clause 5.4.3 table 4(a) and clause 5.4.5. Table 4(c) respectively.
3. Work shall be executed with least disturbance to the Railways tracks and without causing any infringements to running tracks.
4. The rate includes slewing of disturbed BG track to correct alignment, lifting/lowering of track under traffic condition if required arising out of Air pushing of RCC box and maintenance of track to required standards during the entire period of Air pushing.
5. The rate is inclusive of necessary protection needed for safe passage of road traffic in case of Air pushing under road including provision of road traffic signals. If required, self-flickering solar charged traffic lights for guidance of road traffic shall be provided.
6. Necessary precautions are to be taken to safeguard and avoid damage to signaling/communication/electrical/water pipeline or any other utility though the same will be shifted by the concerned authorities.
7. Proper safety precautions and if required corrective measures are to be taken in case of damage to embankments including slopes during the execution of works for both railway and Road formation as applicable. In specific cases, if required, CBE office guidance may be taken as per specific site condition.
2. In case of Air pushing of twin RCC boxes without common monolithic web, and pushed independently, payment as per inside cross-sectional area multiplied by length of each RCC box will be made excluding wearing coat thickness.
9. Railways will supply RDSO structural design drawing for RCC box/boxes where ever required
10. The contractor has to submit detailed structural design and drawing of RCC thrust bed in soft and hard copies as per programme specified/approved by competent authority, for approval of Railways. If required necessary corrections/re designs to be

done by contractor and resubmit both design and drawing for approval of railways .No separate payment will be made for the same as cost included in ' Air pushing method.

11. In case of Ready Mixed Concrete (RMC) is likely to be used for casting of RCC Box/boxes/thrust bed, the same to be approved by Divisional Engineer/Sr. Divisional Engineer/Dy. Chief Engineer, in-charge of work. No separate payment will be made for using RMC concrete.

12. Normally blasting is not permitted during Air pushing. Extra Rate will be paid for using non-blasting methods like chiseling / rock breaking by expansive mortars etc. as required and/or as approved by Engineer-in -charge under relevant USSOR-2021 items.

13.In case RH girder mentioned in the GAD is not available, the work will be done using appropriate RH girder or by using Rail cluster arrangement as detailed in SCR HQ work branch letter No W.71/BR/Bridge policy dt 16.03.2021 (OR) by using I section as detailed in Drawing No GM(W) SC/BR/STD/4393/2021 at the discretion of Engineer in charge for which contractor will not have any claim

14. The work should be carried out under Traffic and power Block where applicable. Due to any reasons if block is not granted or cancelled at a later stage, no extra payment will be paid. Speed restriction will be arranged as per the traffic movement, contractor will not be having any claim over it. The contractor has to keep his labour, machinery, equipment's etc at the site till the completion of work and as per the instructions of Engineer in charge.

**Note: -1) Before starting Air pushing, kutchha drain excavation to be completed**

## PARTICULARS OF WORK

10 SITE

### METHOD

#### GENERAL FEATURES:

2.1 The Tender is for construction of a RCC box by Air pushing method and the following works would form part of this contract as per the approved General arrangement drawings.



- a. Procurement/Fabrication of necessary plant and equipment like jacking line jacks, hydraulic pumps and other plant and equipment required for execution of this work.
- b. Casting of thrust bed as per Railway approved design and RCC box as per Railway's design and Air pushing including shoring or any other arrangement required to protect the earth slopes from sides or Railway embankment to the satisfaction of Engineer in charge and disposal of the excavated earth in the nearby available Railway land within maximum lead of 1 KM. The disposable earth will be utilized to improve cess work, widen the Railway embankment or to develop the circulating area.
- c. Necessary provision of opening in the roof of boxes for bentonite pumping if required and air pushing of boxes.
- d. Pre-casting and curing of RCC box units.
- e. Jacking of pre-cast boxes to form the opening under running Railway traffic conditions. The maximum allowable deviation of the pre-cast boxes at any time from the theoretical alignment will be limited to 100 mm horizontal and 50 mm in vertical direction. Air pushing work shall be done in the presence of Railway's P.Way supervisor not below the rank of P.Way Mistry. The contractor will further ensure such rate of Air pushing as that will not disturb the Railway tracks above and will be personally responsible for the safety of Railway traffic. Maintenance of track to the required geometry will be the responsibility of the contractor and the contractor is required to ensure this with labour trained in attending p-way with all tools and plant under the supervision of Railway supervisor.
- f. Providing 150mm thick M 25 C.C wearing coat on the floor of the box with design camber. Providing longitudinal drainage arrangements within the RCC boxes with minimum 100 mm depth and 200 mm wide drains with provision of catch water drains at the approaches to the boxes, with the arrangement to be approved by the Railway.
- g. Necessary provision of OHE/Portal/Signal foundation as directed by the Engineer-in on RCC boxes shall be provided, if necessary, as per site conditions.
- h. During the execution of work if any sub-soil water is met with, the contractor will make their own arrangements to bail out/pump out such water from the site, free of cost. Any unforeseen accumulated rainwater, during the progress of work, shall be bailed out/pumped out by the contractor free of cost and the rates quoted should include all these elements.
- i. This is an important project which shall be completed well within the stipulated period as mentioned in tender booklet as it is related to safety.

### **SPECIAL CONDITIONS AND SPECIFICATIONS OF CONTRACT:**

NOTE:- These special conditions supplement the condition of Tender and contracts, General conditions of contract and notes appearing under the relevant chapters and sub- chapters of the Standard Schedule of Rates of S.C.Railway 2021 and CPWD DSR - 2021 (Delhi Schedule of Rates) should be considered as part of the Tender papers wherever the provisions of the special conditions are at variance with the General Conditions of the contract and other documents mentioned above these special

conditions shall prevail.

### **3.0 Scope of work:**

The scope of work covered by this Tender is defined in Para 2.0 of General feature under particulars of work.

### **4.0 CODE AND SPECIFICATIONS:**

- 4.1 The Design and Construction of the superstructures shall be carried out in terms of Specifications of latest editions of IRS (Indian Railway Standard), B.I.S. (Bureau of Indian Standard) and I.R.C. (Indian Road congress). When there is any conflict, the agency should bring it to the notice of Engineer-in-charge for decision. The decision of Engineer in-charge shall be final and binding in the interpretation of the clauses of the codes of practice and specifications under the Special conditions regarding site, date and specifications of this tender. No claim whatsoever shall be entertained on this account by Railways. Any difference of opinion between Engineer's representative and contractor shall be referred to Engineer-in charge. The appeal against decision of Engineer-in charge shall lie with Chief Engineer whose decision shall be final and binding. Such items under this scope shall be deemed to be "Excepted Matters". Apart from the basic data specifications etc., all items of work shall be covered by the Following Codes as revised, corrected, and amended up to the time of submission of the price bids / revised price bids for acceptance.
- I. S.C.Railway Engineering Department - General conditions of contract and regulation and instructions to tenderers.
  - II. Notes appearing under the relevant chapters and sub-chapters of Standard Schedule of Rates 2021 of S.C.Railway and CPWD DSR.2021 (Delhi Schedule of Rates)
  - III. S.C. Railway Engineering dept. Standard Specifications for material and works 2021 and CPWD specifications - 2021 (or latest)
  - IV. IS Code of practice for plain and reinforced concrete for general building construction (I.S. 456) - 2000 (Fourth revision).
  - V. IS Code of practice for use of structural steel in plain and reinforced concrete for general building construction (I.S.800 - 1984).
  - VI. IRS Code of practice for electric welding of mild steel structures
  - VII. IRS Code of practice for plain concrete construction, 1982
  - VIII. Indian Railway code of practice of Plain, reinforced and pre stressed concrete for general/bridge construction (Concrete bridge code adopted in 1935 revised 1997.)
  - IX. Design superstructure and substructure of bridges including Chapter-VII of the rule for the opening of Railway adopted 1941-Revised-August, 1982.

- X. Indian Railways Standard (IIB) Bridge substructure and foundations code- code of practice for the design of the sub-structure and foundation of Bridges adopted 1936  
-Revised-1985 (hereinafter referred to as sub-structure code).
- XI. I.S. 226 specification for structural steel standard quantity
- XII. IS.875-1994 code of practice for structural safety of building and loading (Part 1 to 4)
- XIII. I.S 1892 - 1975 Criteria to Earthquakes resistant design of structure (3<sup>rd</sup> revision 1976).
- XIV. Indian Road Congress code for items not specifically covered by any code or provision mentioned in these documents.
- XV. U.T.C.772 - Bearing for Railway Bridges.
- XVI. Criteria for Design of OHE Mast provided on the superstructure.
- XVII. Indian Railway Schedule of dimensions for Broad Gauge.
- XVIII. I.S. Specifications for fine and coarse aggregates from natural source for concrete IS-383- and IS-515
- XIX. IS Methods on testing of Soil I.S. 2720 (Part-II) of 1973.
- XX. IS Methods on testing of soil I.S. 2720 (Part VIII) of 1983.
- XXI. SP-33 of Indian Road Congress, New Delhi.
- XXII. SP-36 - (Part-I & II of BIS).

Note: 1. Latest editions including all correction slips as up to date of submission of price bid/revised bid, shall govern.

- 2. The list given above is by no means exhaustive. All B.I.S. and I.R.S. Codes pertaining to work shall be applicable. Copies of plans and additional information required may be obtained by tenderers from DRM (works) S.C.Railway/ Secunderabad on any working day during office hours.

5.0 Setting out of the work:

- 5.1 The center line of the proposed span of RCC box will be initially set out by the Engineer or his representative. The contractor shall thereafter set out the work and every part thereto fully. The contractor shall be responsible for the accuracy of the lines, levels and dimensions of work in accordance with the drawings, further drawings, directions or instructions supplied time to time to him and every facility shall be given to the Engineer for inspection of the same. The contractor shall also alter or amend any error in the dimensions, lines or levels or work set out or constructed by him to the specifications of the Engineer.
- 5.2 The work shall be set out to the satisfaction of the Engineer, but his approval there for shall not, nor shall his joining with the contractor in setting out the work relieve the contractor from his entire and sole responsibility therefor.
- 5.3 The contractor shall also provide, fix and be responsible for the maintenance of all stakes, templates, profiles, level marks, points etc., and must take all necessary precautions to prevent their being removed, altered or disturbed and will be held responsible for the consequences of such removal, alterations or disturbance should the same take place and for their efficient reinstatement.

## **6.0. EXECUTION OF WORK:**

### **6.1 Service Roads/Jungle Clearance:**

- i. The contractor will be permitted to make use of existing service roads if any free of cost. New service roads required by the contractor in connection with the work either near the work site or elsewhere whether within or outside Railway limits for carriage of materials or for any other purpose whatsoever will have to be constructed and maintained by the contractor at his cost. For the purpose of construction of service Roads on Railway land, permission will be given to the contractor at Railway's discretion. If any land other than Railway land is necessary to be acquired or to be entered upon for the purpose, such land acquisition or permission to enter upon the land has to be arranged for by the contractor at his cost. The contractor will however indemnify the Railway against all claims for all damages whatsoever in this account. Railway however reserves the right to make use of such service roads without any charges.
- ii. Before the work is started the contractor shall clear the area of construction of all trees, grass, shrub, bushes etc., No extra payment will be made for the clearance of jungle shrubs, bushes, trees etc., The jungle and trees cleared thus shall be given to the contractor free of cost. The rates quoted for excavation are deemed to include the charges for the clearance of jungle, shrubs, trees etc.,

### **6.2 OPEN EXCAVATION:**

- i. Open excavation done for foundations may be executed with sloping sides with or without timbering or may be excavated with vertical sides properly timbered and shored from ground level up to the bottom of the excavation and the work should be efficiently carried out in such a way so as to ensure its own stability as well as the safety of adjoining lands, structures, moving rail/road traffic and labour working thereon and also in such a way as will prevent them from being in any way detrimentally effected. However temporary shoring with timbering is to be provided if necessary to protect the track and road embankment from slipping for which the contractor will have to use his timbers. No extra rate will be paid for and the rates quoted for excavation will include the same.
- ii. The excavation must also be kept free from water at all times during the progress of the work by means of bailing or pumping out, leading water away from the excavation as well as diversion of water to prevent its increase in the foundations, or otherwise till the work below water level is completed in all respects. No extra rate will be paid for and the rates quoted for excavation will include the same.
- iii. Any unforeseen, under lying cables, pipelines etc., if met with during execution, care should be taken to either safeguard or divert the same with the approval of departments Concerned. All necessary administrative help will be given in this matter. However, Escalation over the original agreement rates will not be entertained on account of delays in such clearances.
- Iv. Payment for open excavation: The quantity for excavation will be determined by multiplying the plan area of the open foundations as per the approved plans with the depth from ground level to the excavated level. The quantity

of excavation if any done for side slopes of foundations will not be paid for. Any extra excavations made for provision of working space strutting and other supports also will not be paid for. The rates quoted for excavation of foundation shall include the cost of all such work.

- v. The excavated soil should not be left out in heaps causing obstruction after the work is completed in all respects. All excavated soil should be lead out to the places indicated by the Engineer with a maximum lead of 1KM.

6.3 Concrete works with contractor's cement:

- 6.3.1 Concrete required for all works shall be machine mixed only. Hand mixing of concrete will not be permitted except at the discretion of the Engineer in charge. The Concrete must also be properly vibrated with mechanical vibrators. The materials proposed to be used for the work should pass tests/analysis as prescribed by the specifications. Any approval given by the Railway in consequence of such tests or analysis shall in no way limit or interfere with the absolute right of the Railway to reject the whole or portions of such materials supplied which in the judgment of the Railway do not comply with the specifications. The decision of the railway in this regard shall be final and conclusive for all purposes.

- 6.3.2 The contractor shall prepare C.C. Cubes as per IS 456 clause 15.2 at his own cost, standard test cubes of concrete at suitable intervals during concreting operations under the supervision of the Engineer or his authorized representatives and submit the same to the Railway for testing and approval.

- 6.3.3 While executing all concrete works below sub-soil water level, the foundation pit must be kept free of all water by bailing or pumping or in any other manner. The rates quoted for concrete items below bed/ground level shall include the charges for all such type works for which no extra payment will be made separately.

- 6.3.4 All cement shall conform to the specifications of the ordinary Portland cement to I.S. 8112 of 1989 & 12269.

- 6.3.5 The contractor shall along with the bill of purchase of cement should also obtain a test certificate issued by the manufacturer and shall submit the copies of the same to the Railway for verification and record.

- 6.3.6 The contractor shall make his own arrangements for storage of cement and other materials and see that no damage take place during the storage. The contractor shall take all precautions to effectively use the cement between the period of procurement and the period of usage.

- 6.3.7 The concrete mix shall be designed by conducting tests on raw materials such as aggregate, sand and cement on strength criteria only. The design concrete mix shall contain minimum quantity of cement specified in the schedule. These design mixes shall be approved by Engineer-in-charge before commencement of concrete works.

- 6.3.8 The Railway reserves the right to inspect the storage accommodation of the contractor where the cement is stored and to reject in the event of any clogged cement is noticed or any other cement which is not suitable for usage in works and not conforming to specifications.

**6.4            STEEL REINFORCEMENT:**

6.4.1        The steel to be used in reinforcement shall be Tor/HYSD bars and shall conform to IS Specifications No: IS-1786 (grade Fe 500D). If mild steel is to be used for reinforcement it shall conform to IS 432 Part-I (Grade-I).

6.4.2        The Railway reserves the right to inspect the storage yard of the contractor, where the steel materials are stored and take samples wherever considered necessary, get them tested by any agency and the same if found unsuitable or not as per specifications as specified under Clause 6.4.1 shall be rejected. The contractor cannot claim in such event the losses, damages, expenditure incurred by him and Railway shall not entertain any claim on this account.

**7.0            SPECIFICATIONS FOR CONCRETE WORK:**

7.1           These specifications shall be read in conjunction with any other specifications for concreting work given also where in tender documents.

**7.2            AGGREGATE FOR CONCRETING:**

**7.2.1        COARSE AGGREGATE:**

Coarse aggregates shall be only crushed quarry rock and shall conform to requirement of IS 382, 1343, 456, and IS 515.

**7.2.2        FINE AGGREGATE:**

Fine aggregate shall be of approved quality and grading conforming to IS 383, IS 456 and IS 1343 standards. It shall be free from impurities/organic matter and deleterious substances.

The decision of Engineer-in charge shall be final regarding approval of the coarse and fine aggregates for the concreting works. The Contractor shall be required to carry out weighing and sieving of aggregates, if directed by Engineer-in charge and all costs for the same shall be borne by the contractor.

**7.2.3        STORAGE OF AGGREGATES:**

Coarse aggregates shall be delivered at site and stored in separate sizes as ordered by the Engineer-in charge. The Engineer-in charge shall decide and direct the contractor to bring, stack and store aggregates of different sizes separately as he deems necessary for proper quality control. Aggregates shall be stored or stock piled in such a manner that segregation of fine and coarse sizes will be avoided and also that the various sizes will not become intermixed before proportioning. They shall be stored, stock piled and handled in such a manner that will prevent contamination by foreign deleterious materials. In the case of fine aggregates they shall be deposited at the site for not less than 8 hours before use and should be got tested and approved by the Engineer/Engineer representative.

**7.2.4.        WATER:**

Clause 4.3 of IS: 456-1987 shall be applicable in place of clause 4.4 of IRS concrete Bridge Code. However, in case of pre stressed concrete work the permissible limits of solids must satisfy IS 1343.

**7.2.5.        STORAGE OF CEMENT:**

Cement shall be stored above the ground level in perfectly dry and watertight sheds and shall be stacked not more than eight bags high. Wherever Bulk storage containers are used, their capacity should be sufficient to cater to the

requirements at site and should be cleared at least once every 3 to 4 months.

### **7.3 FORMED SURFACES AND FINISH:**

7.3.1 The formwork for RCC shall be of steel and be lined with a material approved by the Engineer-in-charge so as to provide a smooth finish and uniform texture and appearance. This material shall leave no stain on the concrete and joined and fixed to its backing so as not to impart any blemishes. It shall be of the same type and obtained from only one source throughout for construction of any one structure. The thickness of steel plates for formwork, their sizes and bracing shall be got approved by the Engineer-in-charge and shall be such as to produce uniform texture and even surfaces and produce no local bulging or leakage of mortar at joints. The contractor shall make good any imperfections in the resulting finish as required by the Engineer. Internal ties and embedded metal parts will be allowed only with the specific approval of the Engineer.

7.3.2 Preparation of formwork before concreting:  
All formwork shall conform to I.R.C. Guide lines for the design and erection of falsework for Road Bridge (IRC-7-1984)

### **7.4 REINFORCEMENT:**

7.4.1 The contractor will furnish a bar bending schedule on the basis of approved drawing and actual length of bar available including indicating the position of laps and splices and will get the same approved by the Engineer/Engineer representative before commencing placing of reinforcement.

7.4.2 All reinforcing bars shall be accurately placed in exact position as shown on the drawings and shall be securely held in position during placing of concrete by binding wire (MS wire) not less than 1 mm on size and conforming to IS 280:2006 and by using stays, blocks of metal chairs, spacers metal hangers, supporting wire of other approved devices at sufficiently close intervals. Bars will not be allowed to sag between supports nor displaced during concreting or any other operation over the work. All devices used for positioning shall be made of non-corrosive material. Metal supports shall not extend to the surface of concrete, except where shown on the drawings. Placing bars on layers of freshly laid concrete as the work progresses for adjusting bad spacing will not be allowed. Pieces of broken stone, brick and wooden blocks shall not be used as cover to concrete or as separators for bars. Layers of bars shall be separated by spacer bars, pre-cast mortar blocks or other approved devices.

7.4.3 Reinforcement after being placed in position shall be maintained in a clean condition until completely embedded in concrete. Special care shall be exercised to prevent any displacement of reinforcement in the concrete already placed.

7.4.4 In case of columns and walls, vertical bars shall be kept in normal position with timber templates having slots accurately cut in for bar position, such templates shall be removed after the concreting has progressed up to a level just below them. Bars crossing each other, where required, shall be secured

by binding wire (MS wire) of size not less than 1 mm and conforming to IS 280; 2006 in such a manner that bars do not slip over each other at the time of fixing and concreting.

7.4.5. As far as possible, overlapping of bars shall be done as directed by the Engineer. Overlapping bars shall be bound with annealed steel wire, not less than 1 mm diameter twisted tight. The overlaps shall be staggered for different bars and located at points along the span where neither shear nor bending movement is maximum.

7.4.6. Placing bars on layers of fresh concrete as work progresses and major adjustment of bars during the placing of concrete will not be permitted.

7.4.7. The minimum spacing of parallel bars shall be  $2\frac{1}{2}$  times the diameter of the bar but in no case shall the clear distance between the bars be less than  $1\frac{1}{2}$  times the maximum size of the coarse aggregate used. Middle bars shall be tied together at not more than 2 meters centers.

7.4.8. Mesh reinforcement shall be rolled flat before placing concrete unless otherwise shown on the drawings or ordered by the Engineer. It shall be held firmly in place against vertical or horizontal movement by means of devices found satisfactory by the Engineer. Tack welding of mesh reinforcement to bar reinforcement will not be permitted.

7.4.9. Grouping of bars.

7.4.9.1. Splicing of reinforcing bars shall be by lapping or approved type couplings, which shall be arranged by contractor at his own cost.

7.4.9.2. Reinforcing bars may be continuous at locations where splices are shown on the drawings at the option of the Contractor. The location of splice except where shown on the drawings shall be determined by the Contractor as practicable subject to the approval by Engineer.

## **7.5 ADMIXTURES:**

7.5.1. No admixtures shall in general be allowed. Railway may however permit or direct admixtures for specific purpose for which specifications will be drawn and approved in advance. Nothing extra shall be payable for the admixtures and the cost of the same shall be deemed to have been catered for lump sum quoted rates.

7.5.2. To improve the workability of concrete and cement grout, admixtures conforming to IS: 6925 and IS 9103 may be permitted/directed by Engineer-in-charge subject to satisfactory previous use. The decision of Engineer-in-charge shall be final in this case. Admixtures generating hydrogen, nitrogen etc., shall not be used.

7.6. Manufacture, placement and curing of concrete:

7.6.1. Mixing of concrete shall conform to requirements in Clause 9.3.1 of IS: 456.

7.6.2. Mixing of concrete for controlled concrete and pre-stressed concrete works shall be done, unless otherwise agreed by Engineer-in charge, by batch type mixer, which shall comply with IS 1791, IS 4935 or other such type as Engineer-in charge may approve.

7.6.3. Batch mixers will be tested for their performance in accordance with IS 4634 or



such other tests as the Engineer-in charge may require.

7.6.4 Mixer which has been put out of use for more than 30 minutes shall be thoroughly cleaned before putting the new batch. Unless otherwise agreed to by the Engineer, the first batch of concrete from the mixer shall contain only two-thirds of the normal quantity. Coarse aggregate within the plant shall be thoroughly cleaned and removed before changing from one type of mix/cement to another.

7.6.5 During the hot weather the contractor shall ensure that the constituent materials are sufficiently cool to prevent the concrete from stiffening in the interval between its discharge from the mixer and its final position and compaction.

7.6.6 Concrete shall be mixed for a period neither less than 2 minutes nor more than 5 minutes from the time all constituents have been introduced into the mixer and till all materials are uniformly mixed.

#### **7.6.2 PLACING**

7.6.2.1 All concrete members shall be compacted by vibration. Generally internal vibrator shall be used on all sections that are sufficiently large to admit them. Vibrator shall have operating frequency of at least 380 impulses per minute. Vibrators having frequency up to twice the minimum are preferred.

7.6.2.2 The following technique shall be followed for the vibrations.

i Vibrator insertion points shall be distributed so that the concrete becomes uniformly dense and plastic mass.

ii. Vibrators shall be used for compaction only and not for moving concrete horizontally along the form.

iii. For horizontal and vertical operations of form vibrators, the spacing of points of vibration shall be such that the zone of influence overlaps.

iv. For concrete deposited in layers the vibrators shall be inserted vertically and allowed to sink due to its own weight to the bottom of the layer and be slowly withdrawn. For next layer, the vibrator shall penetrate the surface of the previous layer. Compaction shall be according to clause 12.3 of IS 456.

#### **7.6.3. CURING:**

All concrete work in cement, mortar, plaster, pointing etc., shall be continuously cured for the prescribed period as per direction of the Engineer. Curing shall be done by covering the newly laid concrete with gunny bags and keeping them wet constantly. If it is found that the contractor is not properly observing these instructions, the Engineer may undertake the curing through another agency/labour without any notice to the contractor at the cost of the contractor. The cost incurred along with incidental charges @ 2% and along with supervision charges @ 12.5% of the cost will be debited to the contractor. Intimation of the employment of another agency for curing will be given to the contractor as soon as possible. This intimation in writing to the contractor under the head or the Engineer-in-charge of the work shall be conclusive evidence of the employment of another agency.

#### **7.6.4      QUALITY CONTROL:**

7.6.4.1      The contractor laboratory shall be open for use and inspection by Railways at any time. The contractor shall be required to have the gauges and equipment calibrated from a reputed lab as and when directed by Engineer but at least once in six months. The laboratory shall be equipped with following minimum equipment.

- (1) Sieve analysis for coarse and fine aggregates with suitable weight balance.
- (2) Slump test apparatus and compaction factor test apparatus.
- (3) Cube testing machine.
- (4) Concrete permeability testing apparatus.

7.6.4.2      The contractor shall submit concrete mix design for the concrete strength greater than M 20. The design shall be further checked by trial mixes as per relevant IS Code. Cement for trial mixes shall be issued on cost recovery basis. The mix design shall be as per IS code procedures and shall be subject to approval by the Railways.

#### **8.0      Preliminary site testing:**

8.1      Contractor will be required to carry out tests on cement and steel as per provision in the relevant IS Codes. Nothing extra shall be paid on this account. Preliminary work test cubes shall be made and tested for all classes of concrete to be used and for all proposed variations of quality of source of the aggregates, of cement and if either the 7 days or 28 days test cubes fall below the specified strength and the failure is confirmed by testing the balance cubes, the contractor shall make such changes to the mix design, aggregate source, aggregate grading, cement, water, method of mixing or type of mixer and shall produce satisfactory concrete.

All cubes shall be properly marked so that they can be easily identified.

8.2      Works strength tests for Controlled and ordinary concrete.

8.2.1      During the course of the work, samples of concrete will be taken and tested at regular intervals and from representative portions of the works. A sampling and testing programme will be established by the Engineer, in consultation with contractor before any concrete is placed. The establishment of this programme will not preclude the Engineer from obtaining samples and testing of any concrete at any time. The sampling and testing will be carried out in accordance with IS 516-1959.

8.3      Should any of the cubes fall below the specified strength the contractor shall on the Engineer's instructions, either alter the mix design, the method of making the concrete or carry out appropriate remedial measures. If in the opinion of the Engineer the results are such as to jeopardise the stability function or durability of the structure, he may order all concrete be replaced at contractor's expenses. Where no 7 days concrete strength is specified it should be taken to be 65% of the 28 days strength in the case of ordinary cement and 75% in the case of rapid hardening cements. The Engineer may order the contractor to cut out defective concrete due to bad workmanship from the work even though the test cubes for that batch are satisfactory.

8.4      Pre-cast Box units will be allowed to be jacked in place after 14 days of

casting only if 7 days test conforms to 2/3rd value of the specified 28 days test strength.

9.0 Earth Drilling on foundation trenches behind abutments:

9.1 Foundation trenches:

The space between the sides of the foundation trenches and the masonry is to be filled with sound material well framed, in not exceeding 15cm layers. Each layer should be watered, rammed and consolidated before the next layer is laid. Earth shall be rammed with iron rammers/plate vibrators where feasible. Earth used for filling shall be free from salts, organic or other foreign matter. All clods of earth shall be broken or removed.

9.2 Where there is likelihood of rain, the earth filling may closely follow the masonry until ground level is reached but the contractor shall only do this after obtaining the written permission of the Engineer.

9.3 Where concrete foundations are brought up in reducing offset it will be necessary to bring the earth filling up with the form walls but in such cases special care shall be taken that no earth is allowed to fall on the concrete surface, on which further concrete is to be laid.

10.0 PLAIN CEMENT CONCRETE/ REINFORCED CEMENT CONCRETE IN FOUNDATION:

10.1 All concrete works whether plain or R.C.C. should conform to IRS Code of practice for plain, reinforced and pre-stressed concrete for general bridge construction (concrete bridge code and/or the relevant Indian Standard Specifications as directed by the Engineer.)

10.2 The test for the strength of mix shall be conducted in accordance with IS 19262-1982 and SP36. In case, tests fail to show the strength required according to IS Code of reinforced concrete, the portion of the construction with that concrete shall be dismantled and no extra payment will be made for either dismantling or for the sub-standard work done. No extra payment shall be made for making the test cubes.

10.3 All concrete shall be mixed in an approved type of concrete mixing machine. Also such cement concrete should be vibrated by use of mechanical vibrators and nothing extra over and above the approved rates for mass concrete/RCC will be payable for these operations.

10.4 Butt joints are to be provided at places at the directions of the Engineer and 12 mm thick plaster shall be done on one of the surface of the concrete. Neither extra payment for this plaster nor any deduction in the quantities of concrete will be made nor will the rates for mass cement concrete be inclusive of this plastering.

10.5 Welding of reinforcement will not generally be permitted except in special circumstances under the written approval of the Engineer in accordance with the relevant IS Codes. The exposed surface of mass cement concrete and RCC work shall be rendered to leave the surface smooth and even. Nothing extra will be payable for rendering the exposed surface, the cost of which will be considered as having been included in the lump sum rates quoted in the schedule of items, quantities and rates.

- 11.0 Setting up of field laboratory by contractors.
- 11.1 The contractor shall set up a field laboratory of his own cost at work site, which should be opened for use and inspection by the Railway at any time. The laboratory shall be equipped with necessary equipment to carry out the various tests such as sieve analysis, cube testing, slump test, workability test etc., on aggregate, cement, water and concrete required for ensuring the required quality and standard conforming to codal provisions and special specifications.
- 11.2 All the testing equipment of the laboratory shall be got checked/calibrated regularly as directed by the Engineer and the necessary certificates to be furnished to the Engineer by the contractor.
- 11.3 The contractor shall render all reasonable assistance and help in making the checks and test. All the equipment, machinery etc., shall be kept in good working condition.
- 11.4 The cost of setting up the laboratory, equipping the same, maintaining and conducting all tests on materials and cubes shall be borne by the contractor and shall be deemed to have been included in the lump sum rates.
- 11.5 All tests required, as per relevant IS Codes on cement and steel will be done by the Contractor from approved National Testing Laboratories as per CE/Br.Rehab/S.C.Rly Ir No W.CE/Br. Rehab/2019 dated 14.08.2019, 25.09.2019 (enclosed). Nothing extra shall be paid for this.
- 12.0 GENERAL RESPONSIBILITY OF CONTRACTOR:  
Contractor shall be responsible for all structural and decorative damage to property or injury caused by work or his workmen to persons, animals or things and shall indemnify the Railway in respect thereof and shall be held entire responsible for all works carried out by him until it is finally taken over by the Railways and he will be liable to be called to make good any damage or loss which may occur to the bridge work by inclement weather, floods etc., or due to any other cause during entire period until the work is taken over.
- 13.0 SITE FACILITIES:
- 13.1 The site of construction is adjacent to existing Road and land available by the sides of the track is limited. The contractors are advised to acquaint themselves well with the site conditions before quoting the rates.
- 14.0 LAND:
- 14.1 Limited land is available for the project. The same can be used for Construction of site offices etc., by the contractor subject to availability and approval by the Engineer-in-charge. However contractor should make his own arrangements for Private land for requirements in excess of the above for his workshops, construction equipment stacking yards and camps. No claim on this account shall be entertained by the Railways.
- 15.0 CONSTRUCTION EQUIPMENTS:
- 15.1 The contractor shall arrange and operate at his own cost, all necessary tools, plants, machinery and equipment necessary for successful and timely completion of the work.
- 15.2 If, in the opinion of the Engineer,<sup>036</sup> equipment/plants brought by the

contractor are not suitable for the work concerned, the Engineer shall have the right to order the contractor to replace them by suitable plants/equipment. In the interest of public convenience, the Engineer may insist on a specific way of execution of this work.

15.3 The contractor shall be required to give a trial run of the equipment for establishing their capability to achieve the laid down specifications and tolerance to the entire satisfaction of the Engineer before commencement of any work.

15.4 All equipment provided shall be of proven efficiency and shall be operated and maintained at all times in a manner acceptable to Engineer-in-charge.

15.5 No equipment or personnel shall be removed from site without permission of Engineer- in-charge.

16 .0 PROGRAMMES FOR COMPLETION OF WORK:

a) The whole work shall be completed within the stipulated period as mentioned in the tender booklet from the date of issue of acceptance letter including finishing work.

b) The tenderer shall submit detailed programme for the execution of work within the specified period in the form of bar chart as well as CPM chart with details of all resources required for each important stages/milestone of the work. The necessary details of the plant and equipment, manpower and similar works carried out and tendered shall be given in annexures.

c) The time schedule will form a part of the contract and any deviation from the accepted time schedule shall be with the prior approval of the Railways. In the event of failure on the part of the contractor maintaining the through / commensurate progress with reference to time limit given in the contract. The Railway reserves the right to terminate the contract

17.0 MAINTAINING RECORD OF CONSTRUCTION WORK:

a) The contractor is required to make arrangements to maintain the progress of the work up to date and documental evidence to be produced as and when required for which necessary plants and tools such as Digital camera and maintained upto date at site of work.

#### **Special condition/Notes:-**

1. All construction material shall be used as per approved brands/makes as per CE/Works S.C.Rly Hqrts vide letter No. SCR - HQ/ENGG(SOR)/1/2020-Dy CE-WORKS-SCR of 24-05-2022 (copy enclosed)
2. As per headquarters Approved Testing Laboratories .
3. All works should be maintained as per Defect liability clause as per Hqs Ir No SCR-HQOENGG (WC)/38/2019 dated 24.09.20 (Enclosed)

4.Rates for all CPWD DSR - 2021 (Delhi Schedule of Rates) items of schedule J & K are inclusive of cost of cement

**Speciation's and conditions for supplying and fixing of Hot dip galvanized H Beam sleepers with zero toe load fastenings and ER /GR pads in connection with through renewal of channel sleepers with H-beam sleeper**

1) H beam sleeper shall be fabricated using ISHB 200X200 @ 37.3kg/mt procured from approved brands/makes as per CE/Works S.C.Rly lr No SCR-HQ ENGG (SOR)/1/2020-Dy CE/WORKS/SCR Dt 24.05.2022 ( copy enclosed) and fabrication as per drawing (No RDSO/1636/4/R (Alt-3) with steel base plate as per drawing No RDSO/T-8760 (Alt-1) with inner and outer shoulders duly fixed and seating arrangement as per Drawing No RDSO/B-1636/5 (Alt -3). No splice joint is allowed and the fabrication procedures to be followed as listed in BS code -45 as a reference. (Copy enclosed)

2) The agency has to deliver the fabricated H Beam sleepers with steel base plate riveted including inner and outer inserts as per above said drawings to nearby bridge approaches in neat manner without causing infringement to moving dimensions. And in case if there is no direct either/kuccha or pucca road available up to bridge site, it can be unloaded at nearby feasible locations (As decided by the Engineers representative) and later on transported to bridge site with contractors own dip lorries /Railway dip lorries to bridge approaches and for which extra payment shall be made as admissible, as per schedule.

3) Steel to be used should be of grade E-250 Bo quality as mentioned under clause 8.2 (as provided in ACS No 5 dated 30-08-2013) of IRS; B1-2001, as corrected from time to time

Note: -Rolled steel sections like angles, channels, I-sections etc., confirming to IS 2062 Grade 'A' or 'BR' may be used in structure of riveted girder subjected to railway loading till such time rolled sections confirming to IS-2062 grade 'B0' are not available in market. For grade 'BR' steel impact test is optional at room temperature. Provision of high strength steel to E-450 of 'BR' quality may not be used for riveted girder. (The same to be proved by the contractor).

4) Galvanizing should be done after inspection and acceptance of the fabricated H beam sleepers (At your work shop) by the consignee/authorized representative from Railway side nominated by Sr.DEN/DEN and necessary testing equipment as desired by the consignee shall be arranged by the agency and for which no extra payment is admissible.

5) The galvanization should be done as per IS 2629-1966 and IS 4759-1984 of minimum thick shall be 100 microns and for which test certificate is to be furnished (Specifications enclosed)

6) For any material defects, welds, galvanization, the contractor will be held responsible in all respects.

7) The location where H-beam sleeper is to be seated is to be thoroughly cleaned and a thick coat of ready mixed red lead paint conforming to IS: 102 is to be given well in advance before providing H-beam sleeper

8) For the shop rivets (i.e. 20 mm dia.) 35 mm dia. Hole should be punched in the elastomeric pad whereas for field rivets (i.e. 22 mm dia.), it should be 38 mm dia, **these holes shall be filled with ready mixed red lead paint to IS:102 after placing the elastomeric pad in position to avoid accumulation of water.**

9) Maximum Centre to Centre sleeper spacing should not be more than 600mm, except at cross girders. The clear distance between two sleepers at cross girder location should not be more than 450 mm. The clear distance between joint sleepers should not be more than 200 mm (Any correction in IRPWM will apply)

10) The Zero toe load fastenings of H-Beam steel sleepers as per RDSO Drg No T-8759 to RDSO/T -8765 (Alt-1) for 60 kg (UIC) and 52 kg rail. shall be procured from RDSO approved vendors

11) The exact length of H beam sleepers, and size and thickness of MS plates welding to the H beam sleeper as per site conditions to make up level difference of cover plates to be decided as per site conditions (As per Engineers representative)

12) Supply and fabrication of Hook bolt as per specification and drawing No RDSO/B/1636/ 5 (Alt-3) with latest correction to suit to field conditions.

Note: -Length of hook bolts: - Hook bolts of various length are required to be assessed duly taking into consideration the thickness of pad plates required based on the curtailment of plates in top flanges of girder etc (as per engineer representative)

13) Supply of Elastomeric pads of 25/30 mm thick as per Drawing No. RDSO/B/1636/ 5 (Alt-3) with latest corrections issued time to time. The supply should confirm as per IRS specifications for 25 mm thick Nylon cord Reinforced elastomeric pad as per RDSO/M&C/RP-197/03. Cent percent of the material should be got inspected and certified by the RDSO and testing certificate to be enclosed for effecting payment. The testing charges should be borne by the contractor.

14) The work has to be executed during the traffic blocks besides continuation of SR30kmph in presence of Railway nominated supervisor.



15) SSE/P.Way/Bridges shall obtain prior approval of Sr.DEN/DEN through ADEN for operating agreement listed schedule item duly indicating bridge wise details. Duly obtaining the program from the contractor

16) All the released materials such as sleepers and its running and guard rails fittings/hook bolts separated and stacked in neat manner on bridge approaches/nearby PWI depot as directed by Engineer in charge duly handing over with his own labour, tools and plants and vehicles etc complete

17) Rail cutting should be done with disc cutter where ever required as instructed by the Engineer representative

18) Before starting the work, the site drawings showing longitudinal and cross section and first and second cover flange plate details of the girders required for determining the thickness of the MS packing plates to be welded to the bottom flange of H beam sleepers & centers of hook bolts length and its lip/ square neck length and length of H beam sleepers etc to be submitted for obtaining the technical approval before commencing fabrication of sleepers .The drawings to be submitted bridge wise separately in auto CAD.

19) The agency has to inform the Railway administration immediately after procuring steel raw materials from approved steel firms for inspection and certification in writing from authorized Railway representative (Consignee) for permission to use raw steel materials for fabrication of H beam sleepers after verification test certificates, steel bills invoices and heat rolling marks duly capturing in photos for office record.

20). Steel fittings (Guard rail) should be as per IS 226-1962/latest specification and supply shall be made as per Drg No RDSO /T 5155 to 5164.(with latest correction)

21) Grooved rubber pad 6 mm thick as per Drawing No RDSO/T-5163 .(with latest correction shall be as per "IRS specification of 6 mm thick GR pads of 1997" (Provisional)

a) Linking of the track on H Beam sleepers to be done as per drawing No RDSO/1636/4/R,5 Alt-3 and zero toe load fastenings as per drawing No RDSO/T- 8759 to 8765.(Alt-1)

b) The released tie angles and released foot path plate be made best reutilization for refixing back in position and for which payment will be affected under DSR 15.22 for re-erection

22) It is the sole responsibility of the agency to safeguard all his supplied materials under various items at the site with his own men till fixing is completed in all respects. And in case any short falls or missing of the supplied materials is found or noticed the cost of which paid shall be deducted from subsequent or final bills

23) Agency has to provide work force such that work will be done simultaneously at least at two locations at a time preferably on two different lines ie UP and Dn lines

24) The contractor should note that sections are electrified

25) If track on bridge is in curve, measurements are to be taken in consultation with department and versine are to adjusted to hook bolts accordingly

## **2.0 Scope of work.**

2.1. Manufacturing, supplying and fixing of Hot dip galvanized H beam sleepers with zero Toe load fastenings (ZTLF) for 60kg rail in lieu of existing steel channel sleepers over the bridges listed in separate Annexures. Fixing of H Beam sleepers to be carried out as per drawing No listed above with Railway supplied 60KG running and 52 kg guard rails duly drilling of holes as per spacing of H Beam sleepers provided and refixing back of released tie angles and chequered plates with modifications to make reuse of released chequered plates and for which payment will be made under D.S.R The fixing of H beam sleepers in lieu of existing steel channel sleepers shall be carried out under the traffic/power block asrequired

2.2 Two sets of dip Lorries required for transportation of rails/sleepers shall be procured by the agency and for which extra payment will be paid as admissible. Dip lorry working will be worked under the line blocks with departmental supervision ensuring safety protection as per rules in vogue.

2.3. The contractor has to arrange adequate number of skilled workers trained in this particular type of work. Competent supervisor for execution for this work shall also be employed and safety connected instructions of the Engineer – in Charge shall be strictly followed. Contractor's supervisor shall ensure safety during dismantling, transporting and linking of track (preferably he shall be a retired PWI/BRI from Railways.)

2.4 Contractors are advised to inspect all the bridge sites / locations to study site details before quoting the rates. No extra payment will be made either for formation or repair of service roads etc.

## **3.0 Supply of material by Railway**

3.1 Railway will supply Rails, Fish plates, Fish bolts required for linking the track including guard rails at the bridge approach. All the other fittings required for fixing running rails/guard rails to the H beam sleepers shall be arranged by the contractor on his own to bridge site with his own men and vehicles

3.2 Contractor shall make his own arrangements for plant and machinery, equipment, tools including spare parts, consumables stores and labour required to ensure efficient and methodical execution of work including transportation. The rate quoted is inclusive of all above incidental charges.

3.3. Power supply will not be arranged by Railways. Contractor has to make his own arrangement for supply if required for the work during night hours and for which no extra payment will be made.

3.4 Contractor has to ensure that during the execution of work track parameters are not to be disturbed and track cross levels and alignment to be safe guarded for smooth and safe running of trains .No direct or indirect damages or losses to the Railway property or structures shall be allowed and in case any damages to the Railway property, the cost of the damages with penalty, will be imposed and same will be deducted from contractor bill and in case loss of public lives and his workmen involved criminal action will be initiated as per legal procedures.

#### **4.0. Payment for H-Beam sleepers**

Mode of payment for supplying of H Beam sleepers, Zero toe load fastenings, ER/GR pads, hook bolts and guard rail fittings under different heads of the schedule.

4.1 On receipt and acceptance of the consignee for the materials supplied by the agency (i.e. H beam sleepers and ER /GR pads, Zero toe load fastenings, hook bolts and guard rail fittings under different heads of the schedule as a first stage 70% payment will be effected and remaining 30% after fixing in track as per drawings and relaxing the imposed caution order to normal section speed. During the intervening period from the day of fixing to the day of relaxation of caution order any maintenance works involving cross level corrections and track misalignment if any found to be attended by the agency with his own men and materials and machinery, tools and plants and for which no extra payment will be admissible

4.2 Further All works should be maintained as per Defect liability clause as per Hqslr No SCR-HQOENGG (WC)/38/2019 dated 24.09.20 (Enclosed)

4.3. The rates are deemed to include all accessories work involving drilling, cutting,reaming, punching etc complete to facilitate complete job work. Charges for temporary packing, tools and plant, consumables stores etc., will have to be arranged by the contractor at his own cost.

4.4 Accepted rates are deemed to include all taxes direct or indirect liable under central, state or local bodies act or rules, octroie and royalties and similar imposts that may be prevailing from time to time in respect of land structures and all materials supply during performance of this contract.

4.5 Galvanization of steel fittings other than ZTLF will be paid separately under item of schedule 'D'

5.0. Safe working methods.

5.1. The contractor shall at all times adopt such safety methods of work as will ensure safety of track, structures, equipment and labour. If the Railways found the safety arrangements are inadequate or unsafe, the contractor shall take immediate corrective action as directed by the Railways representative at site.

5.2. All precautions are to be taken by the contractor during the handling and transportation of the rails.

5.3. If due to negligence of the contractor or inadequate arrangements by the contractor, in case of bursting of block. The contractor will be liable to pay the loss of damage sustained by Railway

#### **6.0. Inspection.**

6.1. Fabrication of H beam hot dip galvanized sleepers shall be inspected by the consignee or any other supervisor/officer nominated by the Sr.DEN/DEN after the jigs are prepared to check its fabrication fixture arrangements for correctness of various dimensions including gauges, workmanship and to check receipt of the steel raw materials from approved vendors and test certificates before commencing fabrication work. . Contractor shall make necessary arrangements for inspection of Railway officials to his work unit at his own cost.

6.2 After the sleepers are fabricated and before they are galvanized 100% fabricated materials shall be offered for inspection at shop. It is the responsibility of the contractor to ensure the proper dimensions and workmanship.

6.3. After galvanization and before they are dispatched 100% material shall be offered for inspection to check the thickness of galvanization and its quality .

7.0. Maintenance and Guarantee period: Work done by the contractor will be guaranteed by him against any material defect / fabrication defect noticed during maintenance period of 36 months as per DLC. Any defects noticed during the period will be rectified by the contractor free of cost.

## 8.0 Annexures

### 8.1. ANNEXURE-1.

List of zero toe load fastening arrangement for each sleeper set for BG 60KG (UIC)/52KG Rail on H beam sleepers for girder bridges as per Drg No RDSO/T-8759-8765 (Alt-1)

### 8.2. ANNEXURE-1I

List of steel fittings other than zero toe load fittings galvanized (i.e. Hook bolt and guard rail assembly fastenings per each sleeper. (Note As a correction in guard rail assembly tapered washer as per Drg No .RDSO/T-8353 in place of RDSO/T-5162 ( with latest correction )to be provided to follow the tapered profile of H beam sleeper flange slopes.)

### 8.3. ANNEXURE

1II List of rubber pads.)

8.4. Agency has to renew with H beam sleepers in lieu of existing steel channel sleepers to any other bridge/bridges of urgent and important nature as directed by ADEN/Bridge/SC in SC Division

8.5. Some of the bridges may be dropped or added additionally as per site requirement, ensuring the total quantity is within the scope of the agreement quantity for which no claim shall be entertained from the agency for any addition or deletion of the bridges.

### 8.6. ANNEXURE-IV

List of drawings uploaded in the tender schedule in annexure IV. The same may be down loaded before quoting or placing tender. Latest alteration if any to be followed

#### **Special Notes: -**

1. All construction material shall be used as per approved brands/makes as per CE/Works S.C.Rly lr No SCR-HQ0ENGG(SOR)/1/2020-Dy CE/WORKS/SCR Dt

24.05.22 ( copy enclosed)

2. Approved National Testing Laboratories as per CE/Br.Rehab/S.C.Rly lr No W.CE/Br. Rehab/2019 dated 14.08.2019, 25.09.209 are enclosed

3. All works should be maintained as per Defect liability clause as per Hqs lr No SCR-HQOENGG (WC)/38/2019 dated 24.09.20 (Enclosed)
4. Recent updated RDSO approved vendor list s shall be followed for vendor, inspection agency (Uploaded RDSO vendor list to be obtained either from the Dept,or from RDSO web site directly)
5. All drawing shall be followed as per latest alteration/corrections

## **SPECIFICATIONS FOR GALVANIZATION AND ITS TESTING.**

### **1. SCOPE:**

1.1. This standard specifies the requirements for zinc coating applied by hot dip galvanizing and criteria for sampling and inspection of such galvanized members.

### **2.0. GENERAL REQUIREMENTS.**

2.1. Quality of Zinc: Zinc conforming to at least grade Zn 99.5% specified in IS:2629-1966 (latest) shall be used for the purpose of galvanization.

2.2. Base metal: Requirement shall be in accordance with clause of IS 2629 1966. Shot or sand blasting may be used instead of pickling to avoid hydrogen embrittlement.

2.3 Surface preparation: Surface preparation shall be as per clause of IS 2629 1966. Shot or sand blasting may be used instead of pickling to avoid hydrogen embrittlement.

2.4 .Galvanizing: The structures may be galvanized as per the IS 2629 – 1966 and IS: 4759 – 1984 unless otherwise specified in the succeeding paragraphs.

### **3. .COATING REQUIREMENTS.**

3.1. Mass of Zinc coating: The requirement for the mass of zinc coating for all steel structural shall not be less than 705 g/sq.m and the galvanization thickness shall not be less than 100 microns.

3.2 Freedom from defects: The zinc coating shall be uniform adherent, reasonable smooth and free from imperfections such as flux, ash and dross inclusions, bare patches black spots, pimples, lumpiness and runs, rust stains bulky white deposits and blisters. These terms have been defined in IS: 2629 – 1966 which as amended is enclosed at APPENDIX 'A'

3.3 Steel embrittlement: The design of the product and the selection of steel for its suitability to withstand normal galvanizing operations without embrittlement or the method of fabrication shall be the responsibility of the fabricator. Recommended precautions to design, fabricate and prepare the material for galvanizing to prevent embrittlement shall be as per IS 6158 – 1971.

### **4 .0 SAMPLING AND CRITERIA FOR CONFORMITY.**

4.1 The following sampling plan shall be followed for ascertaining the conformity of galvanized coating.

4.2 LOT: All rolled and fabricated sleepers galvanized in a coating bath and comprising of one complete day's turnover shall constitute a lot. For all others, materials of the same type in a coating bath whose coating characteristics are intended to be uniform shall form a lot.

4.3 Samples shall be taken from each lot and tested for conformity of coating. A test piece of mild steel plate of 6mm thick and of size 100 x 100 mm shall be used as sampling piece.

4.4 Scale of sampling: The number of units to be selected from a bath shall be in accordance with column 1 and 2 of the table given.

TABLE - SCALE OF SAMPLING

Lot size (No of units of In a bath )	sample size	Permissible No of defective units.
Up to 25	3	0
26 to 50	5	0
51 to 100	8	0
101 and above	13	1

4.5 Tests for visual inspection.

4.6. Visual inspection of the material in a lot shall be made to determine the conformity with the requirements of 3.2. If the inspection warrants rejection if the lot the galvanizer may segregated the good pieces of the lot and submit it once again for inspection.

4.7. If the lot inspected for visual inspection passes, than the lot shall be declared as conforming to requirements of 25.2

4.8 Number of tests for coating characterizations

4.9 Actual products may be used as test specimen.

4.10 Each sample shall be tested by testing one test specimen. In case the first specimen representing a sample unit fails to conform to the requirements specified in 26.14 the second and the third specimen shall be tested. If any one of the second or third specimen fails to conform to the requirements, the sample unit shall be considered defective. If the number of the defective units in a lot exceeds permissible numbers specified in the above tables, the lot shall be rejected.

4.11 The materials in a lot which have been rejected may be stripped and regalvanized and again submitted for inspection and tests.

4.12 The lot shall be declared as conforming to the specification if 26.11. is satisfied

4.13 Test procedure for mass of galvanized coating:

4.14 . The mass of galvanized coating shall be determined by any of the method as mentioned below as mutually agreed between the Railway and galvanizer.

5.0 Stripping method:

5.1 Cleaning of test piece: The test pieces shall be washed with solvent naphtha, trihalo ethylene or any other suitable organic solvent followed by alcohol and finally dried thoroughly.

5.2 Stripping solution: Dissolve 20 gms of antimony trioxide ( $Sb_2O_3$ ) or 32gms of antimony tri chloride ( $SbCl_3$ ) in 1000 ml of concentrated Hydrochloric acid (Specific gravity 1.16)

5.3 Immediately before tests, prepared the stripping solution by adding 5 ml of the solution prepared under 5.1.1.2 to 100 ml of concentrated Hydrochloric acid (specific gravity 1.16) mix well.

5.4 Procedure: (IS:6745 - 1972) Weight and cleaned test specimen whose mass is less than 200 gms nearest to 1 gm (for test piece whose mass is between 300 to 1000 gm weight to the nearest 0.1 gm and for masses over 1000 gm, the accuracy of weighting shall be nearest to 0.5 gm. After weighing immerse each test piece



singly in test solution prepared in 5.1.1.2 and allow remaining there until the violent evolution of hydrogen ceases and only a few bubbles are being evolved. This required about 15 to 30 seconds.

5.5 The mass zinc coating in gm/m<sup>2</sup> of surface may be calculated as per the following formula.

$$M = (M_1 - M_2) \times 3930 / t \text{ Grams per Sq.m per unit thickness of stripped test piece.}$$

Where M = Mass of zinc coating in gm/m<sup>2</sup> of surface.

M<sub>1</sub> = Original mass of in gms of test piece.

M<sub>2</sub> = mass in gms of stripped test piece

and t = thickness of the stripped test piece  
in mm

5.6 Magnetic or microscopic method as per IS:3203 - 1965 or eddy current method as per IS:6012 - 1970 may be employed to determine the thickness of coating. The mass of coating in g/m<sup>2</sup> shall be calculated by multiplying the thickness in mm by a factor 7047.

5.7 Determination of uniformity of galvanized coating: Where practicable the uniformity of galvanized coating shall be determined by the prece test as prescribed in IS: 2633 -1972. The article should withstand four 1 minute dip.

5.8 Adhesion of galvanized coating: A coating shall withstand the pivoted hammer and knife test as prescribed in IS: 2629 - 1966.

## **6.0 INSPECTION**

6.1 Visual inspection of material shall be made to determine conformity with the requirement of 25.2 when partial inspection warrants rejection of a lot, the galvanizer may reject the lot and submit it once again for inspection.

6.2 Should one specimen or specimens failed to conform to the requirements specified in 26.14 for the mass of coating, the second and third specimen/specimens shall be tested failure of either the second or the third specimen or specimens to conform the requirements shall be the cause for rejection of the lot which the samples represents.

6.3 Materials that have been rejected may be stripped and re galvanized and resubmitted for inspection and test when they shall conform to the requirements of this specification, otherwise the entire lot shall be rejected.

## **7.0 RECTIFICATION OF DAMAGE.**

7.1 Normally all fabrications work in the case of galvanized articles shall be completed prior to galvanizing. If for any reason, fabrication such as cutting, drilling or welding has to be undertaken after galvanizing, protection of metal exposed as result of fabrication, and rectification of damaged galvanized areas shall be done in accordance with either of the following methods or any other method approved by the Railway administration.(i) Sticks or rods, 5-10 mm dia, of high purity zinc shall be used for this purpose. The surface to be protected, of the surface where galvanizing has been damaged, shall be cleaned any oxides removed with a weak acid solution and wire brush. The surface shall be thoroughly washed with water to make it free from any traces of acid. The cleaned area may be heated with a welding torch and rubbed with white salamoniac. A piece of zinc stick or rod of high purity shall be melted on+ this area and spread out with a heated pierce

salamoniac. The area shall then be washed down by water and lightly wire brushed. The workmanship shall be such that the finished surface is smooth and non porous.

(ii) The damaged surface after cleaning, as mentioned in para (i) above, shall be painted with two or more coats of zinc rich primer followed by a finished coat, as per the painting schedule recommended by the supplier of zinc rich primer.

It is to be ensured that the dry film thickness of zinc rich primer shall not be less than the average thickness of the galvanized coating. The complete painting system ie., Zinc rich primer with the finishing paint for this purpose shall be procured from the same source of repute and as approved by the Railway administration

#### ANNEXURE 'A' (Clause 3.2)

##### DEFECTS - THEIR CAUSES AND REMEDIAL MEASURES.

Defects	Causes	Recommended action	Ground for rejection
<b>Bare Spots</b>	Paint, grease or oil Residues	Check cleaning practices	Yes. If bare spots are bigger than 8mm dia
	Scale of rust residues	Check pickling practices	
	Residual welding Slag	Blast clean welds, avoid coating rods	
	Break down of preflux Coating	Check preflux and drying conditions	
	Aluminum content of Bath too high	Regulate aluminum addition	
	Rolling defects in Basic steel	Check steel supply	
	Articles in contact During Galvanising	Keep articles separated	
<b>General roughness</b>	Analysis of original Surface Condition of steel	Check steel supply	NO
	Over pickling	Reduce pickling, use inhibitor.	
	High galvanizing temperature or long immersion time or bath.	Adjust galvanising Conditions.	

<b>Pimples</b>	Entrapped dross	Avoid agitation of dross layer. Check carryover of pickle salts	No. Unless Dross contamination is heavy.
	Withdrawal speed too high	Remove. Work slowly	
<b>Lumpiness and bath</b>	cold galvanizing	Increase temperature	
<b>Runs (uneven drainage)</b>	Delayed run-off from seams joints, bolts, holes etc.,	Remove work slowly	NO
	Articles in contact during withdrawal	Keep articles separated	
	Stale flux burnt on during dipping	Refresh or renew flux blanket	
<b>Flux including 1</b>	Surface residues on steel		
	Flux picked up from top of bath	Check steel preparation skim before withdrawal	YES
<b>Ash inclusions</b>	Ash burnt on during dipping	Skim bath before dipping	Yes if gross lumps
	Ash picked up from top of bath	Skim bath before withdrawal	
<b>Black spots</b>	Includes flux particles from flux dusting dirt	Confine fluxing to top of bath. Check storage conditions	YES
<b>Dull grey coating (All alloy, no free zinc)</b>	Steel composition high silicon, phosphorous or carbon or severe cold work	Check steel supply for composition order to adjust for galvanizing	NO
	Slow cooling after galvanizing	Avoid hot stacking quench	
	Release of absorbed hydrogen during solidification of coating 'weeping' of acid etc. from seams and floods	Avoid over pickling use inhibitor.	
<b>Rust stains</b>	Storage near rusty material	Check storage conditions	NO

<b>Bulky white deposit (wet storage stain white rust)</b>	Confinement of close packed articles under damp conditions	Store and ship in dry well ventilated conditions ,separated articles with space	NO
	Pickling of articles while damp	Dry before packing includes desiccant	
	Expansion of entrapped hydrogen and moisture in flaws	check steel quantity	
<b>Blisters</b>	Driving off of hydrogen absorbed	Use shot blast instead of pickle, check steel supply	Yes, if general
	Improper malleabilising (for malleable iron casting only)	Check malleabilising practice	
<b>Tiny blisters</b>	Effect sometimes observed on quenched work, notably malleable casting. May be caused by gas evolved from the work resulting from absorbed hydrogen or breakdown of combined carbon near surface.	Use shot blast instead of Pickle. Check malleabilising treatment. Should have no combined carbon near surface of coating	Yes, if blistering is generally widespread .

## SPECIAL CONDITION FOR SIDE PATHWAY

### 1.0 SPECIAL CONDITION OF CONTRACT

1. As per hq letter No W.496/Policy/Vol.IX dated 26.05.2022.Reimbursement of cost of steel on 75 % of invoice value or at the rate of 75% of the quoted rate of steel in the contract, whichever is less, can be done to the contractor on his request after steel is physically brought to the site and verified by engineer in charge at site. Proper accountal of the received quantity at site is to be made by engineer in charge'.

### **2.0 Specification and Drawings**

1. The Existing members of the steel girder are to be strengthened before providingside pathway as per site condition during execution as directed by the Engineer representative

2. Side path way shall be fabricated and erected as per latest Standard drawing

3.Structural steel sections for side pathway work shall conform to IS 2062, Quality 'A' Grade Designation E 250, and chequered plate to IS 3502 specifications to be procured from approved list of steel manufacturing companies only and no rerolling and other non-listed manufacturing companies entertained. As a token of evidence for the material procured from the approved companies, bill invoice and Eway generated bill copy and test certificates issued form the companies of same heat mark listed in test certificate issued by manufacturing firm (The list of approved steel manufacturing firms or companies is enclosed in separate annexure issued as per CE/Works S.C.Rly Ir No SCR-HQ ENGG (SOR)/1/2020-Dy CE/WORKS/SCR Dt 24.05.2022

4. All direct connections to main girder stiffeners to side path way truss bracket

shall be invariably to done with riveting only .Rivets should confirm to IS 1148 specifications and riveting to be carried out as per specifications listed in IRBM Para No 215 without damaging bridge girders (extract copy of Para No 215 of IRBM is enclosed).

5. Galvanizing should be done after inspection and acceptance of the fabricatedSteel bythe consignee/authorized representative from Railway side nominated by Sr.DEN/DEN and necessary testing equipment as desired by the consignee shall be arranged by the agency and for which no extra payment is admissible. 6.The galvanization should be done as per IS 2629-1966 and IS 4759-1984 ofminimum thick shall be 100 microns and for which test certificate is to befurnished (Specifications enclosed)

7. Erection and fixing of side path way shall be carried out as per SOD in vogueshall be adhered

8. All works should be maintained as per Defect liability clause as per Hqs Ir No

SCR-HQOENGG (WC)/38/2019 dated<sup>05</sup>24.09.20 (Enclosed)

9. Approved National Testing Laboratories as per CE/Br.Rehab/S.C.Rly Lr .CE/Br. Rehab/2019 dated 14.08.2019, 25.09.2019 are enclosed.

The contractor should note that sections are electrified and work should be Carried out in traffic condition/block period.

10.As per hq letter No W.496/Policy/Vol.IX dated 28.12.21. Agency has to set up site laboratory within 45 days from the date of issue of letter of acceptance (LOA). If the agency does not set up site laboratory then penalty will be imposed accordingly (copy enclosed)

### **QUALITY CONTROL OF WELDING DURING FABRICATION OF STEEL WORK ( As per Head Quarters Lr. No. W.71/Br/P/9/Vol .VI dt 17-09-08)**

To ensure better quality control in welding during fabrication of steel structure, the following tests to be conducted invariably by contractor in presence of inspector -in-charge

**2.0** After removing the slag and brushing with a stiff wire brush, the welds shall be visually inspected for size and profile (Acceptable and defective weld profiles of fillet welds are illustrated in ANNEXURE-I enclosed sketches separately in PDF file

**2.1** Confirming of fillet welds to size and contour shall be determined by use

of gauges (as per ANNEXURE -II enclosed sketches separately in PDF file

**2.2** Welds shall also be examined by the Dye Penetration test as per IS-3658 or by Magnetic particle Flaw Detection method as per IS-3703

Any deficiencies noticed to be corrected immediately by the contractor at his own cost.

### **3. Other conditions**

1) Contractors should ensure no damage to the existing structures, if any damage occurs to existing structures, it has to be made good by contractor at their own cost and railway will not pay for it

2) Safety Precautions to be taken while carrying out the work. There should not be any obstruction to train services.

3) The material should be stacked at nominated place after completion of days work and proper barricading to be done around working, fabrication site and released material should be handed over at SSE/Bridges office

4) No extra payment will be made either for formation or repair of service roads etc. and the contractor has to make his own arrangements to make it feasible for all operation as required at site till the completion of the work as per the scheduled items of work including for all heights and crossing of track.

5) Agency has to be self-sufficient with required skilled labour and Machinery to engage two batches to work from two opposite ends of the bridge besides to work at two different locations simultaneously in case of work combining other units of section. With the above planning bar chart to be submitted by the agency before commencing the work for planning of caution order in advance and if any delay in progress as per the bar chart as

per GCC conditions penalty will be imposed .

6) Contractor shall make his own arrangements for plant and machinery, equipment, tools including spare parts, consumables stores and labour required to ensure efficient and methodical execution of work including transportation. The rate quoted is inclusive of all above incidental charges.

### Special conditions for FOBs

1. As Rly Bd revised guide lines vide Ir No 2017/50/CE-111/BR/FOB Dt 18.12.2018. Fabrication of FOBs can be done through firms other than RDSO approved firms. However, to ensure quality of fabrication, QAP has to be prepared in each case which is to be approved by officer not below rank of JAG
2. Complete fabrication and erection of FOB shall be carried out as per RDSO standard drawings and specifications mentioned in it and latest corrections up to date
3. Metallization should be done for steel work as per the RDSO standard drawing including grit blasting as per IRS-BI-2001 following by one coat of etch primer (as per IS: 5666).
4. This work is to be carried out on platforms in stations. Contractor must protect the work site with barricading (at least double layered green cloth) to avoid discomfort to passengers. During execution of work, train movements should not be hindered.
5. Dismantling/Erection of FOB and ancillary works should be carried out by cranes/hydras in Traffic and Power block during day/night time. Sometimes granted block may be cancelled in the last minute due to train operational constraints. No extra payment will be made.
6. If contractor's machinery such as cranes/hydras/tractors damage platform surface or any railway property, contractor should carry out repairs at His own cost.
7. The excavated earth and construction materials should be stacked properly at nominated place with barricading (at least double layered green cloth).
8. Contractors are advised to inspect the proposed site before participating in tenders to assess availability of approach road, crossing of tracks for transportation of construction materials and machinery, and to plan execution of the work accordingly.
9. If the new Escalator (civil work) is to be provided adjacent to an existing escalator, it should not damage any part of the existing escalator. Cost of repair for any damage should be borne by the contractor.
10. Reimbursement of cost of steel on 75% of invoice value or at the rate of 75% of the quoted rate of steel in the contract, whichever is less, can be done to the contractor on his request after steel is physically brought to the site and verified by engineer incharge at site. Proper accountable of the received quantity at site is to be made by engineer incharge.
11. Contractor at his own cost should deploy watchmen round the clock to prevent any untoward incident regarding safety of passengers moving on the platforms.
12. For structural steel works where quality "A" is mentioned in the drawing, payment will be restricted to the cost of only quality "A" steel even if steel of higher quality is used by the contractor.



## **Working of Road Cranes**

- 1 No machine shall be selected to do any lifting on a specific job until its size and characteristics are considered against the weights, dimensions and lifts radii of the heaviest and largest loads.
2. The contractor shall ensure that a valid certificates of fitness is available before use of road cranes
3. Contractor can utilize the services of any competent person as defined in factories Act, 1948 and approved by Chief inspector of factories
4. The laminated photocopies of fitness certificate issued by competent person, the operator's photo, manufactures load chart and competency certificate shall always be either kept in the operation cabin or pasted on the visible surface of the lifting appliances
5. All lifting appliances including all parts and gears thereof, whether fixed or movable shall be thoroughly tested and examined by a competent authority person once at least in every six months or after it has undergone any alterations or repairs liable to effect its strength or stability

## **2.0 SPECIFICATIONS FOR STRUCTURAL STEEL**

2.1 All rivet steel to comply with IS specification 1148/82.

2.2 Fabrication of steel work should comply with IRS specification B1/2001.

2.3 Welding should conform to codes as detailed in the approved drawing.

2.4 The steel used shall conform to specification as detailed in the approved drawing. And from Railway approved brands vide PCE/SC Ir No SCR-HQOENGG(SOR)/1/2020 Dy.CE/Works/SCR Dated 24.05.2022, The necessary steel test certificate should be obtained and submitted to the above specifications for the materials to be used for this work.

2.5 The joints for main structural members such as ISMB/RSJ/Angles are not permitted. No two pieces shall be welded or otherwise jointed to make up required length of a member

## **3.0 QUALITY CONTROL OF WELDING DURING FABRICATION OF STEEL WORK (As per Head Quarters Lr.No. W.71/Br/P/9/Vol .VI dt 17-09-08)**

To ensure better quality control in welding during fabrication of steel structure, the following tests to be conducted invariably by contractor in presence of inspector -in -charge

3.1 After removing the slag and brushing with a stiff wire brush, the welds shall be visually inspected for size and profile (Acceptable and defective weld profiles of fillet welds are illustrated in ANNEXURE-I) enclosed sketches .separately in PDF file

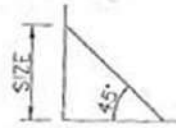
3.2 Confirming of fillet welds to size and contour shall be determined by use of gauges (as per ANNEXURE II) enclosed sketches .separately in PDF file

3.3 Welds shall also be examined by the Dye Penetration test as per IS-3658 or by Magnetic particle Flaw Detection method as per IS-3703

Any deficiencies noticed to be corrected immediately by the contractor at his own cost.

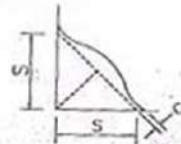
# ANNEXURE 1

## ACCEPTABLE AND DEFECTIVE WELD PROFILES



DESIRABLE FILLET WELD PROFILE

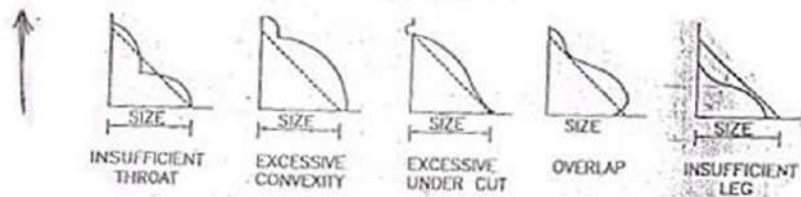
FIG.-24



CONVEXITY C NOT TO EXCEED  $0.1 S + 0.76 \text{ mm}$

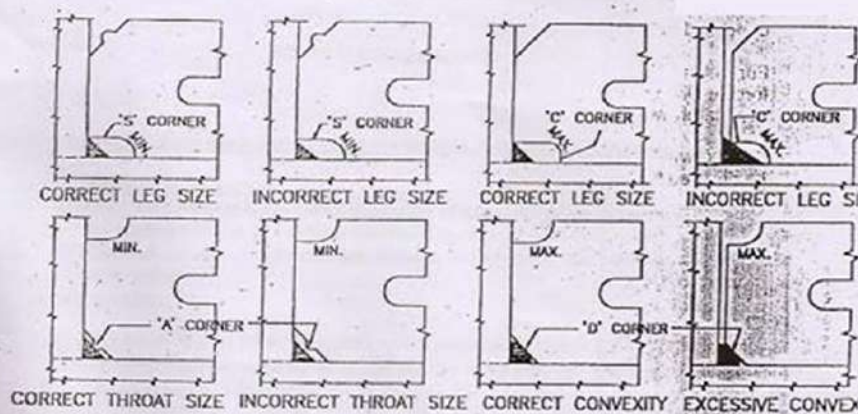
ACCEPTABLE FILLET WELD PROFILE

FIG.-25



## METHOD OF GAUGE APPLICATION

## ANNEXURE II



1. ALL DIMENSIONS ARE IN MILLIMETRES.
2. GAUGE FOR EACH WELD SIZE TO BE MANUFACTURED TO THE DIMENSIONS GIVEN IN THE TABLE ABOVE
3. WELD GAUGE SIZE TO BE MARKED AT LOCATION 'S' IN 3mm LETTERS, OTHER MARKING IN 2mm LETTERS
4. ALL MARKINGS TO BE DONE ON BOTH FACES.
5. THESE GAUGES ARE SUITABLE FOR INSPECTION OF NORMAL FILLET WELD OF SIZES : 25mm WITH ANGLE BETWEEN FUSION FACE OF 90° FOR DEEP PENETRATION WELD AND FOR ANY OTHER ANGLE BETWEEN FUSION FACES, SPECIAL GAUGES MAY BE MADE

### **General Conditions for painting of steel structures**

1. The paint supply shall be in the sealed tins with company labels indicating the manufacturing date and batch number in intact *preferably*
2. The paints procured by the agency should be preferably BE from one lot which has been certified by the CMTD/LGD or any other approved National Testing Laboratories whichever is convenient, at the cost of contractor till completion of work. If batch number of the paints differs again the samples shall be tested from CMTD/LGD or any other approved National Testing Laboratories for IS specification confirmation before utilization
3. The quantities shown in the tender schedule are approximate and will be operated in full or part at the discretion of the Engineer-in-charge. Payment will be made based on the actual items operated.
- 4 All materials to be supplied and used by the contractor in connection with this work should have prior specific approval of the Engineer in charge and should be in accordance with the specifications for materials and works of SC Railway
- 5 Electrical energy that may be required will be supplied by the Railway wherever feasible at the discretion of the Railway on payment of the charges as reqd to the Electrical dept. The contractor will have to make his own arrangements for taking the connection from the nearest Railway electrical source of supply.
- 6 The contractor labour shall be provided with identity cards due to security reasons.
- 7 The damages done to the adjoining Railway assets to carry out the new work shall be made good at the cost of the contractor. And no payment will be made for them
8. The contractor should submit the work programmed chart/Bar chart before taking up the work.
9. The accepted rates should be deemed to include all taxes direct or indirect liable under Central, State or Local bodies Act or rules, Octroi, toll taxes, tools, royalties, seigniorages, cess and similar imposts that may be prevailing from time to time.
- 10 The contractor has to make his own arrangement for Scaffolding/ Jula /staging/ plants with crew and consumable stores and other accessories like ladders, for carrying out the work for which no extra payment will be made.
11. The contractor shall be responsible to take all precautions to ensure the safety of the public wherein on public or Railway and shall post such look-out men as pertaining to the work.
12. No substandard work will be permitted. If any item of the work, at any stage, if found, will be rejected and that portion of the work will be removed at the cost of the contractor and has to be made good by the contractor without any extra payment. The decision of the Engineer In charge will be final in regard to quality and quantity of work. No claims will be entertained in this matter.
- 13 Railway administrations will not be responsible for the safety of labour engaged by The contractor for his work and the contractor should indemnify the Railway for any Compensation to be paid for the loss of human life or injury sustained by his Labour.
- 14 The contractor shall make his own arrangements for storage of materials to see

That no damage will take place during storage period. The contractor shall take all Precautions effectively to safe guard the material between the period of procurement and the period of use.

15 The rate quoted by the contractor will be inclusive of the cost of all the materials, labour, tools & plant etc. complete including transportation of the same at his own cost including loading and unloading.

16 Work is to be executed in the running conditions either under the traffic block or under arranged speed restriction as detailed in letter No W.506/ESO's dt 29.07.20 of SCR.Hqs work branch. The block will be made available as per the convenience of the Railway depending up on the position of the traffic .Railway shall not pay any extra amount for the contractor due to non availability of traffic block.

17. No service roads will be provided by railways. If required the contractor himself has to provide the same for smooth working and no extra payment will be made.

18. The contractor is responsible for safe passage of trains .All trains will be allowed with the specific approval of SSE/JE Bridges in charge in the portion of the bridge. Any variation in this regard the contractor will be held responsible for all damages caused out of negligence manipulated by his staff.

19. It is the responsibility of the contractor to see that there is no detention or interruption to the movement of the trains during the execution of the above work.

20. The general condition of the contract and Unified standard schedule of rates -2021 and its unified specifications of material and work of south central railway and all corrections up to date will be applicable.

21. The intending tenderers are advised to inspect the bridges to obtain first hand knowledge of working conditions, accessibility and weather conditions etc; and they shall take into account all the above factors before tendering.

22. Contractor shall make his own arrangements for safety of labour engaged for which no extra payment shall be made. The contractor shall comply all regulations of central, state, local govt and labour laws in respect of labour employed on his work including insurance cover. The contractor shall depute look out man with Hooters etc; to warn the workers. Necessary protective clothing safety equipment, goggles etc;

23. Necessary scaffolding, derrick, ladders etc: for painting the structure should not infringe Railway's moving dimensions and shall be arranged by contractor at his own cost and the arrangements shall be approved by the Engineer in charge.

24. Surface preparation shall be approved by Engineer in charge before commencement of the painting. Similarly successive coats of Paints shall be applied only after the approval of each completed paint coat by Engineer in charge.
25. First coat paint shall be done only after the surface preparation is approved by Engineer in charge.
26. The approved colour of strainer of desired colour in requisite proportion should be added in the paint to differentiate between the two successive coats of paint.
27. Mixing of thinner or any dilute in paint is not at all allowed in any condition during the execution of painting work.
28. The equipment (Elecometer) required for measuring dry film thickness should be arranged by contractor.
29. In case of rain within 24 hours of application of paint film, contractor should redo the coat at his own cost.
30. Painting work should be done under the supervision of competent Bridge Engineering staff only.
31. To carry out the painting/maintenance works on the girder bridges/Foot over bridges within the vicinity of OHE (ie less than 2 meters distance) a memo has to be sent to TRD supervisor of the jurisdiction by the SSE/Br/Works duly mentioning the time period required to arrange the „permit to work’ Conditions enclosed vide **Annexure - A**. Before starting the work contractor has to ensure the same

#### **ANNEXURE -A**

Draft proceeding order to be followed by TRD and Engineering Supervisors/Tenderer/Contractor with regard to maintenance works for the Bridges:

- a) “No Work” shall be done above or within 2 meters from the live OHE without a “permit-to-work”
- b) Use of steel measuring tapes or long metalizing wires is prohibited in electrified sections.
- c) Painting work should be done under the supervision of competent Bridge engineering staff only
- d) To carry out the painting maintenance works on the girder bridges i.e. within the vicinity of OHE (less than 2 meters distance) a memo has to be sent to TRD supervisor of the jurisdiction by the

SSE/Br/Works duly mentioning the time period required to arrange the „permit to work’. No engineering SSE/Br/Works supervisor should allow the contractor staff or bridge staff to carry out the works on bridges (less than 2 meters from OHE) without obtaining “permit-to-work” from the authorized person

of TRD Official. Before starting the work contractor has to ensure the same

- e) After obtaining power-block on OHE, the TRD supervisor will then arrange two discharge rods to OHE on either side of the Bridges work spot, and then issue permit to work to engineering supervisor.
- f) After completion of the work, the Engineering supervisor should give a clearance memo to TRD supervisor and then only the two discharge rods will be removed from OHE and the OHE will be charged.
- g) Care should be taken when labour were engaged by contractor to do the painting on the girder bridges i.e. they should be allowed to work after obtaining permit to work only.
- h) While doing the painting/.maintenance works beyond 2 meters distance to OHE the staff must be counseled/watched not to come into the danger zone (i.e. below 2 meters distance to OHE) during the course of working by SSE/Br/Works . and to be ensured by the contractor
- i) Responsible person from the SSE/Br/Works side should be available at the work spot of the Bridge maintenance/painting works) during the “power block” (permit to work) period to avoid any untoward incidents. Before starting the work contractor has to ensure the same

## **SPECIFICATION FOR PAINTING OF GIRDER BRIDGES, FOBs AND STEEL STRUCTURES**

### **33.0 SURFACE PREPARATION**

**33.1** Scraping/cleaning/surface preparation of steel is one of the important pre- requisites for the painting to last long. Sufficient care should therefore be taken in preparing the surfaces two types of surface preparations are involved according to the condition of the existing paint/surface.

**33.2 Type I Preparation:** This should be used where the primary coat of paint is sufficiently in good condition, adhering to the metal firmly and there are no signs of rust. The existing primary coat of paint will not chip off when hit by the pointed end of the chipping hammer.

**33.3 Type II Preparation:** -This should be used where rust has appeared in many place and existing primary coat of paint has developed cracks, littering, peeling, brittleness, etc., and is in bad condition. Type II Preparation has to be resorted to if the primary coat of paint chips off when hit by the pointed end of the chipping hammer.

**33.4** Surface preparations of the above two types of finishes on the same girder may be prescribed if areas are sufficiently large and distinguishable and measured before work is commenced. For example, in many girders the top flanges particularly of stringers and cross girders develop corrosion, while the web portion remains in good condition. In such locations, it is possible for the whole web to be cleaned to type I preparation and the top flange to Type II preparation.

**33.5.** Prior decision by ADEN/BR in case of girders and structures maintained by SSE/Br/Works , and that of Sectional ADENs for other structures maintained by PWIs and IOWs, should be taken about the areas where Type I or Type II surface preparation has to be done after making detailed inspection of the condition of paint on girders and structures and these should be intimated to the Inspectors in case of departmental painting and incorporated in the Schedules/Tender Documents in case where painting is done through contracts.

**33.6.** Specification for Type I Preparation: The surface shall be made free from Oil, grease and dirt. The existing primary coat of paint which is firmly adhering shall not be removed. Surface shall be rubbed with wire brushes and sand paper/emery paper. This is only for roughening the surface and not for removing the paint.

**33.7.** Specification for Type II Preparation: The surface shall be cleaned of oil, grease, dirt, rust, loose paint, mill scales and other foreign matter completely and at least 75% of each square inch (10sq.m) of surface are shall be free from visible residues and the remainder shall be limited to slight discoloration/stain. Such discoloration shall not exceed ¼ " (6mm) square. The tools used may be hand or power operated. These may include scrapers, chippers, hammers, knives, chisel, wire brushes, Emery/sand papers, pumice stones, brickbats etc. Grease, if any, should be removed before mechanical tools, are used. Wire brushing should invariably be done at the end so as to obtain a uniform rough surface.

The surface prepared by Type I & II methods may be checked by visual observations for uniformity of surface prescribed in the particular type of cleaning.

**33.8. Surface** preparation shall not be done unless the approved paints of sufficient quantity (both primer and finishing coat paints) are available in stock.

**33.9.** Special care should be taken in preparing corners, junctions, of members, head and nuts of bolts rivets holes, areas less accessible, hidden pockets etc. and uniformity of preparation at these locations shall be attained to that of rest of the surfaces.

**33.10** Surface preparation/ painting shall not be done in the following conditions:-

- i) When the ambient temperatures is below 10° C or above 50 degreeC
- ii) In rainy season
- iii) Night
- iv) In winter before 8 AM
- v) In summer between 11 AM and 3 PM on areas that are likely to beexposed to direct sun light.
- vi) When the moisture content in the atmosphere is more than 80%
- vii) Extremely windy/misty/dust blowing conditions.

**33.11.** Chemicals shall not be used for surface preparation of both the types.

#### **34.0****PAINTING**

**34.1** **For Type I Preparations:** All the steel work shall be painted with 2 coats of paint confirming to IS 13607 (smoke grey ) for spans up to 100 ft.(30.5m) or Paint aluminum to specification IS:2339 for spans 100 ft and above i.e. 2 finishing coats only)

**34.2** In the case of paint confirming to IS 13607 (smoke grey), a little quantity of lamp black shall be added to the first coat to obtain a darker hue in order to distinguish the first coat from the second coat. Similarly, in the case of aluminum paint a little blue paint shall be added, instead of Lamp black to



the first coat of Aluminum Paint for distinguishing it from the second coat.

**34.2.1     For Type II of preparations:** All steel work shall be painted with 3 coats of paint

**34.2.2     First Coat (Primer coat)** For bridges (A) Applying coat of primer with Zinc chromite to specification IS:104 with all contractor's material, labour, tools, plant, machinery, scaffolding including all lead, lift etc. Complete and as directed by the Engineer-in-charge at site

(B) Applying coat of primer with Zinc chromites red oxide over zinc chromites to specification IS: 2074 with all contractor's material, labour, tools, plant, machinery, scaffolding including all lead, lift etc. complete and as directed by the Engineer-in-charge at site.

Note: - items A & B forms as one primer coat for bridges and structures.

(C) Applying coat of primer with Zinc chromites to micro wave towers to specification IS:104 with all contractor's material, labour, tools, plant, machinery, scaffolding including all lead, lift etc. Complete and as directed by the Engineer-in-charge at site

(D) Applying one coat of ETCH primer consisting polyring Butynal phosphoric acid catalyst of approved quality to all the members of the tower as per the specifications conform to civil aviation regulation to IS :5666 with all contractor's material, labour, tools, plant, machinery, scaffolding including all lead, lift etc. Complete and as directed by the Engineer-in-charge at site ( for microwave towers )

(E) Applying first finishing /protective coat with orange white/ required colour synthetic enamel of best quality and anticorrosive to with stand exposures to outside condition and of standard equivalent to synthetic enamel paint of Shalimar, British or Asian paint. The mast shall be painted in alternative band of international orange (ISI shed 592) and white terminating with orange at top and the bottom height of each band shall not exceed 6 meters and should not less than 0.50 meters as per the specifications conform to civil aviation regulation to IS: 5666 with all contractor's material, labour, tools, plant, machinery, scaffolding including all lead, lift etc. Complete and as directed by the Engineer-in-charge at site (for microwave towers)

**34.2.3** Applying second finishing /protective coat of orange and white enamel/required colour of best quality and anticorrosive to with stand exposure to outside conditions and standard equivalent to synthetic enamel paint of shalimar, british or Asian paints

.The second coat of enamel paint as per the specifications and as directed by the Engineer -in-charge at site with all contractor's material, labour, tools, plant, machinery, scaffolding including all lead, lift etc. Complete and as directed by the Engineer-in- charge at site (second coat for microwave towers).

**34.3 Second Coat:** (Finishing/Protective coat) with paint confirming to IS 13607 (smoke grey) for spans up to 100 ft (30.5m) and above In the case of paint confirming to IS 13607 (smoke grey) , a little quantity of lamp black shall be added to the second coat to obtain a darker hue in order to distinguish the second coat from the third coat. Similarly, in the case of aluminum paint a little blue paint shall be added, instead of Lamp black

**34.4 Third Coat** (Finishing/Protective coat) with paint confirming to IS 13607 (smokegrey) for spans up to 100 ft (30.5m) and above

**34.5** Various defects in Painting, their causes and effects are furnished in **Annexure- B.**

**34.6** In case material description is available in approved brands/makes as per CE/Works S.C.Rly Ir No SCR-HQ0ENGG(SOR)/1/2020-Dy CE/WORKS/SCR Dt

06.03.20. Brand mentioned to be strictly followed. Otherwise the material needs to be tested as per clause mentioned in S. No 2 of General Conditions for painting of steel structures

**34.7** Paints required for primer and finishing coats may preferably be procured from the same firm for achieving better results.

**34.8** If thinners are to be added to the Paint supplied by the Contractors/specifications. In all cases, the thinner shall be added wherever necessary only in the presence of SSE/ Br/ Works . The quantity of thinner should be decided after trial and only the required quantity added so that the specified dry film thickness is obtained for each coat.

**34.9** The viscosity of the paint at the time of application shall be checked by using 'FORD Cup No.4' by the SSE/ Br/ Works at site as detailed in specification IS:101-64 in addition to the tests conducted by CMT/LGD or any other National Test House.

**34.10** Paints should be used within the prescribed shelf life from the date of manufacture. The quantity of paint procured should be such that it is fully utilized before the prescribed period for its use.

### **Shelf life of Paints**

- i) Paint Red Lead Ready mixed : 4 months
- ii) Paint Red Oxide Ready mixed : 1 year
- iii) a) when paste and oil are not mixed: : 1 year  
b) When paste and oil are mixed : 4 days
- iv) Red lead dry pigment – : No time limit.
- v) Oil Linseed Boiled.

34.11 The Contractor/Supplier shall furnish the Railway the date of manufacture of the Paint as certified by the Manufacturer. The labels on the containers should furnish information regarding the date of manufacture, batch No, etc.

34.12 First coat of Painting shall be done only after the surface preparation is approved by the SSE/Br/Works /AEN. Paint shall be applied on dry surface free from any type of moisture and shall not be done under the conditions mentioned earlier in para 33.10.

34.13 Paint shall be mixed well in the container before it is applied. Over mixing shall not be done. Visible air bubbles or foam formation shall totally be avoided.

34.14 Brush shall not be less than 2" (5cm) in width and should have good flexible bristles. If a new brush is used, the same should be soaked in Raw Linseed Oil for at least 24 hours. The brush shall be cleaned at the end of each day's work.

34.15 Dust settled after scraping shall be cleaned before applying paint.

34.16 When the paint is applied by brush, the brush shall be held at 45 Degrees to the surface and paint applied with several light vertical/lateral strokes turning the brush frequently and transferring the paint and covering the whole surface. After this, the brush shall be used cross-wise for complete coverage and finally finish with vertical/lateral strokes to achieve uniform and even surface.

34.17 Rags, waste cotton, cloth or similar particles should not be used for applying paint. The coat of paint applied shall be such that the prescribed dry film thickness is achieved by actual trial for the particular brand of paint. The applied coat of paint shall be uniform and free from brush marks, sags, blemishes, scattering, crawling uneven thickness, holes, lap marks, lifting, peeling, staining, cracking, checking, scaling holidays and aleatoring.

34.18 Each coat of paint shall be left to dry till it sufficiently hardens before the subsequent coat is applied. The time lag between the completion of the primer coat and the commencement of the covering coat shall not exceed 7 days.

The drying time shall not be less than 3 days in the case of Red Lead Paint. Each coat of paint shall be inspected by SSE/Br/Works/AEN and certified as satisfactory before applying the subsequent coat.

The Paints/painting shall be tested with the help of the following instruments supplied by the contractor at his own cost and should be made available at the work sites during the execution of work for checking paint thickness and quality of the paints being utilized during the higher official inspection. After the completion of work in full respects before passing the final bill these equipments in good working condition shall be handed over to ADEN/Br/Sc office and acknowledgement to be produced. The following test is invariably to be conducted at site in the field by the SSE/Br/Works/ADEN in addition to the test conducted by the CMT/LGD or any National Test House.

- i) Weight per litre cup 100 ML capacity Stainless steel.
- ii) For Cup No.4.
- iii) Scratch Hardness Tester Hand operated preferably with lighting arrangement.
- iv) Flexibility and Adhesion Tester with 1/4" (6.25mm) dia rod.
- v) "ELCO" Meter: 0 to 5 Mils Range
- vi) "ELCO" Meter: 5 to 20 Mils range.
- vii) Digital coating thickness gauge ( F& NF Type) including all optional accessories as per the company instruction manual and along with cable and soft ware for RS 232C

**34.20** Representative samples from each Batch of Paint shall be got tested by either the Chemist & Metallurgist/Lallaguda (Secunderabad) or at any other National Testing Laboratories whichever is convenient at the cost of the Contractor. If the samples of paint tested, do not conform to the ISI Specifications the whole lot of paint pertaining to that Batch shall be rejected.

The thickness of the dry film shall not be less than the specified thickness. Engineer-in-charge should satisfy himself that the thickness obtained is not less than that specified.

35.0 The entire surface shall be painted however difficult it is to reach. Painted surfaces shall be smooth and uniform in colour. The thickness of each coat of paint shall be measured By ELCO meter.

35.10 The time lag between successive operations indicated below shall under no circumstances be exceeded.

- a) i) Between completion of surface preparation to Type II Standard and the application of Primer coat  
24 hours
- ii) Between Type-I preparation and 1<sup>st</sup> finishing coat 48 hours
- b) Between the Primer coat and the 1<sup>st</sup> finishing coat 7 days

- c) Between the 1<sup>st</sup> finishing coat & the 2<sup>nd</sup> finishing coat 7 days

### 36.0 MAINTENANCE OF FIELD-CUM-SITE ORDER BOOKS:

**36.1** Field-cum-site order books shall invariably be maintained for the painting work. Two separate Field Books shall be maintained for each Bridge, so that one Book can be with the Inspector concerned, while the other book accompanies the Bill and M. Book for check and passing of the Bill. All the field books shall accompany the Final Bill and they shall be finally filed in DEN's office.

**36.2** Inspector-in charge shall record certificates, in both Field Books and M. Books on completion of each stage of work i.e. surface preparation either Type I or Type II, Primer coats, 1<sup>st</sup> finishing coat and 2<sup>nd</sup> finishing coat in token of the completion of each stage of work confirming that each operation is done satisfactorily and completely. The minimum thickness of paint for each coat has to be recorded by the Inspectors and the AEN's shall test checks the same.

**36.3** The certificate to be forwarded by the Inspectors and AENs shall read as under:- "Certified that Primer coat of span No. \_\_\_\_\_

1<sup>st</sup>  
Finishing  
coat. 2<sup>nd</sup>  
Finishing  
Coat

Bridge No. \_\_\_\_\_ is satisfactorily completed in full (except for \_\_\_\_\_). The total quantity of paint used is \_\_\_\_\_.

**36.4** Field-cum-site order book shall contain the following information:-

- i) Section, KM Bridge No. Span details, Type of girders.
- ii) Contractor' Name and address: Details of Agreement.
- iii) Name of Manufacturer of the Paint, specifications, Batch No Manufacturing Date, expiry date, Reference to Certificated by the Chemist and Metallurgist, Lallaguda, Secunderabad or certificate issued by National Test House.
- iv) Date of commencement and completion of each of the following operations, for each span:
  - a) Surface preparation.
  - b) Painting Primer coat
  - c) Painting 1<sup>st</sup> Finishing coat
  - d) Painting 2<sup>nd</sup> Finishing coat
- v) Measurement of thickness of paint as measured by "ELCO" Metre.
- vi) If a particular portion of Girder namely Top

Boom, Bottom Boom Diagonal, vertical member, etc. is not required to be prepared to Type II preparation, advance intimation has to be given to contractor and clear acknowledgement obtained in the Field Book before the contractor commences the work on any Girder span.

- 36.5** Results of tests conducted by SSE/Br/Works on paint shall also be recorded in the Field/site Order Books. A minimum of two tests per batch of paint shall be conducted at random.

**ANNEX**  
**URE-B**

**DEFECTS IN PAINTED SURFACE**

Sl No	Nature of defect	Causes	Effects
1	Blistering	1 Painting in hot sunlight 2 Excessively thick coating	Film surfaces dries too rapidly trapping solvent which later expands and blisters the paint
2	Brush marks	1. Excessive working of wet film. 2. Working in high temperature. 3 Less material applied. 4 Insufficient drying time for previous coat	1 Reduces flow leaving marks. 2 Solvent evaporates before film is leveled 2 Insufficient body does not permit flow. 3 New coat softens previous coating 4 Which prevents normal flow of paint?
3	Cracking checking's scaling & Flaking.	Thick Paint film	Too thick a film applied and previous layers brittle.
4	Bubbling  & crating	1 Over shaking. 2 High Temperatures.	1 Excessive foaming and bubbling of paint before applying. 2 Material dries quickly preventing Breaking of bubbles and flowing.
5	Crawling	1 Improperly cleaned surface  2 Moisture	1 Contaminants like oil, grease, Residue etc. left on surface causing crawling. 2 Moisture present on surface causes crawling, (Particularly early in the day.)

6	Uneven gloss	1 Porous surface 2 Uneven 3 thickness 4 Moisture  Overlaps	1 Vehicle of new coat sinks into the Surface leaving excessive pigment without binder and loss of gloss. 2 Gloss increases with increased Film thickness. 3 Moisture on film during drying Flattens the gloss. 4. Due to varying thickness.
7	Lap marks	1 Working too long in one area 2 Too much heat 3 Improper thinner	1 coating begins to set 2 Solvent is lost rapidly giving thicker film 3 Quick evaporating thinner shortens Working time causing thicker film.
8	Lifting	1 Application of new film on poorly adhering paints. 2 Applying next coat before drying of previous coat. 3 Applying hard coat over & softer coat	1 Shrinking of new film dislodges the old film 2 Final coat traps solvent of previous coat 3 Contraction of new coat pulls up The softer coat.
9	Peeling	1 Inadequate surface cleaning 2 Non-roughening of glossy surface before applying new coat. 3 Long delay in applying Finishing coat. 4 Failure to paint immediately after cleaning	Primers when exposed for long period may chalk or dust and grease contaminate the surface preventing bonding Rust which forms has unstable surface.
10	Sagging & allegorating	1 Failure to roughen the hard or glossy finish of previous coat. 2 Applying too much paint 3 Excessive thinning.	

11	Staining	Contaminants on the surface	They dissolve paint and cause instaining grease, e.g. oil pen/pencil marks.
12	Wrinkling.	1 Applying too much paint 2 Applying 2nd coat before 1st coat is dried. 3 Painting in hot sun 4 Applying paint on cold surface.	1 Surface dries but inner layer remains soft. 2 New coat shrinks and wrinkles the softer inner coat. 3 Surface dries rapidly 4 Surface dries faster while inner paint is still wet.

**Special condition:-** The paints procured by the agency should be from one lot which has been certified by the CMTD/LGD or any other approved National Testing Laboratories

Approved National Testing Laboratories as per CE/Br.Rehab/S.C.Rly lr No W.CE/Br. Rehab/2019 dated 14.08.2019, 25.09.2019 are enclosed

2. All works should be maintained as per Defect liability clause as per Hqs lr No SCR-HQOENGG (WC)/38/2019 dated 24.09.20 (Enclosed)



## **SPECIFICATIONS AND SPECIAL CONDITIONS FOR CONCRETING, READY MIXED CONCRETE & STEEL REINFORCEMENT.**

### **1.0. MATERIAL & IS CODES.**

- i) Concrete : IS 456, IS 4926(Ready Mixed Concrete)
- ii) Cement : IS 12269(53 grade OPC).
- iii) Aggregates : IS 383-1970.
- iv) Steel Reinforcement: IS 1786

2.0 **CEMENT:** Supply and usage of cement shall be as per the South Central Railway (Indian Railways) Unified standard specifications 2021& CPWD specifications 2021for DSR-2021.

2.1. The cement shall confirm to the specifications of ordinary port land cement as per the site requirement and as approved by the Engineer-in-charge.

2.2 In addition to confirming to IS specifications as detailed above, the contractor(s) shall procure Cement from the reputed cement companies/ brands but not cement manufactured by minor cement plants. The make should be approved by the Railways.

2.3. The contractor should submit the bill of purchase of cement to the Railways for Verification and record. Contractor shall also submit a test certificate issued by the manufacturer for standard properties of cement for verification & record.

2.4 Occasionally Cement has to be got tested from **“In house labs or site lab established under provisions of the contractor National Test House or Government Engineering Colleges/NITs/IITs. In exceptional cases when (i) there is no in-house facilities or site-lab for testing and National Test house near by and (ii) Govt. Engineering Colleges may take longer time causing undue delay in the progress of project, any nearest NABL accredited laboratory having scope and validity of accreditation may be used for period testing of cement during execution. However, Tests required for initial acceptance of material or design shall be done in any of the “In house labs or site lab established under provisions of the contract or National Test House or Government Engineering Colleges/NITs/IITs”, and as per the directions of Engineer-in-charge and submit the report. Charges for such tests shall be borne by the contractor. Further in this regard instructions issued by DyC E/Works/HQ vide letter no.SC R-HQOENGG(SOR)/21/2019 DATED 08.12.20 followed”.**

### **2.5. Storage of cement:**

2.5.1. The contractor shall make his own arrangements for storage of cement and other materials and see that no damage takes place during storage. The storage of cement should confirm to standard height in a column to avoid damage during storage.

2.5.2. The Railway reserves the right to inspect the storage accommodation of the contractor and to reject in the event of any clotted cement is noticed or any other cement which is not suitable for usage of work and not confirming to the specifications and no compensation will be made for the loss if any sustained by contractor on this account. A ledger shall be maintained at site showing the quantities of cement procured, date wise consumption and balance available at site. These Ledgers are to be jointly signed by the JE/ SE/Works at site and contractor/his representative.

### **2.6. CONSUMPTION/USAGE OF CEMENT:**

- 2.6.1. The contractor shall take all precaution for effective usage of cement between the period of procurement and period of usage without losing any strength of cement.
- 2.6.2. The contractor shall ensure the consumption of cement specified under each item of work correctly. In this connection CVC published an article in their web site and same circulated by PCE office vide Ir no:- W.416/Unified/SS/SSR/Vol.IV Dt:-09.02.2022 on "Design mix concrete - Economy & Environmental issues". As per the above article, the range of cement content for various grades of concrete observed in all Govt./Semi Govt. bodies are as follows.

Grade	Cement content in Kg per Cum	Avg. Cement content in Kg.per Cum
M15	250 to 300	275
M20	300 to 330	315
M25	310 to 360	335
M30	340 to 390	365
M35	360 to 420	390
M40	380 to 450	415
M45 to M55	400 to 450	425

It is to inform that increase in cement quantity more than required may have adverse effect on the durability of concrete apart from avoidable additional cost. Therefore, for Design mix concrete, efforts should be made to use minimum amount of cement in the above stated ranges at the time of approval of Design mix. In case Design mix contains cement quantity more than average shown above, design mix will be approved by SAG level i.e.(i) CPM/GSU/SC of the project in Gati Shakti unit. However, while approving all possibilities should be explored to reduce the cement content and it should not be a ritual without any technical

## 2.7 PAYMENT FOR CONTRACTORS CEMENT:

Payment for the supply of cement will be paid under relevant item of supply of cement under relevant schedule. Payment for above item will be made on the basis of actual consumption in the item/as per approved design mix and no advance payment will be made on procurement of cement. No extra payment will be made for wastage.

3.0 **AGGREGATES** shall be as per the IRU standard specifications for formation works, Bridge works and P.Way works USSR 2021 & CPWD specifications 2021 for DSR 2021.

3.1. Aggregate shall consist of naturally occurring stones, gravel & sand. They shall be hard, strong, dense, durable, clear and free from injurious amounts of disintegrated pieces, alkali, vegetable matter and other deleterious substances.

3.2. Materials for concrete such as granite stone metal, sand, etc., should also be collected from outside Railways land and the Contractor shall pay all seigniorage charges.

3.3. Aggregate shall not contain any harmful material such as pyrites, coal, lignite, mica, shale or similar laminated material.

4.0. **COARSE AGGREGATE** shall be as per the IRU standard specifications for formation works, Bridge works and P.Way works USSR 2021 & CPWD specifications 2021 for DSR-2021.

5.0. **FINE AGGREGATE** shall be as per the IRU standard specifications 2021 for formation works, Bridgeworks and P.Way works USSR 2021 & CPWD specifications 2021 for DSR-2021.

5.1 Fine aggregate shall be of approved quality and Grading to IS 383, IS 456 & IS 134 3 standards. It shall be free from impurities & deleterious substances. The

decision of Engineer in charge shall be final and binding on the contractor regarding the approval of the coarse and fine aggregate for concreting works. The contractor shall be required to carry out weighing and sieving aggregates, if directed by Engineer in charge and all costs shall be borne by the Contractor.

- 6.0 **CONCRETE WORKS :** shall be as per IRU Standard Specification-2021-for formation works, Bridge works and P.Way works USSR 2021 & CPWD specifications 2021 for DSR-2021.
- 6.1 **Supply of RMC**
- i) “In case the total quantity of RCC/PSC/CC/MCC involved is significant (say 15,000 Cum or more) the Contractor shall preferably set up his own RMC plant at site or shall make suitable exclusive arrangement close to the site to ensure high quality RMC supply”.
  - ii) “Use of RMC shall also be mandatory in the work where substantial quantity (say 500 Cum or more) of RCC/PSC/CC/MCC is involved and work site is located in Urban areas and RMC plants are readily available nearby”.
  - iii) “The specification for RMC shall confirm to IS 4926-2003 as well as IRU Standard Specifications, for formation works, Bridge works and P.Way works USSR 2021& CPWD specifications 2021 for DSR 2021”.
  - iv) “The RMC plant shall be inspected and approved by concerned Dy.CE/GS/SC. The accepted rates of items of RCC/PSC/CC/MCC shall be deemed to be for RMC. Nothing extra will be payable for RMC in the Contract of work. However, if RMC is not feasible in certain isolated portion of work, then conventional concreting can be allowed by Engineer- in-charge in such isolated locations/portions with the same rates”.
- 6.2 Concrete required for all works shall be machine mixed using weigh batches. Hand mixing will not be permitted. The Contractor should keep vibrators of 25mm needle for jacketing work and 40mm needle for concrete work. Standby needles and vibrators should be kept. During the course of concrete work if vibrator is not working the work shall be stopped.
- The materials proposed to be used for the work should pass tests/analysis as prescribed in relevant IS/ IRS codes & manuals. An approval given by the Railway in consequences of such tests or analysis shall limit or interfere with the absolute Right of the Railway to reject the whole or portions of such materials supplied which, in the judgment of the Railway do not comply with the specifications. The decision of the Railway in this regard shall be final and conclusive for all purposes.
- 6.3 The contractor shall prepare at his own cost, standard cubes of concrete at specified intervals during concreting operations under the supervision of the Engineer or his authorized representatives and submit the same to the Railway for testing and approval. Contractor should arrange equipment for testing of concrete cubes at site. Based on the discretion of Engineer-in-charge certain cubes shall be got tested from **“In house labs or site lab established under provisions of the contract or National Test House or Government Engineering Colleges/NITs/IITs. In exceptional cases when (i)there is no in-house facilities or site– lab for testing and National Test house nearby and (ii) Govt. Engineering Colleges may take longer time causing undue delay in the progress of project, any nearest NABL accredited laboratory having scope and validity of accreditation may be used for period testing of concrete cubes during execution. However Tests required for initial acceptance of material or design shall be done in any of the “In house labs or site lab established under provisions of the contractor National Test House or Government Engineering Colleges/NITs/IITs” and as per the directions of Engineer- in – charge. Charges**

for such tests shall be borne by the agency Further in this regard instructions issued by Dy.CE/Works/HQ vide letter no.SCR-HQOENGG(SOR)/21/2019 DATED 08.12.20 followed.

6.4 While executing all concrete works below sub-soil water level the foundation pit must be kept free of all seepage water by bailing or pumping or in any other manner. The rates adopted for concrete items below bed/ground level are inclusive of the charges.

6.5 As this work is located in “moderate” category of environment the minimum cementitious material content in concrete structures shall be as given below and the actual consumption of cement depends upon the requirement as per design mix.

Plain concrete – 300/250 Kgs. Cement/Cum. -- Max. W/C ratio 0.50

R.C.C. – 350/300 Kgs. Cement/Cum. -- Max. W/C ratio 0.45

**NOTE:** For under water concrete 10% extra cement should be added over and above the normal cement content of the concrete mix specified above. For SSR items the cement consumption shall be as specified in the USSR, 2021.

6.6 **DESIGN MIX:**

System improvement guidelines for Concrete mix design has been circulated vide PCE office vide lr no **W.416/Unified/SS/SSR/Vol.IV Dt:-21.03.2022**. In that connection, special tender conditions on concrete Mix Design along with the proforma has been framed as below:-

The Contractor shall be guarantor of quality of concrete used in construction. It shall be obligatory on the Contractor to carry out the mix design and obtain approval of the Engineer before use in permanent work. Without in any way limiting the generality of the foregoing, the procedure shall include the following:

- a) The Engineer shall advise the Contractor the ruling design parameters for each grade of concrete. Contractor shall carry out the mix design (through Govt. Engg. Colleges/NITs/IITs only), following all appropriate codes (IS: 10262, IS: 456, IS: 383, IS: 9103, IRS Concrete Bridge Code and all other Codes referred therein) / specifications/guidelines in selection of suitable constituent material and it's proportioning for preparing design mix for prescribed strength and durability, and obtain approval of the Engineer. The mix proportion shall be prepared keeping in view the required strength, long term durability in the intended exposure condition and with sufficient workability to place in intended position of the structure uniformly in well compacted condition without any segregation or bleeding.
- b) The mix proportion so designed shall be checked by means of trial batches. Workability of the 1st Trial Mix shall be measured and the mix shall be carefully observed for freedom from segregation and bleeding and its finishing properties.
- c) If the workability of the 1<sup>st</sup> trial mix is as stipulated, two more Trial Mixes shall be made with the water content same as initial Trial Mix and varying the free water- cement ratio by +/- 10 percent of the preselected value. From all three trial mixes, at least three test cubes shall be made, cured and tested at 28 days in accordance with IS: 516.
- d) If the measured workability of 1st Trial Mix is different from the stipulated value, the water and/or admixture content shall be adjusted suitably. With this

adjustment, the mix proportion shall be recalculated keeping the free water-cement ratio at the pre-selected value and procedures in para no. “b” and “c” above may be followed.

- e) If the test results of the samples at three variable water cement ratios are valid (for each sample, the individual strength of all specimen are within  $\pm 15\%$  of average of three specimens) and more than target strength, Graph between three water-cement ratio and their corresponding strength shall be plotted and mix proportion for field trial should be worked out.
  - f) Above details of test and mix proportion duly authenticated by approved institution/lab should be submitted in a prescribed Proforma (Annexure — A) for approval of Engineer for field trial.
  - g) On receipt, the Engineer shall expeditiously scrutinize the proposed design mix for field trial. Apart from all other aspects, it should be specifically observed that the quantity of cement content should be minimum possible for meeting the due requirement and is within the limit prescribed vide letter no.W.416/Unified/SS/SSR/Vol. IV dt.09.02.2022 for all types of works. If it is more, and there is possibility to bring it within limit by redesigning the proportion, the same should be returned to the Contractor with remarks to submit the mix design with reduced cement content. If the cement content is marginally on higher side and the Engineer is convinced that in the specific circumstances there is no possibility for further reduction even after use of plasticizer/super plasticizer, he will forward the mix design for approval of the Competent Authority. After review of the design mix received with recommendation of the Engineer, the Competent Authority shall either approve the Design Mix for field trial or return the same to Engineer to get fresh design mix for approval.
  - h) On approval of mix design in field trial, again cube samples should be made with the concrete produced by method of actual concrete production.
  - i) Test cubes (specimens) will be tested for compressive strength at 28 days. The results are considered valid only if the average compressive strength of the sample (3 specimens make one sample) is not less than the Target mean strength and variation among individual specimens is within  $\pm 15\%$  of average strength. The concrete mix design shall be allowed by Engineer for use in actual execution, if the test results of samples are valid.
  - j) Above approval by the Engineer shall not relieve the Contractor of any of his responsibilities under the Contract.
  - k) For Bridge works, concrete design mix shall be designed as per para no 5.5.1.2 and 5.5.2 of IRS Concrete Bridge Code: 1997. Minimum cementitious material and exposure condition shall be as per table 4(c) of IRS Concrete Bridge Code: 1997. In this connection, the proforma has been framed as shown below for authority sanction as shown in next page.
- 6.7 All the concrete works shall be done only in the presence of the SS E/JE/Work. The programme/ planning of the concrete works shall be submitted to XEN/AXEN/Dyce-GS-SC well in advance so as to direct SS E/JE/Works for witnessing the same.

**CONCRETE DESIGN MIX**

1. Name of the work: \_\_\_\_\_
2. Agency: \_\_\_\_\_
3. Agt. No./Acceptance letter details: \_\_\_\_\_
4. Type of work - **Bridge\*\* / Other than Bridge\*\*** \_\_\_\_\_
- (\*\* strike whichever is not applicable)

<b>A.</b>	<b>Basic Data</b>
<b>A-1</b>	<b>To be specified by Engineer</b>
1	Concrete grade* (Min*/Max* cement content Kg/Cum)
2	Workability (Slump)*
3	Cement Grade*
4	Exposure Condition*
5	Nominal size of Coarse Aggregate (CA)*
<b>A-2</b>	<b>Other Details</b>
1	Source of CA
2	Results of sieve analysis of CA
3	Specific Gravity of Coarse Aggregate
4	Grading Zone of fine Aggregate
5	Source of FA
6	Results of sieve analysis of FA
7	Plasticizer / Super Plasticizer (brand name, qty used etc)
8	Water absorption of Fine aggregate
9	Water absorption of Coarse aggregate
<b>B</b>	<b>MIX PROPORTION:</b>
1	Cement Kg
2	Water kg
3	FA Kg
4	CA Kg
5	Plasticizer/Super plasticizer Kg

<b>C</b>	<b>CUBES CASTING DETAILS:</b>	
1	Date of casting of cubes	
2	Officials present at the time mixing & casting of cubes	
3	Workability of trial mix was as per design	
<b>D</b>	<b>CUBES TESTING DETAILS:</b>	
1	Date of testing of cubes	
2	Testing done at	
3	Officials present at the time of testing,	
4	Is test results and Strength vs. Water cement ratio enclosed?	
5	Does the test result comply with design requirements	

\* to be specified by Engineer depending upon the specific requirement.  
 \*\* strike whichever is not applicable

Signature of the Designer: \_\_\_\_\_  
 Name of Designer: \_\_\_\_\_  
 Name of the Lab/Institute: \_\_\_\_\_  
 Stamp: \_\_\_\_\_

Signature of the Contractor: \_\_\_\_\_

Remarks of the Engineer: \_\_\_\_\_

- 7.0 Curing shall be executed as per IRU Standard specification-** for formation works, Bridge works and P.Way works USSR 2021 & CPWD specifications 2021 for DSR-2021.
- 7.1 All concrete work in cement, mortar/plaster pointing etc., shall be continuously cured for the prescribed period as per direction of the Engineer. Curing shall be done by covering the newly laid concrete with gunny bags and keeping them wet constantly. If it is found that the contractor is not properly observing these instructions, the Engineer may undertake the curing through another Agency/labour without any notice to the Contractor at the cost of the contractor. The cost incurred along with incidental charges @ 2% and along with supervision charges 12.5% of the cost will be debited to the Contractor. Intimation of the employment of another agency, for curing will be given to the Contractor as soon as possible. This intimation in writing to the Contractor under the head of the Engineer- in-charge of the work shall be conclusive evidence of the employment of another agency.
- 8.0 STONE AGGREGATE shall be executed as per IRU Standard specification-** for formation works, Bridge works and P.Way works USSR 2021 & CPWD specifications 2021 for DSR 2021.  
Lime stone, quartz and shale are not acceptable for concrete or masonry work. The contractor will have to use hard granite/ basalt stone aggregate for RCC, PSC works and other concrete items and quote the rates accordingly. Occasionally aggregate has to be got tested at reputed private/Govt. laboratories (or) Engineering colleges as per the directions of Engineer- in-charge for chloride, Sulphates, abrasion, impact value and water absorption and submit the report. Charges for such tests shall be borne by the contractor. The tests are to be conducted at every stage of change in quarry besides occasional tests as ordered by the engineer or his representative.
- 9.0 USE OF SAND COLLECTED FROM THE WATER COURSES WITHIN THE RAILWAY LAND:**  
If the sand available in the river bed water course within the Railway land, and if it is found suitable for the works, the contractor can collect the sand from the area within the Railway boundary and utilize the same for the works. The Railway will not levy any charges for sand so collected for the work within the Railway boundary. However, seigniorages charges if any payable to state or local authorities shall be borne by the Contractor. The tenderer shall take these aspects into account while quoting the rates. The location of the borrow pits for collection of sand within the Railway area should be approved by Engineer- in-charge.
- 10.0 SHUTTERING ARRANGMENTS shall be executed as per IRU Standard specification-** for formation works, Bridge works and P.Way works USSR 2021 & CPWD specifications 2021 for DSR2021.
- 11.0 SUPPLY, FABRICATION AND ERECTION OF STEEL WORK shall be executed as per IRU Standard specification -** for formation works, Bridge works and P.Way works USSR 2021 & CPWD specifications 2021 for DSR 2021.
- 11.1 For works the contractor is required to use own steel for reinforcement. Payment for supply of reinforcement steel in MCC / RCC/PSC items will be made under respective Schedule.



- 11.2 The Contractor is required to safeguard the steel and use the same on the work in accordance with the actual requirement as approved by the Engineer and as may be indicated in the relevant drawings or specifications.
- 11.3 The Railway reserves the right to inspect the storage yard of the contractor, where the steel materials are stored and take samples wherever considered necessary, get them tested by any agency for Physical & Mechanical properties, chemical composition as directed by the Engineer-in-charge from "In house labs or site lab established under provisions of the contract or National Test House or Government Engineering Colleges/NITs/IITs. In exceptional cases when (i) there is no in-house facilities or site lab for testing and National Test house nearby and (ii) Government Engineering Colleges may take longer time causing undue delay in the progress of project, any nearby NABL accredited laboratory having scope and validity of accreditation may be used for period testing of steel during execution. However Tests required for initial acceptance of material or design shall be done in any of the "In house labs or site lab established under provisions of the contract or National Test House or Government Engineering Colleges/NITs/IITs" and as per the directions of the Engineer-in-charge and submit the report. Charges for such tests shall be borne by the Contractor. Further in this regard instructions issued by Dy.CE/Works/HQ vide letter no. SCR-HQOENGG (SCR)/21/2019 dated 08.12.2020 followed".

If the steel is found to be not confirming to relevant IS 1786 and IS 2062 provisions, the entire steel lot represented by the tested sample will be rejected. The contractor shall not use any such reinforcement and will lift them from site at his own expenses. The contractor cannot claim in such an event any losses, damages, expenditure incurred by him and Railway shall not entertain any claim on this account.

The payment for the steel reinforcement will be made on bar bending schedule and the quantity shall be arrived by converting the lengths into weight based on sectional weight. While working out the quantity consumed, the overlaps, hooks, bends, chains will be taken into account. If there is any wastage, it shall be to the contractor's account. The item for placement of reinforcement steel is provided with cost of binding wire.

- a) Supply and placement of reinforcement steel and supply, fabrication & erection of structural steel shall be as per IRU Standard Specifications - for formation works, Bridge works and P-Way works USS R 2021 & CPWD specifications 2021 for DSR 2021.
- b) All Reinforcement Steel (TMT bars) and Structural Steel shall be procured as per specifications mentioned in BIS's documents— IS: 1786 and IS: 2062 respectively. Independent tests shall be conducted for physical & mechanical properties, chemical composition at reputed private/Govt. laboratories (or) Engineering colleges to ensure that the materials procured conform to the specifications. If the steel is found to be not confirming to relevant provisions, the entire steel lot represented by the tested sample shall be rejected. It shall be ensured that a bill copy along with manufacturer's test certificate is submitted at the time of supply of material.
- c) The reinforcement steel and structural steel shall be procured from the following firms,  
circulated as per sl. no. 4 & 39 vide PCE/SC's office letter no. SC R-HQOENGG(SOR)/  
1/2020-Dy.C E/Works/SC R dt.24.05.2020, which are Established, Reliable, Indigenous & Primary Producers of Steel, having Integrated Steel Plants (ISP) using iron ore as the basic raw material and having in-house iron rolling

facilities, followed by production of liquid steel and crude steel, as per Ministry of Steel guidelines.

S.No.	Brand	Make
1	SAIL	Steel Authority of India Ltd
2	VIZAG	Rastriya Ispat Nigam Ltd
3	TISCO	TATA Steel Ltd
4	JSW	JSW Steel Ltd
5	JSPL	Jindal Steel & Power Limited

However, only certain isolated sections of structural steel, not being rolled by ISPs, can be procured from the authorized re-rollers of ISPs or authorized licensee of BIS having traceability system and who use billets procured by ISPs. The traceability of the material shall be ensured by an Officer authorized by the CPM/GS/SC on case to case basis for this purpose.

The following note shall be applicable for the operation of IRUSSR items to avoid ambiguity at the time of execution.

**Note for Weep holes at Retaining walls:**

Weep holes wherever required to be provided and are considered as integral part of relevant item of concreting. Hence nothing extra will be paid on account of supply and fixing of weep holes and no deduction will be made for the concrete

## **SPECIFICATIONS FOR STRUCTURAL STEEL FABRICATION**

- i) Steel work for all members of the plate girders is made of mild steel only. The steel should be of Grade-E-350 A quality for Plate Girders and Tubular section of YST310 conforming to IS 2062 - 2006. For, COP steel Grade should be of E-250 A 0 quality. A copy of the approved general arrangements drawing and detailed standard RDSO drawings for fabrication showing the proposed FOBs, COPs and Lifts will be issued to the Contractor after accepting the tender. The contractor has to submit the scheme of erection to Railways for approval and erection shall be taken up on receipt of approval from Railways.
- ii) All materials required for the work including raw steel, paints, welding materials, consumables, bolts and nuts, etc., shall be arranged by the contractor. The contractor shall be solely responsible for the procurement of the required materials.

### **1.0. FABRICATION ARRANGEMENTS:**

- 1.1 The tenderer shall clearly note that the fabrication of the steel work will have to be carried out at the site allotted by the Railway in the Railway land and transport the same to site of work at his cost. However, prior approval of Railway shall be taken if fabrication is proposed to be carried out at contractor's workshop. The decision of Railways is final and binding on the contractor.
- 1.2 In case of fabrication proposed to be done at the contractor's workshop, the freight and other incidental charges in bringing fabricated steel from the fabricator's work shop to the site shall be borne by the contractor and rates provided deemed to be inclusive of all such charges including re handlings if any against respective items and the Railway do not undertake to pay on this account any extra rates over the above rates quoted. All fabricated materials will have to be brought to the site of erection at contractor's cost.
- 1.3 The land required for fabrication and stacking materials will be allotted by the Railway free of cost as per availability.

### **1.4 GUIDELINES ON FABRICATION OF STEEL STRUCTURE**

- 1.4.1. The fabrication of steel girder is to be done at any work shop, which is approved by the Engineer-in- charge. The work shop/firm should have required facilities including stud welding machine.
- 1.4.2 The guidelines for steel fabrication specifications as given in IRS B1-2001 (Fabrication specifications) shall be followed as applicable.

### **1.5 Welding process and positions:**

- i) Welding shall be carried out in accordance with the approved welding procedure, specifications by approved welders, processes and positions. Only submerged arc welding should be used for all shop fabrication. Proforma for welding procedure specification and welding procedure qualification records are enclosed as Annexures.

- ii) All welding be preferably done in flat position (horizontal) welding should be done as per drawing ensuring proper size of weld. Over size may lead to excessive heat affected zone which may lead to failure of material. Welding should be carried out in a warm and dry place so that the rain water or other atmospheric elements may not come in contact while welding is in progress.
  - iii) Electrodes shall conform to Class A2 of IRSM-28 and wire for CO2 welding shall conform to Class 1 of IRSM-46.
  - iv) All consumable shall be stored and handled with care and in accordance with the manufacturer's recommendations.
  - v) All tests to be carried out as per the notes mentioned in the drawing and got approved by competent authority.
- 1.6**
- i) Since the length of plates of standard make are available upto 12.00 mts., where steel girders of length more than 12.00 mts., the length of girder be made by allowing spliced joint instead of field welding. The spliced joints shall be fabricated by using high strength friction grip bolts only.
  - ii) Field connection shall preferably be done using HSFG bolts confirming to IS-4000-1967.  
Where this is not feasible, riveting may be done with the approval of Engineer-in-charge in field.
- 1.7**
- i) Final cutting and finishing of components:  
Final finishing of length, profile and notches etc., is accomplished by accurate marking with the help of templates, measurement and gauge wherever necessitates and then by gas cutting (Chipping, grinding) as the case may be. Excessive metal is normally chipped off or gas cut (more than 3mm) and the exact finishing or profiling is achieved by fine and accurate grinding.
  - ii) Stud welding, shear studs welded to top flange should be done by using automatic stud welding machines.
- 1.8** Inspection stages:
- a) Before fabrication b) During fabrication c) After fabrication
- a) **Before fabrication:**  
Quality assurance plan shall be prepared and got approved. Raw material such as Channels and plates etc., to be inspected as per specification mentioned against each items and rolling mark certificates.  
Lamination, piping, pitting, rolling defects and straightness of material to be checked before fabrication. Consumables such as rivets, welding electrodes and paints etc., are as per standard specification. Welding procedure specification needs to be approved. Welder's approval as per welding procedure specification.
  - b) **During fabrication:**  
Layout, Jigs, Fixtures and profile to be checked. Welding by Qualified welder as per approved WPSS.  
Welding parameters are to be set and checked during welding.  
Riveting by qualified and skilled personnel with approved work instructions.

**c) After fabrication:**

Verify rolling mark number of steel section used for fabrication from certificate issued by manufacturer. Check the register maintained by them. Surface defects shall be checked visually. Quality of welds with respect to specified sizes, length and any visual defects. Quality of rivets to be checked visually and with the help of riveting hammer. Dye penetration tests Magnetic particle radio graphic test of welds as agreed to by Engineer-in-charge. Leading dimensions ie., overall length, hole dimensions, end finishing etc., shall be checked for tolerances as per IRC 24. For this purpose detail measurement sheet shall be prepared for.

**2.0 ERECTION SCHEME:**

- 2.1 The steel work shall be temporarily assembled in shop fully and checked for tolerance, camber etc., and necessary holes drilled for field assembly and approved by Engineer-in-charge.
- 2.2 The successful tenderer after awarding tender shall submit detailed scheme for erection of steel girders and casting of deck slab to make composite structure proposed to be adopted for the erection of the various members keeping in view of the movement of rail traffic, electrification, location etc., In finalising his scheme for actual execution the contractor shall take into account any objections/directions that may be given by the Railway.
- 2.3 Any approval given by the Railway in this regard shall in no way absolve the contractor from full and sole responsibility for the soundness and safety of erection methods as may be finally adopted by him as well as for delivery of the finished structure in accordance with the approved drawings and as per the specifications.
- 2.4 The tenderers are advised to quote rates taking into consideration all the conditions stipulated in the tender document without quoting their own conditions as regards to methods of measurement, terms of payment, site facilities, wastage of steel. Tenders of those who quote their own conditions under the above heads are liable to be rejected.
- 2.5 Payment for steel work, supplied, fabricated and erected will be paid in terms of notes of the respective chapter-4 of IRU standard specifications for formation works, Bridge works and P.Way works and follow USSR 2021.

**3.0 WEIGHT:**

- 3.1 For steel work, payment will be made only for actual quantities to be calculated as per approved Railway Drawing. The quoted rate for supply, fabrication and erection item shall be applied to the weight thus calculated. The standard drawings for fob will be supplied by the Railway.
- 3.2 The weight of plates and sections will be calculated from the approved rdso drawings using over all lengths and square dimensions and theoretical unit weight. No deductions being made for holes, notches and skew cuts. Gussets will be paid on the dimensions of the smallest enclosing rectangle. In addition, for all built up members welded, the calculated weight of the members shall be arrived as per Notes under Chapter-4 of Unified S tandard Specifications (formation works, Bridge works and P.Way works), 2021.

- 3.3 The payment for High Tensile Studs and HSFG bolts and nuts will be made only for actual weight irrespective of size/lengths under item No.1 of schedule – “ E”. No extra rate is payable to these categories.
- 3.4 Shear connectors/studs, HSFG bolts, HTS nuts are to be sourced from reputed fasteners only after approval of Engineer-in-charge.

**Defects Liability Clause:** ( As per approval of PCE vide letter No.SCR-HQ0ENGG(WC)/38/2019, Dt.24.09.2020)

Contractor's primary obligation under this contract is to carry out and complete the works to the high quality standard set out in the contract i.e., only new material of specified quality and high standard of workmanship shall be ensured during execution. The defects liability period is intended to complement this liability by remedying the defective work i.e., deficiency in quality of works including defects due to faulty material or workmanship which may become apparent during the defects liability period reckoned from the date of issue of completion certificate. The normal use based wear and tear or damage due to an act or omission not attributable to the contractor, shall be excluded from the liability of the contractor under this clause. The Defect Liability period (DLP) shall be **36 months** for the new works consisting of construction of (i) Buildings, Roads, RCC tanks, Platform walls/Surface, Concrete/Masonry Drains, Bridges including FOBs/ROBs or major repair/painting of important bridges, **6 Months** for the repair works of bridges /RUBs / ROBs /FOBs /lift and escalators/Painting works and liability of the contractor shall be as under :

1) If any defect is found during the defects liability period, the contractor must, promptly and at its own cost repair, replace or otherwise make good (in consultation with the Engineer) the defect as well as any damage to the facility caused by the defect. The Contractor will bear all incidental costs, including any costs of removal associated with the repair, replacement or making good of the defect or damage.

2) If the contractor fails to commence the work necessary to remedy the defect or any damage to the facility caused by the defect with in a period of 21 days of issue of such notice, the Railway may proceed to do the work, or engage any other agency to do the work and the costs, including incidental costs, incurred by the Railway as a result will be a debt due and payable to the Railway on demand and may be deducted from Security Deposit or from any payments otherwise due to the contractor in any other contract anywhere in Indian Railways.

3) Where the Railway, acting reasonably, considers that substantial repair, replacement or making good is done during last quarters of DLP or during 21days notice period which fails beyond original DLP, the defects liability period shall extend by a suitable period in such a manner that any repair, replacement or making good the works shall have cover of 3 months of extended DLP.

4)The acceptance at any time of Materials or Equipment by or on behalf of the Railway shall not be a bar to future rejection if they are subsequently found to be defective, inferior in quality, or uniformity to the Material or Equipment specified, or are not as represented to the Railway.

5) The decision of the Engineer for determination of the defects needing repair/replacement or the cost incurred by Railways in defect rectification or estimated cost of repair, if the contractor fails to do the work with in specified period shall be final and binding on the Contractor.

6) Only after successful completion of aforesaid liability by the Contractor, SD money shall be released after deductions, if any due to failure on the part of the Contractor. On submission of "Indemnity Bond " in the Format enclosed, SD money may be released after 12 months from the date of issue of Completion Certificate provided no defects have been observed in the work executed during 1<sup>st</sup> year of DLP.

7) The rights of the Railway under this clause are in addition to and do not limit any other rights which the Railway has under this contract or under any law of the land.

8) The "Defect Liability Clause" shall supplement the liability of the contractor during Maintenance Period "specified elsewhere in the contract" and the conditions under this Clause shall supersede such conditions of the contract to the extent of contradiction .

9) Any determination by the engineer under Defect Liability Clause shall be treated as "Excepted Matter" and shall not be arbitrable.



Format of "Indemnity Bond"

FORMAT OF INDEMNITY BOND FOR RELEASE OF SD BEFORE DEFECT LIABILITY PERIOD IS OVER (To be furnished in stamp paper as per stamp act) (Stamp paper should be purchased in the name of the Contractor)

This deed of indemnity executed on ..... at ..... by M/s ..... having its registered office at ....., through Mr.....as the authorized representative of M/s ..... hereinafter referred to as 'Indemnifier ' which expression shall, unless repugnant to the context or meaning thereof, include its successors, administrators, representative and assignees in favour of ....., South Central Railway having its registered office at.....through Mr..... as the authorized representative, hereinafter referred to as the 'Indemnified' the expression which shall, unless repugnant to the context or meaning thereof, include its administrators, Successors, representative and assignees.

Whereas the indemnified herein has awarded to the indemnifier herein a contract for the work "....." on terms and conditions set out inter alia in the Contract Agreement No. .... Dated ..... Valued at Rs..... (Rupees .....only).

AND

Whereas, Defect Liability Clause (Clause no..... of special conditions of the above mentioned Contract Agreement) provides for guarantee (i.e.) for the works executed under the contract to be free from defect due to faulty material or workmanship identified during Defect Liability Period (DLP) of 36 calendar months from the date of issue of completion certificate of the work.

The indemnifier hereby irrevocably agrees to indemnify the indemnified that in the event of any specified liability during Defect Liability Period, original or extended as per the terms of the contract, the Indemnifier shall repair /replace the defective works at site or pay the amount on demand as debt due without any objection and in case of any non-compliance by the Indemnifier, the Indemnified may deduct the amount determined under the Defect Liability Clause from any payments due to the Indemnifier in any other contract anywhere in Indian Railways. The Indemnifier also irrevocably agrees that any determination of the Indemnified under Defect Liability Clause shall be final and binding upon Indemnifier and treated as "Excepted Matter " and shall not be arbitrable.

For .....  
(Signature with Name and Designation)  
Company seal

Station:

Date :

Witness :1.....

Signature with Name, Designation & Address

2.....

Signature with Name, Designation & Address.

**SOUTH CENTRAL RAILWAY/ SECUNDERABAD DIVISION**  
**Safety precautions to be adopted while working in Electrified Area.**

1. The attention of all workers is drawn to the fact that under 25kV ac 50 Hz single phase traction, there is heavy induction on all metallic structures and conductors in the vicinity of the track.
2. Don't carry out any work within a distance of 2 meters from live parts of overhead traction wires unless the traction wires are made dead and earthed and PERMIT TO WORK is obtained from an authorized traction staff of Railways.
3. Don't cut or trim a tree near the traction OHE without the presence of an authorized traction staff and without obtaining PERMIT TO WORK from authorized traction staff.
4. Don't touch any fallen / hanging wire under any circumstances until it is made dead and earthed by traction staff.
5. Don't disturb track bonding or bonding provided to OHE structures. In the electrified section nearby metallic structure/part such as platform shelter, fencing, rail, FOB, traction mast etc will be charged due to induction effect. This effect will increase according to the length of parallelism and when the distance between the OHE and metallic structures is reduced. To nullify the induction effect, all the metallic structures in the vicinity of electrified track will be earthed by providing traction bonds. These bonds should not be disturbed / disconnected on any circumstances without adopting standard procedures. If bonds need to be disconnected the same shall be done under the supervision of TRD officials only.
6. In a railway yard, voltage of the order of 200 volts may be induced on yard lighting mains situated 8m away from the Centre of a double line track, if it runs parallel to the 25kV lines for a distance of about 270m, it could be several thousand volts when parallelism is much longer. In such a case, a dangerous voltage due to induction will exist even after power supply to the line has been switched off. No one shall therefore attempt to work on any overhead line running alongside the electrified tracks without taking special precautions of earthing on both sides of the work. Before a section is electrified the necessary modifications to distribution lines in all stations and yards should be carried out, so as to limit the induced voltage within permissible values, but this by no means obviates the need of earthing the lines on both the sides of the working party. Earthing should be done individually by each working party as close to the work-spot as possible. The distance between the two earths shall not exceed 1km.

7. Such inductive effects occur on large metallic structures such as fencing, structural steelwork of platforms running parallel to the track. They will therefore have to be earthed suitably to afford safety.
8. Don't remove / loosen the fish plates without making a temporary connection with a jumper of approved design. To avoid electric shock due to return current through rail before starting any work in rail short jumper may be connected across the fishplate or fractured rail web by using rubber gloves. This jumper connection will provide path to the return current. Similarly long jumpers may be used for full length or long welded rails replacement. The jumper connection should be provided only on traction rail.
9. In track circuited area, for giving continuous path to the return current at glued / insulated joint polarity bonds / transverse bonds are connected. Insulation sleeve is provided above this bond where it crosses the signal rail. This is to avoid shorting of polarity bond with signal rail. Any damage / displacement/missing of insulation sleeve will lead to signal failure. Hence availability of the sleeve shall be ensured while doing any track work.
10. Don't have simultaneous contact with an insulated section of rail and non-insulated section of rail of the same or other track.
11. Don't use steel measuring tapes or long metallic wires / rods on the electrified track.
12. Don't use rails as foot path, a seat or for such other purposes.
13. Don't carry long pipes, poles, ladders, vertically which will come within the danger zone of 2 meters of live overhead traction equipment.
14. Don't allow loading and unloading of over wagon or hopper used for Material Trains in electrified tracks without the personal supervisions of P.W. Maistry or of OHE staff (who will ensure that no tool or part of body of worker will come within the danger zone of 2 meter from OHE).
15. During electrification, OHE foundation, mast erection, contact & catenary wire height, stagger of contact wire are adjusted and kept in position according to track alignment at site. Any change in the track alignment will affect the OHE and may lead to panto entanglement and subsequent OHE break down. As such any change in track parameters shall be done in the presence of an authorized TRD official.

16. During replacement of any insulation joint, before disconnecting the polarity bond, first provide continuity for the traction return current. This can be provided with the help of long jumper wires having ending clamps on either end. First connect one end of the jumper clamp to the traction rail near to the work spot and other end of the jumper wire clamps is to be connected to the adjacent traction rail. This will ensure / provide the traction return path. Remove the polarity bond and dismantle the insulation joint. After re-insertion of the insulation joint, connect the polarity bond; ensure the insulation sleeve on the polarity bond in place, where it crosses the signal rail. Then finally the temporary jumper can be removed.

17. In track circuited area, one rail is used for traction return current and other rail for signal circuit. The signal circuits are working on low voltage & current. Due to the induction effect & parallelism, high voltage can develop, which may cause damage or erratic functioning of the track circuited relays, thereby affecting the signaling system. To avoid such problems the total rail length between home signal to home signal has been divided into small lengths of track circuit and connected in zigzag manner (transposition to nullify the effect of parallelism.) For separating signal & traction rail, insulated joints are used and polarity bonds are provided at these joints, for giving continuity path for traction current. One of the limb of the polarity bond may pass underneath of signal rail. To avoid shorting of this polarity bond with signal rail, insulation sleeve will be provided on the polarity bond. The availability of such sleeves shall be ensured while doing any track works.

18. From the safety point of view use of jumper wire, hand gloves are to be ensured. The insulated joints should not be shorted with any metallic tool or metallic part and also do not touch the joints with bare hand / foot as this may result in severe electric shock due to difference in potential.

19. If any work is being taken up under Power Block, duty of the supervisor at site to provide earth rods on OHE on either side of the work site. Depute staff with hand signal well in advance of the earth rod to protect the work site from the approaching trains.

20. No crane shall be worked on or near traction overhead equipment's unless authorized by OHE representative. While working, care shall be taken to avoid hitting or damaging OHE structures.



**SOUTH CENTRAL RAILWAY**  
OFFICE OF THE PRINCIPAL CHIEF ENGINEER,  
'A' BLOCK – 5<sup>TH</sup> FLOOR, RAIL NILAYAM, SECUNDERABAD – 500 003.

e-mail: dyceworkshqscr@gmail.com

CUG: 9701370219

**No.SCR-HQ0ENGG(SOR)/1/2020-DyCE/WORKS/SCR**

Date: 26.02.2026

**CAO/C/SC, CAO/RSP**

**CPM/GS/ I/SC, II/SC, BZA, GTL**

**Sr. DEN/Co-Ord/SC, BZA, GTL, GNT, HYB & NED**

**Dy.CE/C/Plg, Dy.CE/EWS/LGD, Dy.CE/CPOH/RYP.**

**Sub:** Revised Approved list of Brands / Makes for 161 categories of materials for use in all Civil Engineering Works in SCR – Reg.

**Ref:** 1. This office letter of even no. dated 30.06.2025.

2. Amendment no.1&2 to Ref.1 issued vide this office letter of even no. dt 18.09.2025

\* \* \*

In order to improve quality of Civil Engineering Works, it is necessary to use the materials of reputed brands as, in many cases, specifications alone may not be sufficient to ensure appropriate standard of work.

Accordingly, vide ref 1 &2, Approved list of Brands and Makes for 160 categories of materials along with Amendment no.1 & 2 was circulated.

Now, the revised approved list of Brands and Makes covering 161 categories of materials is issued herewith as Annexure-A to be used in all works duly incorporating the same as Special Condition in all related tenders with immediate effect.

In case, Brands/Makes from approved list are not available, other reputed Brands/Makes having better aesthetic, Quality and Service life may be permitted with the approval of Sr.DEN/Co-Ordination in divisions or Project in-charge in Construction organization/Gati Shakti, as the case may be.

Material from Govt./Semi-Govt. subsidiaries amongst the approved Brands / Makes should be given 1<sup>st</sup> priority. Only in case of non-availability, other brand should be used if required for expeditious execution of the work.

This supersedes the all previously issued Approved list of Brands/Makes with amendments.

This issues with the approval of PCE.

**Encl:** Annexure-A&A(1)

**RAMU**

**BHUKYA**

Digitally signed by  
RAMU BHUKYA  
Date: 2026.02.26  
10:36:15 +05'30'

**Dy.Chief Engineer/Works**

**Copy to:** Secy. to PCE for kind information of PCE

SDGM, PFA, PCMM, DRM/SC, BZA, GTL, HYB, GNT & NED,

CTE, CBE, CE/P&D, CGE, CE/TS, CE/TM, CE/RSW, CE/SD for kind information.

LIST OF APPROVED BRANDS/MAKES			
SI No.	Material Description	Brand	Make
1	Chloropyrifos(Pesticides)	Piramid	Amvac Agri Rasayan Pvt. Ltd.
		Noban	Chemet Wets & Flows Pvt. Ltd.
		Dursbantct	DE-NOCIL Ltd.
		Premise Agenda	Bayer Ltd
		Hilban	Hindustan Insecticides Ltd.
		Sarups Pest Control	Sarups Pest Control Ltd.
2	Ordinary Portland Cement	ACC	ACC Cements Ltd
		Ultra Tech	Ultra Tech Cement Ltd
		Birla.A1	Orient cement Ltd.
		Dalmia	Dalmia Cement Bharat Ltd.
		Zuari	Zuari Cement Limited
		Jaypee Cement	Jaypee Cement Ltd.
		J.K.Cement	J.K.Cement Pvt.Ltd.
		Ambuja Cement	Ambuja Cements Ltd.
		Coromandel OPC Cement	Coromandel Cements ltd
		Ramco OPC 53 grade	Ramco Cements
		Penna OPC cement	Penna Cement Industries Ltd
		KCP OPC cement	The KCP Limited
		Chettinad OPC cement	Chettinad Cement Corporation Pvt.Ltd
		Bharathi OPC cement	Kalburgi Cement Private Limited
		MAHA Cement	My Home Industries Private Limited
		Sagar Cement	Sagar Cements limited
		JSW Cement	JSW Cement Pvt.Limited
		Nagarjuna cement	NCL Industries Limited
		Deccan Cement	Deccan Cements Limited
		CCI	Cement Corporation of India Ltd.
3	Damp Proof material	Bangur	Shree cement Limited
		Sri Chakra	Sri Chakra Cement Limited
		MAPEI	MAPEI Construction Products India P Ltd.
		Ferrous Crete	Ferrous Crete (India) Pvt. Ltd.
		Impermo	Snowcem Paints
		Duraseal	Apurva India Pvt. Ltd.
		ACCO Proof	ACC Cements Ltd
		Dr.Fixit	Pidilite Industries
		Fosroc	Fosroc Chemicals India Pvt. Ltd.
		CICO	CICO Industries
		SIKA	Sika Inida Pvt Ltd.
		PIDILITE	Pidilite Industries Ltd
		BASF	BASF India Ltd
		MYK	MYK LATICRETE India Pvt. Ltd
4	TMT bars	Guidelines issued vide this office letter No.SCR-HQ0ENGG(SOR)/1/2020-Dy CE WORKS/SCR dt 12.09.2025 enclosed as <b>Annexure-A(1)</b>	

SI No.	Material Description	Brand	Make
5	Plasticiser & Super Plasticiser	BASF	BASF India Ltd
		CICO	CICO Industries
		Plastiment, Sikament	Sika Inida Pvt Ltd.
		Contrament, Power flow	MC Bauchemie (India ) Pvt. Ltd
		Conplast SP430	FOSROC India
		MYK Schomburg	MYK Arments Pvt. Ltd.
		Chryso-HP/Delta/Optima	Chryso India Pvt. Ltd.,
		Sunanda Chemicals	Sunanda Chemicals Ltd.
		Bond tuf	Bond tuf Construction Chemicals
		CAC	Concrete additives & Chemicals Pvt.ltd
		AP smart care	Asian paints Limited
6	Expansion Joint Bitumen board	Dura board HD100	Supreme Industries
		STP	Shalimar Tar Products
		DURAFILL	Supreme industries
7	Post tensioning System	CRUX	Crux Processing systems Pvt Ltd.,
		VSL	VSL India Pvt Ltd.
		Ultracon	Ultracon Structural Systems Pvt Ltd
		BBR	BBR (India ) Pvt . Ltd
		Dynamic	Dynamic Prestressing
		Usha Martin	Usha Martin Ltd
		JK Pre stressing	JK Pre stressing company,Hyd
8	PT Strands	DP wires	D.P Wires Ltd.
		TATA wiron	TATA Steel Ltd
		Usha Martin	Usha Martin Ltd
9	Adhesives	Dunlop	Dunlop India Tire and Rubber Co(India) Ltd.
		Vamorganic	Vamorganic Ltd.
		Sika	Sika India Pvt. Ltd.
		Fevicol	Pidilite Industries
		CICO	CICO Industries
		Proofex of Adhesive	FOSROC India Ltd
10	Grout	Ardex	Ardex Endura Adhesive India Pvt. Ltd
		Ferrous crete	Ferrous Crete (India) Pvt. Ltd.
		LATA POXY SP-100	MYK LATICRETE India Pvt. Ltd
		BASF	BASF India Ltd
		Fosroc GP2	Fosroc India Ltd
		MYK Schomburg	MYK Arments Pvt. Ltd.
		Fugabella, Porcelana	Kerakoil India Pvt. Ltd
		Dr.Fixit	Pidilite Industries
		Weber	Saint-Gobain India Pvt. Ltd
		Asian Paints-Apcorep	Asian paints Ltd
		Polyglaze	Evershine Build India Private limited
		Bond tuf	Bond tuf Construction Chemicals
		Berger	Berger Paints India Limited

SI No.	Material Description	Brand	Make
11	Ready Mix Concrete	Ultra Tech	Ultra Tech Concrete
		ACC	ACC Ltd
		RMC (India)	RMC (India) Pvt. Ltd.
		Lafarge	Lafarge India Pvt. Ltd
		Aparna(RMC)	M/S.Aparna Enterprises Limited
		Nagrjuna RMC	NCL Industries Limited
		Prism RMC	Prism Johnson Ltd
		JAIDHAR Concrete	Jaidhar constructions
		Infra Market Concrete	Hella Infra Market Pvt Ltd
		R6 Infra	R6 Infra RMC
		IJM Concrete Products	IJM Concrete Products Pvt Ltd
12	AAC Blocks	Xtralite	ULTRATECH Cement Ltd
		Areocon	BirlaNu limited
		Siporex	SIPOREX
		Nucon	Green way building materials India Pvt. Ltd
		NCL	NCL VEKA Ltd
		Renacon	Renaatus Procon Pvt. Ltd
		Smart Brix	Bondada eco build Pvt.Ltd
		Gouthami Eco Lite Blocks	Gouthami Eco Lite Blocks Industry
13	Wooden Flush door shutters	Indian Timber Products	Indian Timber Products
		Greenlam	Greenlam Ply Industries Ltd.
		Mayur	Mayur Ply Industries
		Kitply	Kitply Industries Ltd
		Duro Flush doors	Duro Ply Industries Ltd.
		Kenwood	Kenwood Ply & Board
		Century	Century Flush Doors
14	Water Proof Plywood,Commercial ply, Fire retardant ply and Block boards	Green Ply	Green Ply Industries Ltd.
		Kitply	Kitply Industries Ltd
		Duroply	Duro Ply Industries Ltd.
		Archidply	Archid ply industries Ltd.
		Century ply	Century Flush Doors
15	Laminate	Green Lam	Green lam Industries Ltd.
		Centuary	Centuray laminates
		Merino	Merino laminates
		Archidply	Archid ply industries Ltd.
		Kitmica	Kitply Industries Ltd
		Sunmica	Sunmica Industries
		Formica	Formica Laminates (India) Pvt Ltd
		Decolam	Decolam India Pvt Ltd.
16	Prelaminated particle board Exterior Grade	Novapan	GVK Novapan Industries Pvt Ltd.,
		Merino	Marino laminates
		Kitlam	Kitply Industries Ltd
		TESA Action Co.	TESA Action Co.
		Ecoboard	Ecoboard Industries Ltd.
		Associate	Associate Decor Limited
		Archid ply	Archid ply industries Ltd.
		Centuary	Centuary MDF
		Green Lam	Green lam Industries Ltd.



SI No.	Material Description	Brand	Make
17	High Density (HDF) Prelaminated board	Pergo	Red Floor India
		Green Ply	Green Ply Industries Ltd.
		Green Lam	Green Lam Industries Ltd.
18	Gypsum board	Gyproc Saint Gobain	Saint Gobain Gyprock India Ltd.,
		Lafarge	Lafarge Gypsum India Pvt. Ltd
		USG Boral Board	USG Board India (P) Ltd.
		Armstrong	Armstrong World Industries
19	Glass door hardware	Dorma	Dorma India Pvt Ltd
		Kich	Kich Architectural Products Ltd.
		Classic	Classic hardware
		Squash	Squash glass doors
		Hafele	Hafele India Pvt. Ltd
		Ozone	Ozone Hardware.
		Geze	GEZE GmbH
		Dorset	Dorset Industries Pvt Ltd
20	Hydraulic door closers/Floor springs	Godrej	Godrej locking solutions & systems
		Hardwyn	Hardwyn hardware
		MAGNUM KIT	Mukund Overseas
		Dorma	Dorma India Pvt Ltd
		Everite	Everite agencies
		Dorset	Dorset Industries Pvt Ltd
21	Locks & Latches	Dorset	Dorset Industries Pvt Ltd
		Godrej	Godrej locking solutions & systems
		Hitech	Globe Locks India
		Hafele	Hafele India Pvt. Ltd
		Harrison	Harrison locks
		Plaza	Bharat lock House
		Yale	ASSA ABLOY India (P) Ltd.
		Link	Link Locks
22	Metalic / Steel Fire Door	Shakthi Hormann	Shakthi Hormann Pvt Ltd
		Promat	Promat fire & Insulation (P) Ltd
		MPP Schodders	MPP Technology Pvt.Ltd.
		NAVAIR	NAVAIR International Pvt Ltd
		Signumfire Protection	Signumfire Protection Pvt. Ltd
		Sukri	Sukri Fire doors Pvt.Ltd
		Kenwood	Kenwood Ply & Board
		Godrej	Godrej Security solutions
		Tata pravesh	Tata steel
		KROSS door	Kross Innovations Pvt Ltd
23	Fire Smoke Seal	Hilti	Hilti India Pvt Ltd
		Promat	Promat fire & Insulation (P) Ltd
		Atroflame	Atroflame Ltd.
		Raven	Raven Global

SI No.	Material Description	Brand	Make
24	Fire rated hardware	Dorma	Dorma India Pvt Ltd
		Ingersolrand	Ingersolrand (India) Ltd
		Dorset	Dorset Industries Pvt Ltd
		Backers FS	Backers FS
		Geze	GEZE GmbH
25	Non Metallic Fire door	NAVAIR	NAVAIR International Pvt Ltd
		Promat	Promat fire & Insulation (P) Ltd
		Godrej	Godrej Security solutions
		Kenwood	Kenwood Ply & Board
26	Stainless steel screws	Kundan	Kundan Industires Ltd
		Alloy	Alloy Ltd
		GKW	GKW Limited
		Nettlefold	Nettlefold screws
		Atul	Atul fasteners Ltd
27	Butt Hinges openable window shutters	Hafele	Hafele India Pvt. Ltd
		Earl Bihari	Earl Bihari India Pvt Ltd.
		Dorma	Dorma India Pvt Ltd
		Dorset	Dorset Industries Pvt Ltd
		Alu Alpha	Alu Alpha India
28	Mild Steel Butt Hinges	Jolly	Jolly Engineering works
		Supreme	Supreme
		Saswat	Saswat
		Deepak	Deepak
		Swift	Swift screws
		Garg	D P Garg & Company
		Amit	Lovely metal industries Pvt Ltd.
		Jyoti	Jyoti Architectural Pvt Ltd.
29	Stainless steel Butt hinges	Prayag	Prayag Polymers (P) Ltd
		Ozone	Ozone Hardware.
		Dorma	Dorma India Pvt Ltd
30	Concealed tower bolt	Dorma	Dorma India Pvt Ltd
		Ingersolrand	Ingersolrand (India) Ltd
		DORSET	Dorset Industries Pvt Ltd
		Alu Alpha	Alu Alpha India
31	UPVC doors, door frames and windows	Fenesta	Fenesta DCM Shriman
		Encraft	Encraft India Pvt.Ltd.
		LG	LG India Pvt. Ltd.
		Rehau	Rehau Unlimited Polymer Solutions
		Aluplast	Alu Alpha India
		Komarling	Profile India Window Technology Pvt.Ltd.
		Duroplast	Duroplast Extrusion Pvt Ltd
		Aparna(venster) /Okotech	M/S.Aparna Enterprises Limited
		NCL VEKA	NCL VEKA Ltd
		Shinotech	Bondada eco build Pvt.Ltd

SI No.	Material Description	Brand	Make
32	PVC Doors and Frames	Accucel	Accura Polytech Pvt.Ltd
		Sintex	Sintex plastic technology Ltd.,
		Duroplast	Duroplast Extrusion Pvt Ltd
		Polyline	Polyline extrusion Pvt Ltd
		Rajshri	Rajshri Productions Pvt. Ltd.
33	Stainless friction hinges	Hettich	Hettich India Pvt .Ltd.
		Hafele	Hafele India Pvt. Ltd
		Securistyle	Securistyle India Pvt .Ltd.
		Earl Bihari	Earl Bihari India Pvt Ltd.
		EBCO	EBCO
		ROTO	ROTO Frank Asia
34	Float Glass	Saint Gobain	Saint Gobain India Pvt Ltd
		Modiguard	Gujarat Guardian Ltd.
		Asahi	Asahi India glass Ltd.
		Pilkinton	Pilkinton India Pvt
35	Reflective glass	Saint Gobain	Saint Gobain India Pvt Ltd
		Asahi	Asahi India glass Ltd.
		Pilkinton	Pilkinton India
		Modifloat	Gujarat Guardian Ltd.
		Glaverbel	Glaverbel India
36	Tempered reflective/clear glass	Saint Gobain	Saint Gobain India Pvt Ltd
		FUSO	FUSO Glass India Pvt .Ltd.
		Gurind	Gurind India
		Asahi	Asahi India glass Ltd.
		Modiquard	Gujarat Guardian Ltd.
		Impact safety	Impact safety glass works Pvt Ltd
37	Fire rated glass	Contra flam /Pyroswiss of Saint Gobain	Saint Gobain India Pvt Ltd
		Promat	Promat fire & Insulation (P) Ltd
		Pyran of Schott	Schott glass India Pvt Ltd.
		Pilkinton	Pilkinton India
38	Anchor / SS Stone Cladding Clamps / Dash fasteners	Hilti	Hilti India Pvt Ltd
		Fischer	Fischer India
		Anchor	Anchor Ltd
		Nutech	Nutech fasteners
		Canon	Cannon
		Wuerth	Wuerth India Pvt. Ltd
		Trixel	Axel India Pvt.Ltd
		Helfen	Helfen Gmbh
		BOSCH	BOSCH Ltd
39	Structural Steel	SAIL	SAIL
		VIZAG	RINL
		TISCO	TATA STEEL
		JSW	JSW
		JSPL	Jindal Steel & Power Limited

SI No.	Material Description	Brand	Make
40	M.S.Pipe, Tubes	SAIL	SAIL
		TISCO	TATA STEEL
		JINDAL	JSW
		MPL	Mahalakshmi profiles Private limited
41	Stainless steel / Stainless steel pipes	Salem	SAIL
		Connect	Connect Ltd.
		Jindal	JSW
		SAIL	SAIL
		KINGSTON	KINGSTON Brass
		JSL	Jindal stainless limited
42	Stainless steel Bolts, washers, nuts	Kundan	Kundan Industires Ltd
		Atul	Atul fasteners Ltd
		Hilti	Hilti India Pvt Ltd
43	Stainless steel pressure plate screws	Kundan	Kundan Industires Ltd
		Pooja	Pooja steel corporation
		Atul	Atul fasteners Ltd
44	Welding rods	Advani	Advani oerlikon Ltd.
		ESAB	ESAB India Pvt. Ltd
		G-Weld	GEE Limited
		Royal Ark	Royal Ark
		Raaj Ratna	Raaj Ratna
		Mailan	Mailan
45	Metal Deck Sheet	TATA	TATA STEEL
		SAIL	SAIL
46	Shear Stud / Connector	KOCO	KOSTER & Co.
		PE	PE
		MNE	MNE
		Stalwart	Stalwart Techno source India Pvt Ltd
47	Vitrified tiles	Jhonson	Prism Jhonson Ltd
		Kajaria	Kajaria Ceramic Ltd
		Somany	Somany Ceramic Ltd
		NITCO	NITCO Ltd
		RAK	RAK Ceramic India Pvt Ltd.
		Varmora Granito	Varmora Granito Granite Pvt. Ltd
		Aparna(Vitero)	M/S.Aparna Enterprises Limited
		Exxaro	Exxaro Tiles
		CERA	CERA Sanitaryware Limited.
		Orient	Orient bell Ltd
48	Glazed Ceramic tiles (Also wall tiles)	Jhonson	Prism Jhonson Ltd
		Kajaria	Kajaria Ceramic Ltd
		Somany	Somany Ceramic Ltd
		NITCO	NITCO Ltd
		RAK	RAK Ceramic India Pvt Ltd.
		Varmora Granito	Varmora Granito Granite Pvt. Ltd
		Aparna(Vitero)	M/S.Aparna Enterprises Limited
		Cera	Cera Ceramics limited

SI No.	Material Description	Brand	Make
49	Synthetic Sports flooring	Armstrong	Armstrong flooring
		LG	LG Hausys India
		Wondorfloor	RMG Polyvinyl India Ltd.
50	Linoleum sports flooring	Armstrong	Armstrong flooring India Pvt Ltd.
		Forbo	Forbo flooring India Pvt. Ltd.
		Gerflor	Gerflor flooring
51	False floor	Hewetson	Hewetson India
		Access floor system	Access Floor System
		Unifloor	Unifloor India Ltd
		Unitile	Unitile office systems Pvt. Ltd
		PINNACLE	PINNACLE
		Kebao	Inner Space (Distributors)
52	Engineered wood floor	Armstrong	Armstrong flooring
		Mikasa Real wood floors	Green Lam Industries
		New wood	New Wood India Ltd
		Werner	Duraflor werner GmbH
		Pergo	Red Floor India
53	Floor spring	Dorma	Dorma India Pvt Ltd
		Ingersolrand	Ingersolrand (India) Ltd
		OZONE	Ozone Hardware.
		GEZE	GEZE GmbH
54	Cement concrete parking tiles	NITCO	NITCO Ltd
		Ultra	Ultra tile Private Ltd
		Eurocon	Eurocon tiles India
		Dazzle	Dazzle Designer Tiles Pvt Ltd
		NTC	NTC Parking tiles
		Hindustan tiles	Hindustan tiles, Ranchi Pune
55	Synthetic Carpet tiles	TOLI	TOLI corporation
		Hollitex	Hollitex carpet tiles
		Standard Carpets	Standard Carpets
56	Vitrified paving tiles	PAVIT	PAVIT Ceramics Pvt Ltd
		Johnson	Johnson
		Nitco	Nitco
		Kajaria	Kajaria Ceramics Pvt Ltd
57	Glass mosaic tiles	Italia	Tile Italia mosaics Pvt Ltd.
		Coral	Coral tiles
		Mridul	Mridul tiles
		Palladio	Palladio Mosaics
		Bisazza	Bisazza Italy
		Birla White	Birla Corportion Ltd.
		JK White	J. K. Cement Ltd
		PAVIT (Eco Tile)	PAVIT Ceramics Pvt Ltd
58	Thermal Insulation	Pidilite	Pidilite Industries
		Elastospray	BASF
		MYK arment	MYK Arment Private limited

SI No.	Material Description	Brand	Make
59	Acoustic Insulation	Twingerinsul	U.P.Twiga fiber glass Ltd
		Lloyd Insulation	Lloyd Insulation (India ) Ltd
		Saint Gobain Gyproc	Saint Gobain Gyproc India
		Himalyan Acoustics	Himalyan Acoustics
		Knauf	Knauf Gypsum India Pvt. Ltd.
		Anutone	Anutone Accoustics Ltd.
60	UPVC Pipes and fittings (Rain water pipes)	Supreme	Superme Industries Ltd
		Prince	Prince Pipes and fittings Ltd
		Finolex	Finolex Industries Ltd.
		Prepoly	Premier PVC Industry
		Astral	Astral polytechnik Ltd
		Ashirwad	Ashirwad PVC Pipes
		Flow Guard	Flow Guard
		Sudhakar	Sudhakar PVC Products Private Limited
61	Sandwich PUF panelled roofing sheets	Lloyd Insulation	Lloyd Insulation (India ) Ltd
		JINDAL MECTEC	JINDAL Mectec Pvt. Ltd
		Danpalon	Danpal Light architecture
		GE Plastic	GE Silicones
		LEXAN	LEXAN Ltd
62	Poly carbonate Sheet	MG Polyplast	MG Polyplast
		GE Lexon	GE Silicones
		Danpalon	Danpal Light architecture
		Alcox	Hindeggan Alcox Ltd.
		Polygal	Polygal India Pvt Ltd.
63	False ceiling	Saint Gobain Gyproc	Saint Gobain Gyproc India
		Armstrong	Armstrong World Industries
		USG Boral	USG Boral
		Aerolite	Andhra Polymers Pvt. Ltd./Aerolite Industries Pvt.Ltd.
		Hunter Dougals	Hunter Dougals
		Gridsquare	Gridsquare Ceilings
		Knauf	Knauf Gypsum India Pvt. Ltd.
		Anutone	Anutone Accoustics Ltd.
		Diamond	Diamond International Inex Pvt.Ltd
64	False Ceiling Members (Perimeter, Ceiling section, intermediates, angles etc.,)	Armstrong	Armstrong World Industries
		Aerolite	Andhra Polymers Pvt. Ltd./Aerolite Industries Pvt.Ltd.
		Gridsquare	Gridsquare Ceilings
		Gypframe steel	British Gypsum
		Knauf	Knauf Gypsum India Pvt. Ltd.
		Lloyd	Lloyd Insulation (India ) Ltd
		Saint Gobain	Saint Gobain Gyproc

SI No.	Material Description	Brand	Make
65	Synthetic enamel Paint	Premium glass enamel	Asian paints Ltd
		Dulux	ICI dulux Ltd
		Nerolac	Nerolac Paints Ltd
		Berger	Berger Paints
		Nippon	Nippon Paint India Ltd.
		INDIGO	Indigo Paints
		Shalimar Paints	Shalimar Paints Limited
		JSW	JSW Paints
66	Pink primer	Wood primer	Asian Paints
		Dulux	ICI Dulux
		Nerolac	Nerolac Kansia Nerolac Paints Ltd.,
		Berger	Berger Paints
		Nippon	Nippon
67	Red Oxide Zinc Chromate primer	High performance yellow metal primer	Asian Paints
		Dulux	ICI Dulux
		Nerolac	Nerolac
		Berger	Berger Paints
		Nippon	Nippon
		Shalimar Paints	Shalimar Paints Limited
		MYK arment	MYK Arment Private limited
68	Oil Bound Distemper	Tractor Agalock	Asian Paints
		Dulux (Maxilite)	Dulux
		mG Polyplast	Nerolac
		Berger (Bisom)	Berger Paints
69	Acrylic emulsion	Premium emulsion	Asian Paints
		Dulux (Super Cover)	ICI Dulux
		Nerolac (Beauty Gold)	Nerolac
		Berger(BISM)	Berger Paints
		Indigo Paints	Indigo Paints Pvt Ltd
		JSW Paints	JSW Paints Pvt Ltd
		Shalimar Paints	Shalimar Paints Limited
70	Water Proof Cement paint	Asian exterior wall primer	Asian Paints
		Berger	Berger Paints
		Surfa	Surfactoats (India) Pvt. Ltd.
		ICI DULUX	ICI Dulux
		Snowcem	Snowcem Paints
		Birla Cements	Birla Cements
		JK Cements	JK Cements Pvt Ltd
		JSW Paints	JSW Paints Pvt Ltd

SI No.	Material Description	Brand	Make
71	Acrylic smooth exterior paint	Dulux	ICI Dulux
		Apex	Asian Paints
		Nerolac	Nerolac
		Berger	Berger
		Nippon	Nippon
		Birla Cements	Birla Cements
		JK Cements	JK Cements Pvt Ltd
		JSW Paints	JSW Paints Pvt Ltd
		Indigo Paints	Indigo Paints Pvt Ltd
		Shalimar Paints	Shalimar Paints Limited
72	Premium Acrylic smooth exterior paint with silicon additives	ULTIMA	Asian Paints
		Dulux	ICI Dulux
		Nerolac	Nerolac
		Berger	Berger
		Royal Emulsion	Asian Paints
		JSW Paints	JSW Paints Pvt Ltd
		Shalimar Paints	Shalimar Paints Limited
73	Cement based wall putty	J.K.wall putty	J. K. Cement Ltd
		Birla wall care	Birla Cements Ltd.
		Asian paints	Asian paints Ltd
		Altek	NCL Alltek & seccold Ltd.
		Berger	Berger
		Ardex Endura	Ardex Endura India Pvt. Ltd.
		Ferrous Crete	Ferrous Crete (India) Pvt. Ltd.
		Polyglaze	Evershine Build India Private limited
74	Acrylic textured plaster	Apex Duracast	Asian Paints
		Spectrum paints	Spectrum paints Ltd.
		Heritage	Heritage Rajkamal Group
		Asian paints	Asian Paints
		Nerolac	Nerolac
75	Ready mix cement plaster	Readi Plast	Ultra Tech Cement Ltd
		Gyproc Plasters	Saint Gobain Gyproc India
		Ultra tech	Ultra Tech Cement Ltd
		Ferrous Crete	Ferrous Crete (India) Pvt. Ltd.
76	Melamine Polish	Asian paints	Asian Paints
		Melamine Gold wudfin	Pidilite Industries
		Polycure	Polycure Malaysia
77	Fire retardant paint	Jotun	Jotun paints
		Hilti	Hilti India
		Akzonobel	Dulux Akzonobel Paints
		Asian Paints	Asian Paints
		STPL	STPL Ltd.
78	Anticorrosive bitumastic paint	Berger	Berger Paints India Ltd
		Shalimar	Shalimar paints India Ltd.
		Bituminous black	Asian Paints



SI No.	Material Description	Brand	Make
79	Cement Primer	Asian paints	Asian Paints
		JK Primaxx	J. K. Cement Ltd
		Berger	Berger Paints India Ltd
		Shalimar Paints	Shalimar Paints Limited
80	Epoxy paint	Asian epoxy	Asian Paints
		Berger	Berger Paints India Ltd
		Shalimar	Shalimar paints
		STP	Shalimar Tar Products
		Ardex Endura	Ardex Endura India Pvt. Ltd.
		Nerolac	Nerolac
		Asian Paints-Apcorep Repair range	Asian paints Ltd
81	Epoxy coating	BASF	BASF India Ltd
		Fosroc	Fosroc India
		Laticrete	MYK Laticrete India
		Ardex Endura	Ardex Endura India Pvt. Ltd.
		Ferrous Crete	Ferrous Crete (India) Pvt. Ltd.
		Bond tuf	Bond tuf Construction Chemicals
		MYK arment	MYK Arment Private limited
		Asian paints smart care	Asian paints limited
82	Sililcon coating	Dow corning	Dow corning India
		BASF	BASF India Ltd
		GE	GE Silicones
		Wacker	Wacker silicones.
83	Interlocking Concrete Paver Blocks	NITCO (ROCKARD)	NITCO
		Ultra	Ultra tile Private Ltd
		REGENCY	Regency
		Hindustan tiles	Hindustan tiles, Ranchi , Pune
		Vyara tiles	VYARA TILES Pvt Ltd./ Surat
		BHARAT (NILSAN)	Bharat
		Dazzle	Dazzle Designer Tiles Pvt Ltd
		Shree	Shree Bharat Paver blocks
		Basant Betons	Basant Betons,Hyd
84	Solar studs/ Median markers	3M	3M Science
		Avery Dennison	Avery Dennison India Pvt Ltd.
		Nikkalite	Nippon carbide Industires (USA)
85	Polycarbonate Convex mirrors, Rubberised road hump	Unique safety solutions	Unique safety solutions
86	Mirror	Modi Guard	Gujarat Guardian Ltd.
		Saint Gobain	Saint Gobain Glass India Ltd.
		AIS mirror	Asahi India glass Ltd.
		Atul	Atul glass Industries Ltd.,

SI No.	Material Description	Brand	Make
87	Vitreous Commodes/ Wash basin	Hindware	HSIL Ltd
		Roca	ROCA Bath room products
		Parryware	ROCA Bath Pvt. Ltd.
		Kohler	Kohler world wide
		CERA	CERA Sanitaryware Ltd.
		Jaquar	Jaquar Group
		Johnson	Johnson
88	Flushing Cistern	Parryware	ROCA Bath Pvt. Ltd.
		Kohler	Kohler world wide
		Hindware	HSIL Ltd.
		CERA	CERA Sanitaryware Ltd.
		Jaquar	Jaquar Group
		Johnson	Johnson
		Prayag	Prayag Polymer (Pvt.) Ltd.
89	SWR PVC Pipes & fittings	Supreme	Superme Industries Ltd
		Astral	Astral polytechnik Ltd
		Finolex	Finolex Industries Ltd.
		Flowgard	Ashirwad PVC Pipes
		Prince	Prince Pipes and fittings
90	Stainless Steel Kitchen Sink	Jhonson	Prism Jhonson Ltd
		Diamond	Pheonix Appliances Pvt. Ltd.
		Jindal	Centuary polytech
		Nilkanth	Nilkanth
		Nirali	Jyoti (India) metal Industries Pvt Ltd.
		Hindware	HSIL Ltd
		Silver shine	Blue stone sanitary Industries Pvt. Ltd.
		Joyna	Joyna
		Navkar	Shri Navkar Metals Ltd.
		Franke	Franke India Ltd.
		Futura	Futura Kitchen Sinks India Pvt. Ltd.
91	Centrifugally Caste (Spun) Iron Soil Pipes	Neco	Jayaswal Neco Ltd
		SKF brand	SKF Industries
		HEPCO	Hepco
		Bengal Iron	Bengal Iron Corporation
		RPMF	Raj Pattern Makers and Founders Pvt. Ltd.
92	PE-AL-PE Composite	Kitec	Kitec Industries (India) Pvt. Ltd.
93	G I Pipes	TATA	TATA Steel Ltd
		Zenith	Zenith Birla (India) Ltd.
		HISSAR	HISSAR
		Jindal	Jindal Pipes Ltd.
94	G I Pipe fittings	Zoloto	Zoloto Industries
		Unik	Unik malleables
		HB	HB Industries
		ICS	Shree samarth Engineers

SI No.	Material Description	Brand	Make
95	Water supply Valves	Zoloto	Zoloto Industries
		Leader	leader valves Ltd.
		ARCO	Arco valves Pvt. Ltd.
96	CPVC pipes and fittings	Supreme	Superme Industries Ltd
		Finolex	Finolex Industries Ltd.
		Astral	Astral polytechnik Ltd
		Prince	Prince Pipes and fittings Ltd
		Truflo	Hindware Limited
		Birlanu	BirlaNu limited
		Ashirwad	Ashirwad PVC Pipes
		Flowgard	Flow Guard
		Sudhakar	Sudhakar PVC Products Private Limited
97	PVC / HDPE water storage tanks	Sintex	Sintex plastic technology Ltd.
		Vectus	Vectus Industries Ltd
		Supreme	Superme Industries Ltd
		Plasto water tank	RC plasto tanks & pipes Pvt Ltd
		Storefit	Prince Pipes and fittings Ltd
98	DI (Ductile-Iron) Pipes	Electrosteel	Electrosteel
		Jindal	Jindal
		Tata Ductura	Tata Ductura
		Electrosteel	Electro Steel Castings limited
99	DI Fittings	Electrosteel	Electro Steel Castings limited
		Jindal	Jindal
		Tata Ductura	Tata Ductura
100	Water supply fixtures like bibcock, Shower panels	Jaquar	Jaquar Group
		Parryware	Roca bath room products Pvt. Ltd.
		Johnson	Prism Jhonson Ltd
		MARC	MARK Showers
		HINDWARE	HSIL Ltd
		Prayag	Prayag Polymers (P) Ltd
		CERA	CERA Sanitaryware Limited
101	Air release valve	Kirloskar	Kirloskar brothers Ltd
		RBM	AFS Ltd.
		Kartar	Kartar valves private Ltd.
102	Centrifugally (Spun) Cast Iron	Electrosteel	Electrosteel castings Ltd.
		Lanco/Sripipes	Electrosteel castings Ltd.
		Jindal	Jindal saw Ltd.
		Kesoram	Kesoram Industries Ltd
103	Spun cast iron fittings	Neco	Jayaswal Neco Ltd
		Kartar	Kartar Valves Private Ltd.
		Electrosteel	Electrosteel castings Ltd.
		Kapilansh Centrifugal	Kapilansh Dhatu Udyog(P)Ltd.
		SKF brand	SINGHAL IRON FOUNDRY Pvt. Ltd

SI No.	Material Description	Brand	Make
104	CI double flange sluice valve	Kirloskar	Kirloskar brothers Ltd
		RBM	AFS Ltd.
		Kartar	Kartar valves private Ltd.
		IVS	Indian valves private Ltd.
		Zoloto	Zoloto Industries
		BURN	BURN
		Leader	Leader valves Ltd.
105	CI double flanged non return valve	Kirloskar	Kirloskar brothers Ltd
		Fluidtech	Fluidtech
		Zoloto	Zoloto Industries
106	Gun metal Valves	Zoloto	Zoloto Industries
		Leader	Leader valves Ltd.
		Sant	Sant valves Pvt Ltd
		Audco	L&T Valves
107	PTMT/PVC water supply sanitary fittings, bib cocks, pillar cock	PEARL	Precision Products
		Prayag	Prayag Polymers (P) Ltd
		Supreme	Supreme Industries
108	RCC Pipes	Indian Hume Pipe	Indian Hume Pipe Ltd.
		Madurai spun pipe	Madurai spun pipe company
		Lakshmi Sood & Sood	Lakshmi Sood & Sood Pipe Co.
		Jain & Co	Jain spun pipes Co.
		Uday Industries	Uday Industries
109	CI/FRP/GRP Composite Manhole cover	Neco	Jayaswal Neco Ltd
		HEPCO	Binay Udyog Pvt. Ltd.
		BIC	Bengal iron corporation
		Thermodrain	Thermoset Poly products (I) Pvt Ltd
		HP composites	HP composites LLP
110	SFRC/ FRP/GRP Composite Cover and grating	KK	KK Manhole and gratings Co Pvt Ltd.
		Advent	Advent concrete vision
		Kutty	Kutty Industries
		Nu-TEC	Nu-Tech concrete products (P) Ltd.
		Thermodrain	Thermoset Poly products (I) Pvt Ltd
111	Plastic Encapsulated Foot Rest	KK India	KK Manhole and gratings Co Pvt Ltd.
		KGM	KGM Exports
		Accurate Buildcon	Accurate Buildcon company.
112	Spun cast iron covers & gratings	Neco	Jayaswal Neco Ltd
		Jagannath	Sri Jagannath Iron Foundry Pvt Ltd.
		Kapilansh Centrifugal	Kapilansh Dhatu Udyog(P)Ltd.
		SKF brand	SINGHAL IRON FOUNDARY Pvt. Ltd
113	Aluminium doors/windows sections	Hindalco	Hindalco Industries Ltd.
		Jindal	Jindal Aluminium Ltd.
		Padmavathi Extrusion	Padmavathi Extrusion Private Ltd.
		Hyd	Hydro Extrusion
		Omalco Extrusion	Omalco Extrusion Pvt. Ltd.
		Bhoruka	Bhoruka Aluminium Ltd.
		Indal	Indian Aluminium Ltd
		ALTEZA	Aparna Craft Exteriors PVT Ltd

SI No.	Material Description	Brand	Make
114	Aluminium systems/Anodised aluminium fittings for doors/windows	Define	Define Overseas Pvt. Ltd.
		Schueco	Schueco India Pvt. Ltd.
		Bhoruka	Bhoruka Aluminium Ltd.
		Kawneer	Kawneer India
		Hardima	Hardima sales corporation
		Everite	Everite Agencies
		Jyothi	Jyothi Industries
		Sigma	Sigma Corporation
115	Friction stay hinges	Earl Bihar	Earl Bihari Pvt. Ltd.
		KINLONG	Kinlong Industries
116	EPDM Gaskets	Anand	Anand NVH products (P) Ltd.
		Roop	Roop Polymers Ltd
		Bohra	Bohra rubber Pvt Ltd.
		Hanu	Hanu Industries
		Amees Rubber	Amees Rubber Industries Pvt Ltd.
117	Silicon Gaskets	Sree Gaurav	Sree Gaurav Rubber products
118	Masking Tapes	3M	3M
		Sun	Sun
		Wonder polymer	Wonder Tape Industries
		Roop	Roop Polymers Ltd
119	Water proofing compound	Fosroc	Fosroc India
		Ferrous Crete	Ferrous Crete (India) Pvt. Ltd.
		Sika	Sika India
		MYK Schomburg	MYK Arments Pvt. Ltd.
		Penetron	Penetron India Pvt Ltd
		Dr. Fixit	Pidilite Industries
		Accoproof	ACC Cements Ltd
		Ardex Endura	Ardex Endura (India) Ltd
		Alchemica	Alchemica Ltd.
		Berger	Berger Paints India Limited
120	Membrane Water proofing system	BASF	BASF India Ltd
		Ferrous Crete	Ferrous Crete (India) Pvt. Ltd.
		STP Ltd	Shalimar Tar Products
		MYK Schomburg	MYK Arments range of products
		SmartCare Membranes	Asian paints
		Dr Fixit	Pidilite Industries
		Alchemica	Alchemica Ltd.
		Ardex Endura	Ardex Endura Ltd
		Hydro tech	Hydro tech Ltd
		Membrane tech	Membrane tech Pvt Ltd
		Asian Paints-Smart care Water proofing	Asian paints Ltd
		Berger	Berger Paints India Limited

SI No.	Material Description	Brand	Make
121	Chemical water proofing system	BASF	BASF India Ltd
		Ferrous Crete	Ferrous Crete (India) Pvt. Ltd.
		MC-Bauchemie	MC-Bauchemie India Ltd
		Sika	Sika India
		Sunanda speciality coating	Sunanda speciality coating Pvt Ltd.
		Perma construction Aid	Perma construction Aid Pvt Ltd,
		Fosroc	Fosroc India
		Dr. Fixit	Pidilite Industries
		Bond tuf	Bond tuf Construction Chemicals
		Berger	Berger Paints India Limited
		MYK arment	MYK Arment Private limited
122	Water stops	Hydrotite	Sika India
		BASF	BASF India Ltd
		Dr. Fixit	Pidilite Industries
		Ardex Endura	Ardex Endura Ltd
		Ferrous Crete	Ferrous Crete (India) Pvt. Ltd.
		Hydroswell	Sika India
		Berger	Berger Paints India Limited
		MYK arment	MYK Arment Private limited
123	Aluminium composite panels	Alucobond	3A Composites India Pvt.Ltd.
		Eurobond	M/S Euro panel products Pvt. Ltd
		Aludecor	M/S Aludecor Lamination Pvt. Ltd
		Reynobond	Reynobond
		Alpolic	Alpolic
		Alstrong	Alstrong
		Hynadecor	Hynadecor
		Alstone	Alstone
		4 Mann Aluminium composite panels	4 Mann Industries Pvt.Ltd
124	PVC Perforated Pipes	Rex Polyextrusion	Rex Polyextrusion Ltd,
		Akash Enterprises	Akash Enterprises
		Zenplas Pipes	Zenplas Pipes Pvt. Ltd
		Supreme	Supreme Industries
125	Play Equipements	Koochie Play	Koochie Play Systems Pvt. Ltd
		Playworld Systems	Playworld Systems India
126	Structural Sealant	Dow corning	Dow corning India
		Wacker	Wacker Silicones.
		GE	GE Silicones
		STP Ltd.	Shalimar Tar Products
		Smart Care Sealant	Asian paints
		Fosroc	Fosroc India
		BASF	BASF India Ltd

SI No.	Material Description	Brand	Make
127	Poly-sulphide sealant	Dr. Fixit	Pidilite Industries Ltd
		Ferrous Crete	Ferrous Crete (India) Pvt. Ltd.
		MYK Schomburg	MYK Arments Pvt. Ltd.
		Pidilite	Pidilite Industries
		STP	Shalimar Tar Products Limited
		Fosroc	Fosroc India
		Techseal	Choksey Chemical Pvt. Ltd
		Tuff seal	Bondit construction Chemical
		Berger	Berger Paints India Limited
128	Bitumen Impregnated Board	Shalitex	Shalimar Tar Products
129	Polyethylene backer rod	Supreme	Supreme industries
130	Weather Silicon makeand grade	Dow corning	Dow corning India
		Momentive (GE)	GE Silicones
131	GRC Jali	Terrafirma	Terrafirma GRC Industries
		Ecovision	Ecovision Industries Pvt. Ltd.
		Mahesh GRC	Mahesh Prefab Pvt Ltd.
132	Air transfer grills	Cool grills	Cool grills, Pune
		Systemair India	Systemair India Pvt. Ltd..
133	Ready made/ Gysum Plaster	Ferrous Crete	Ferrous Crete (India) Pvt. Ltd.
		Gyproc Cute 100	Gyproc India
		Ultrtech	Ultra Tech Cement Ltd
		Polyglaze	Evershine Build India Private limited
134	Steel Windows/Pressed Steel Frames	Madhu Industries	Madhu Industries
		San Harvic	Sen-Harvic Windows Private Limited
		NCL	NCL Industries
135	PVC Door Frames & Shutters	Rajshri	Rajshri Productions Pvt. Ltd.
		Plastiwood	Plasiwood
		Sintex	Sintex plastic technology Ltd.
		Accucel	Accura Polytech Pvt.Ltd
136	PVC Flooring	LG Hausys	LG Hausys
		Gerflor	Gerflor flooring
		Armstrong	Armstrong World Industries
137	Grass Paver	Unistone	Unistone
		Ultra	Ultra Ltd.
		Basant Betons	Basant Betons Expirience Centre
		Green Natural	Green Natural Products Pvt Ltd
138	FRP Door Frames & Shutter	Meena Fibre Glass.	Meena Fibre Glass
		Duroplast	Duroplast Extrusion Pvt Ltd
		Cactus	Cactus
		Polyline	Polyline

SI No.	Material Description	Brand	Make
139	Non Metallic Floor Surface Hardners	Ironite	Ironite
		Hardonite	Hardonite
		FOSROC	Fosroc India
		SIKA	SIKA India
		BASF	BASF India Ltd
		CICO	CICO Technologies Ltd.
		Pidilite	Pidilite Industries Ltd
		MYK arment	MYK Arment Private limited
140	PU Enamel Metallic Paints on MS Structure & Epoxy paints (Premium Quality)	SKK	SKK Ltd
		Akzonobel	Akzonobel
		Asian	Asian Paints
		Berger	Berger Paints India Ltd
		MRF	MRF Paints
141	Rockwool/Glasswool insulation	Twigafiber	Twigafiber glass Ltd
		Lloyd Insulation	Lloyd Insulation Ltd.
		Supereme	Superme Industries Ltd
142	Structural Glazing	Modi	Modi Guard
		Saint Gobain	Saint Gobain Glass India Ltd.
		Asahi	Asahi India glass Ltd.
		Glaverbel	Glaverbel India
143	Sensor Based Auto flush Systems	AOS Systems	AOS Systems
		TOTO	TOTO Ltd
		Parryware	Parryware Sanitaryware
		Hindware	HSIL Ltd
		Grohe	Grohe
		Jaquar	Jaquar Group
		Kochier	Kochier
		Cera	CERA Sanitaryware Limited
144	Float Valve (Ball Valve)	Prayag	Prayag Polymers (P) Ltd
		Leader	Leader valves Ltd.
		Zoloto	Zoloto Industries
		IBP	IBP Industries
		Arco	Arco valves Pvt. Ltd.
145	Spider Patch Fittings for Structural Glazing	Dorma	Dormakaba
		Sevax	Saint Gobain Glass India Ltd.
		Kich	Kich India
		Ozone	Ozone Ltd
		Hafele	Hafele Ltd
146	Multi Walled Potycarbonate Roofing Sheets	Danpalon	Danpal Light architecture
		Lexan GE	GE Lexan



SI No.	Material Description	Brand	Make
147	Adhesive for AAC Block/Tiles	Ultratech	Ultra Tech Cement Ltd
		Ardex Endura/Gold Star	Ardex Endura
		Ferrous Crete	Ferrous Crete (India) Pvt. Ltd.
		Bricklite	Bricklite Blocks Private limited
		Polyglaze	Evershine Build India Private limited
		Bond tuf	Bond tuf Construction Chemicals
		Berger	Berger Paints India Limited
		MYK LATICRETE	MYK LATICRETE India Pvt. Ltd
148	Aluminium Framework	MFE(MIVAN)	MIVAN
		S-Form	S-Form
		MFS	MFS
149	EPDM Water Proofing Membrane	Smart Care	Asian Paints
		Ferrous Crete	Ferrous Crete (India) Pvt. Ltd.
		Pidilite	Pidilite Industries
		STP	Shalimar Tar Products
		Fosroc	Fosroc India
		Berger	Berger Paints India Limited
		MYK arment	MYK Arment Private limited
150	PU Coating (UV Resistant Liquid Applied Coating)	Smart Care	Asian Paints
		Pidilite	Pidilite Industries
		BASF	BASF
		Fosroc	Fosroc India
		SIKA	SIKA India
		Berger	Berger Paints India Limited
		MYK arment	MYK Arment Private limited
151	Polyurea Ultra	Smart Care/Ferrous Crete	Asian Paints
		Ferrous Crete	Ferrous Crete (India) Pvt. Ltd.
		BASF	BASF
		SIKA	SIKA India
		Pidilite	Pidilite Industries
		Berger	Berger Paints India Limited
		MYK arment	MYK Arment Private limited
152	Modular Kitchen	Sleek	Asian Paints
		Godrej	Godrej & Boyce Co.
		Spacewood	Spacewood
		Evoke	Evoke
153	High end Exterior Textures	Allura/Graniza Range	Asian Paints
		SKK Brand	SKK Ltd
		Berger	Berger Paints India Ltd

SI No.	Material Description	Brand	Make
154	Acrylic Exterior Textures	Asian paints	Asian Paints
		Berger	Berger Paints India Ltd
		Akzonobel	Akzonobel
		Ebco	Ebco
		Nerolac	Nerolac Paints Ltd
155	Puff Insulations	Smart Care	Asian Paints
		Lloyd Insulation	Lloyd Insulation (India ) Ltd
		Fosroc	Fosroc India
		BASF	BASF
		Pidilite	Pidilite Industries Ltd
		Supreme	Supreme Ltd
		MYK arment	MYK Arment Private limited
156	Galvolume sheet for roofing, cladding, Sandwich panel	Lloyd Metal Craft	Lloyd Insulations.
		Tata Blue Scope	Tata Bluescope
		Bhushan	Bhushan steel
		JSW	JSW
		Essar	Essar group
157	Mechanical coupler for Reinforcement	Dextra	Dextra India Pvt. Ltd
		Sanfield	Sanfield India Ltd
158	Stainless Steel bars	Sunflag Steel	Sunflag Iron & Steel Co.ltd
		JSL	Jindal stainless limited
159	GRP Water tanks	Sintex	Sintex-BAPL Limited
		Sovisy	Sovisy India Pvt.Ltd
		Amitex	Amitex Enterprises
		Exeed	Exeed engineers (i) pvt.ltd (with BIS license no. CM/L-7500299419)
160	HSFG Bolting	HSFG Bolting assemblies with DTI washer	RDSO's approved vendors list updated from time to time as per IREPS vendor directory. (File path : IREPS login --> E tender --> Misc --> Approval of Vendors --> Vendor directory --> RDSO --> B&S --> Item ID: 3100428, HSFG Bolting assemblies with DTI washer)
161	Furniture	Interio by Godrej	Godrej enterprises Group
		Zuari	Zuari Furniture
		Urban grey	Urban Grey Furniture industries

**RAMU**  
**BHUKYA**  
 Digitally signed by  
 RAMU BHUKYA  
 Date: 2026.02.26  
 10:28:42 +05'30'  
**Dy.Chief Engineer / Works**

**SOUTH CENTRAL RAILWAY**

OFFICE OF THE PRINCIPAL CHIEF ENGINEER,

'A' BLOCK – 5<sup>TH</sup> FLOOR, RAIL NILAYAM, SECUNDERABAD – 500 003.

e-mail: dyceworkshqscr@gmail.com

Rly No: 86394

CUG: 9701370211

No: SCR-HQ0ENGG(SOR)/4/2025-Dy CE/WORKS/SCR

Date: as signed

**CAO/C, CAO/RSP****CPM/GS/I/SC,II/SC,BZA,GTL****Sr.DEN/Co-Ord/ SC, BZA,GTL,GNT,HYB& NED****Dy.CE/EWS/LGD, Sr.DEN/LGDS,****Dy.CE/TM/Lines/BZA, Dy.CE/CPOH/RYP.****Sub:** Guidelines for procurement of TMT bars-Reg**Ref:**

1. This office letter no. SCR-HQ0ENGG(SOR)/1/2020-Dy CE WORKS/SCR 28.08.2024
2. RDSO's STR Guidelines (Doc. No. WK-G-8.1-1, Ver. 1.3).
3. Representation received from various TMT firms.

\* \* \*

This office vide letter under ref above has advised to procure reinforcement bars (TMT bars) from the following steel producers which are in comply with IS 1786 with latest amendments.

1. SAIL (Steel Authority of India Ltd)
2. VIZAG (Rastriya Ispat Nigam Ltd)
3. TISCO (TATA Steel Ltd.)
4. JSW (JSW Steel Ltd.)
5. JSPL (Jindal Steel & Power Limited)
6. Any other steel producer having Integrated steel plant (ISP), using Iron Ore as basic raw material and having In-House Iron facilities for production of steel through the process of **DRI-EAF, BF-BOF and Corex - BOF only**, duly following the RDSO guidelines issued vide letter No.2022/TK-II/22/7/1 dt 09.02.2022 and Schedule of technical requirements (STR) Doc.no.WK-G-8.1-1 Ver 1.3.

While selecting the TMT brand under 6th Category, it must be ensured that the manufacturer's credentials are thoroughly verified in accordance with RDSO's STR Guidelines (Doc. No. WK-G-8.1-1, Ver. 1.3). If any such firm is found suitable and permitted, the same may kindly be intimated to this office for record purposes.

This is issued with the approval of CGE.

**Encl:** Ref.1&2

Digitally Signed by Peddu  
Murali Krishna  
Date: 12-09-2025 18:20:20  
Reason: Approved  
Dy.CE/LM



दक्षिण मध्य रेलवे

SOUTH CENTRAL RAILWAY

प्रमुख मुख्य इन्जिनीर कार्यालय/ PCE's Office

कार्य शाखा/ क / Works Branch

रेल निलयम / Rail Nilayam

सिकंदराबाद / Secunderabad

SCR-HQ0ENGG(SOR)/1/2020-Dy CE WORKS/SCR

Ph.No. 040-27822004

Rly: 070- 86365

email:dyceworkshqscr@gmail.com

दिनांक /Date. 28.08.2024

CAO/C, CAO/RSP

CPM/ GS/ SC, BZA, GTL, HYB, GNT, NED,

Sr. DEN/Co-Ord/SC, BZA, GTL, HYB, GNT, NED,

Dy.CE/EWS/LGD, Sr.DEN/LGDS,

Dy.CE/TM/Lines/BZA, Dy.CE/CPOH/RYP.

**Sub:** Guidelines for Procurement of TMT bars – Reg.

**Ref:** 1) RDSO letter no.WKS/67/VD/TMT dt 21.02.2022 (Copy enclosed).

2) Railway Board letter no. 2022/TK-II/22/7/1 dt 09.02.2022 (Copy enclosed)

\*\*\*\*

RDSO Vide letter under **ref.2** above have **Decontrolled** the Vendor list for TMT bars stating that, these can be purchased from market based on the specifications. However RDSO shall continue to frame functional specifications, Schedule of Technical Requirements (STR) etc., for the all civil engineering items as per present practice and communicated the same to all Zonal railways vide **ref.1** above.

In this Connection, it is to mention that all Reinforcement steel (TMT bars) as per IS 1786 with latest amendments should be Procured from the following steel producers.

1. SAIL (Steel Authority of India Ltd.)

2. VIZAG (Rastriya Ispat Nigam Ltd.)

3.TISCO (TATA Steel Ltd.)

4.JSW (JSW Steel Ltd.)

5.JSPL (Jindal Steel & Power Limited)

6. Any Other Steel Producer having Integrated Steel Plant (ISP), Using Iron Ore as basic raw material and having in-House Iron rolling facilities for production of steel through the process of **DRI-EAF, BF-BOF and Corex-BOF** only, duly following the RDSO guidelines issued Vide letter No.2022/TK-II/22/7/1 dt 09.02.2022 and **Schedule of technical requirements (STR) Doc.no. WK-G-8.1-1 Ver.1.3.**

This Issues with the approval of PCE

**Encl:** As above

*[Signature]*  
28/08/2024

(N.Anjaiah)  
Dy.CE/Works

**Copy to:** Dy.CVO/Engg for information & necessary action.

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सत्यमेव जयते

**Government of India - Ministry of Railways  
RESEARCH DESIGNS & STANDARDS  
ORGANISATION**

**DOCUMENT NO. WK-G-8.1-1 Ver. 1.3  
(Earlier Doc. No. WK-G-8.1-1 Ver. 1.2)**

**SCHEDULE OF TECHNICAL REQUIREMENTS  
for  
SUPPLY OF TMT REINFORCEMENT BARS TO IR**

**WORKS DIRECTORATE  
RESEARCH DESIGNS & STANDARDS ORGANISATION  
MANAK NAGAR, LUCKNOW – 226011**

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## **SCHEDULE OF TECHNICAL REQUIREMENTS FOR SUPPLY OF TMT REINFORCEMENT BARS TO IR**

### **A. ELIGIBILITY CRITERIA :**

- I. “The vendor, who intends to register as supplier of steel (TMT reinforcement bar) to Indian Railways, should be a producer of steel, irrespective of process route, starting their operations from iron making, using iron ore, virgin or processed, with necessary refining facilities/ methodology and rolling / processing facilities at a single location or else in multiple locations provided that the entire gamut of iron & steel production, from iron making to finished steel production, is owned by the same company or its subsidiary company(ies) and provided that the iron making capacity is sufficiently matching the steelmaking capacity. Further, downstream units should use material from the upstream units of the same company or its subsidiaries with traceability system”.
- II. The vendor had already produced minimum 50,000 Metric Tonnes TMT Reinforcement bars in every year for the last 3 years. However, total production quantity 1,50,000 MT shall be considered upto last 36 months prior to the month of submission of application.
- IIA. Any case rejected after plant visit shall be considered only after completing the production of 1,50,000 Metric Tonnes TMT Reinforcement bars (after the month of rejection) including submission of satisfactory compliance of cause of rejection. However, firm should qualify Criteria II above regarding production of TMT Reinforcement bars.
- III. TMT reinforcement bars should comply to IS: 1786 (latest) as well as Para 5.3 of IS: 13920 (latest) for all seismic zones i.e. II, III, IV or V.
- IV. For DRI – EIF process route of steelmaking – Firm should have refining facilities such as LRF or any other established technology of suitable capacity matching in line with the production of liquid steel for manufacturing of TMT reinforcement bars.

### **B. REQUIREMENTS:**

**Vendor, who is fulfilling the eligibility criteria mentioned in ‘A’ above needs to submit following documents along with application:**

1. **Quality Assurance Plan (QAP):** covering manufacturing process, quality control measures, internal inspection plan, details of tools and plant, test piece manufacturing facilities, system of maintaining the data of customer complaints/warranty failures & details of testing equipment along with the details of qualification / experience of quality control personnel as per QAP format available on RDSO’s website.



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1. Certificates issued by plant manufacturer/ plant consultant stating that firm is producing raw steel from iron ore or processed iron ore and entire infrastructure for producing sponge iron, billet and TMT Reinforcement Bars using iron ore as the basic material at single / multiple locations by the same company or its subsidiary companies (with plant address details) with details of installed annual production capacity in terms of sponge iron, billets and TMT Reinforcement Bars. In case of group concern units, firm needs to submit details of shares holdings / common shareholders certified by Chartered accountant.
2. Copy of legible layout plan of steel plants, indicating details of existing facilities.
3. Factory license showing work address and document showing office address.
4. Certificate issued by Plant manufacturer / Plant consultant (with documentary proof of process) establishing process of steel making ( such as BF – BOF route / Corex – BOF route / DRI – EAF/EIF route or any other technology) being used at plant as steel producer, manufacturing TMT reinforcement bar using iron ore as basic raw material.
5. Summary of monthly production of Sponge Iron, Billets & TMT Reinforcement Bars carried out in last three or more years and purchase / sale details of sponge iron / pellets & billets (purchased from subsidiary(ies) firms only) for last 36 months certified by Chartered Accountant. Supporting documents including Purchase orders / Sale invoices shall be verified during plant visit.

#### **C. LIST OF PLANT/ MACHINERY AND EQUIPMENTS:**

<b>SN</b>	<b>ITEM</b>
<b>A.</b>	<b>Manufacturing facilities / equipments</b>
i.	Blast Furnace / Rotary Kiln (for DRI)/ COREX or any other patented technology
ii.	Electric Arc Furnace / Electric Induction Furnace/ Basic Oxygen Furnace
iii.	Refining facilities for liquid steel
iv.	Billet Caster (Continuous Casting Machine)
v.	Re-heating furnace (if applicable)
vi.	Rolling Mill
vii.	Quenching system (Any licensed quenching system)
<b>B.</b>	<b>Testing Facility</b>
i.	Digital Universal Testing Machine with extensometer facility.
ii.	Bend, Re-bend facility as per IS: 1786 (Latest)
iii.	Raw Material laboratory : Arrangement for testing C, S, P
iv.	Spectrometer
v.	Other testing facilities as specified in IS:1786 (Latest), IS: 13920 (Latest) & IS: 2830 (Latest)

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**D. PROFORMA FOR TECHNICAL CAPABILITY ASSESSMENT/REASSESSMENT FOR MANUFACTURE AND SUPPLY OF TMT REINFORCEMENT BARS {confirming to IS: 1786 (Latest) & Para 5.3 of IS: 13920 (Latest)} TO INDIAN RAILWAYS**

NOTE: (i) All details to be filled in by the firm. No para to be left blank.

(ii) All manufacturing and testing facilities to be available in the unit.

(iii) Attach documents separately wherever required.

**GENERAL INFORMATION**

**1. Section - I:**

1.1 Name of the firm -----

1.2 Address:

a) Head office: -----

b) Works: -----

c) Distance of Works in Km from the Nearest Railway station. : -----

d) Nearest Railway Station. : -----

e) Distance of Firm's railway siding from nearest railway station (if applicable): \_\_\_\_\_

f) Source of water intake for firm's work unit: \_\_\_\_\_

g) Registered trademark of TMT bar: \_\_\_\_\_

h) Six digit Bureau of Indian Standards Identification Number (BIS Id. No.) of work unit being marked on TMT Reinforcement bars: \_\_\_\_\_

1.3 Factory Area (in Sq.m.)

a) Covered: -----

b) Uncovered: -----

c) Is the factory site in your name or on rental basis?-----

(With supporting documents).

1.4 (a) Telephone Numbers:

(i) Head office: -----

(ii) Works' premises. : -----



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(b) Telegraphic / Telex address / Fax Nos.:

(i) Head Office: -----

(ii) Works' premises: -----

(iii) E-mail Address: -----

1.5 Power Availability: (KVA)

a) General allotted capacity & In – house power generation :-----

b) Name the part / person in whose name the power is:----- Sanctioned and your agreement with the party/person (Support with reasonable documents)

1.6 Name of any other units located in the above premises :-----

1.7 Name & work address of other units / group concerns:-----.

(Please furnish the name & address of other units of the firm if any, where TMT reinforcement bar is being manufactured irrespective whether these are required to be registered with RDSO or not)

1.8 Man-power management (Attach list separately):

a) Managerial Staff :-----

b) Shop Floor Engineers / Supervisors. :----- (Their number, names, qualification & service experience)

c) Laboratory in-charge whether full or part time :----- (Indicate his / her name, qualifications & service experience)

d) Inspection & quality control staff :----- (Give their names, qualification & service experience).

## TECHNICAL INFORMATION

### 2. SECTION- II

2.1 Manufacturing Facilities

(i) Blast Furnace / Rotary Kiln (for DRI)/ COREX or any other patented technology (Mention Nos. & installed capacity): -----

(ii) Electric Arc Furnace / Electric Induction Furnace/ Basic Oxygen Furnace (Mention Nos. & installed capacity): -----

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(iii) Refining facilities for liquid steel (Mention Nos. & installed capacity):-----  
-----

(iv) Billet Caster (Mention Nos. & caster size): -----

(v) Re-heating furnace (if applicable): -----

(vi) Rolling Mill (Mention installed capacity): -----

(vii) Quenching/ cooling system: -----

(viii) Any other production setup such as – Ferro alloys, Pig iron, Structural Steel etc.  
(Please mention process, involved machinery and installed capacity) – if any: -----  
-----

## 2.2 Testing Facilities:

### 2.2.1 Raw material testing facility

Chemical Composition Test of Iron ore, Coal, Sponge Iron, Bath Sample etc.

(a) Carbon & Sulphur apparatus with suitable chemicals for analyzing C, S & P elements

(b) Muffle Furnace

(c) Analytical / Digital Balance

(d) Other apparatus for the chemical / metallurgical test lab.

Or Through Spectrographic facility.

### 2.2.2 Finished material testing facility

i) Digital Universal testing Machine with extensometer facility.

(a) Capacity: - -----

(b) Make: -----

(c) In-house/ outsource calibration facility: -----

(ii) Bend & Re-bend Test Facility: -----

(iii) Spectrographic facility for chemical / metallurgical analysis

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(iv) Any other relevant testing facility specified in IS: 1786 (Latest), IS: 13920 (Latest) & IS: 2830 (Latest): -----

2.3 Source of raw material:

(a) Iron Ore lumps / fines : -----

(b) Coal: -----

(c) Limestone / Dolomite: -----

(d) Method of transportation of raw material: \_\_\_\_\_

2.4 Availability of IS: codes: -----

2.5 Availability of BIS Licenses with validity – TMT Bars grade & dia (IS: 1786) and Billets (IS: 2830).

## EXPERIENCE

**3. SECTION- III** (Attach documents separately):

- a) Latest (two years minimum) certificate of approval issued by Central Govt., State Govt., Central / State PSUs, if any.
- b) Copy of Certificate of Incorporation & Memorandum of Article of Association of Firm.
- c) Purchase / Supply orders completed/ in- hand to Central Govt., State Govt., Railways, Metro Railways, IRCON & other railway PSUs.
- d) Purchase / Supply orders completed/ in- hand in Infrastructure & Road Bridge projects of minimum three years.
- e) Recent test results of TMT Reinforcement Bars got done by third party from any reputed Govt. /PSU/ Govt. Colleges or NABL accredited laboratory.
- f) Supply experience/ appreciation letters issued by purchasers / users within 3 years with supporting purchase orders.
- g) Details of In-house testing facility for physical & chemical tests with their valid calibration certificates and their NABL accreditation.

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- h) Copy of production registers showing production of TMT reinforcement bars for various grades & dia. having approval of Bureau of Indian Standards (BIS).
- i) Documents such as purchase / supply orders, test reports carried out at NABL accredited laboratory etc. which shows production of Low alloy steel / CRS (Corrosion Resistant Steel) TMT Reinforcement bars for sizes 8 mm to 40 mm dia.
- j) ISO 14001 (Latest) : Environment Management System
- k) OHSAS 18001 (Latest) : Health & Safety
- l) Notarized declaration regarding **No-Use** of external scrap in steel making at firm's premises.
- m) Notarized declaration regarding T&P / M&P installed at firm's premises for manufacturing of TMT Reinforcement Bars.

\*\*\*

## **H. Maintenance of Site records in contracts for ensuring quality of work :**

**(Authority : PCE/SC Letter No. W.55/I/1/Quality control/Site records of dated : 26.05.2022.)**

List of registers required to be maintained commonly for **both building and bridge works** and **exclusively for Bridge works** is mentioned below.

### **A. Common Registers to be maintained for both Buildings and Bridge works (18 registers).**

1. Site order book (E – 1123),
2. Field book (E – 1122),
3. Technical register,
4. Quality control register. {consists of (i) Tests for Cement Steel & Water, (ii) Sieve Analysis for CA & FA, (iii) Bulkage of sand, (iv) Bricks tests, (v) Compressive strength of Concrete cube register, (vi) Slump test and (vii) Timber test},
5. Cement register,
6. Steel register,
7. Wood work register,
8. Anti corrosive treatments register,
9. Other consumable items register,
10. Daily contractor's labour register,
11. Daily progress of work register,
12. Tools and plants of Contractor at site register,
13. Bill register (no annexure),
14. Hindrance Register,
15. Drawing issue register,
16. Piling Register,
17. Structural Steel Register,
18. RMC Register.

### **B. Registers to be maintained exclusively for Bridge works (09 Registers).**

19. Grouting record register,
20. Cable profile register,
21. Permeability Concrete test register,
22. Pile passing register,
23. Well passing register,
24. Record of load testing of foundation,
25. Record of load testing of PSC Girders,
26. Camber Register,
27. Stressing cum Elongation register.

It shall be ensured that all registers duly completed and signed by both parties to the contract and should be submitted during passing of bills. A certificate mentioning that items for which payment is proposed are meeting the specifications passed the requisite tests and records thereof have been duly maintained.

**Encl:** Compiled list of site registers along with proformas :

**ANNEXURE - 6**

**SOUTH CENTRAL RAILWAY DRM (W)'s Office,**

(Division).....Location.....

**1.** 1st page shall be designated for General Information mentioned as under.

Register issued on :

Name of work :.....

Letter of Acceptance :.....

Contract Agreement No .....

Value of Work:.....

Revised Value of Work :.....

Date of Completion :.....

Extended date of Completion :.....

No. of Machine Numbered Pages :.....

**Railways Officials**

Senior Section Engineer.....Contact No.....

Asst. Divisional Engineer.....Contact No.....

Sr. Divisional Engineer.....Contact No.....

Divisional Engineer.....Contact No.....

**Contractor's Officials:**

Contractor's Authorised Representative : .....Contact No.....

Contract's Engineer.....Contact No.....

Signature of SSE/Works

Representative/Engineer

Signature of Contractor's  
Authorised

**I. Site Laboratory Establishment by Contractor :**

**(Authority : PCE/SC letter No. W.496/Policy/Vol.IX of dated : 28.12.2021)**

The contractor should set up site laboratory within 45 days from the date of issue of letter of acceptance (LOA). If he/she does not setup site laboratory, the following penalty shall be imposed.

<b>Category</b>	<b>Value of Work</b>	<b>Penalty per Month in Rs.</b>
a	Works costing upto Rs. 2.0 Crs.	No penalty
b	Works costing above Rs. 2.0 Crs and upto Rs. 5.0 Crs	25,000/-
c	Works costing above Rs. 5.00 Crs	50,000/-

Equipment's required in site lab for above category of works is enclosed as Annexure – "7" & "8"

**J. Applicability of Stage payment for steel after receipt at site of work :-**

**(Authority :- PCE/SC letter No. W.496/Policy/Vol.IX of Dt : 26.05.2022.)**

\*\*\*\*\*

Reimbursement of cost of steel on 75% of invoice value or at the rate of 75% of the quoted rate of steel in the contract, whichever is less, can be done to the contractor on his request, after steel is physically brought to the site and verified by engineer-in-charge at site. Proper accountal of the received quality at site is to be made by engineer-in-charge.

## Annexure – “7”

List of Equipment to be provided by Contractor in site Laboratory  
(For value of work costing above Rs. 2.0 Crs and upto Rs. 5.0 Crs.)

Sl.No	Details	Nos.
1	Full set of IS sieves for testing of materials for Coarse aggregate, fine aggregate, soil and Blanket Materials as per IS code and as per RDSO guidelines along with sieve shaker and brushes.	1 No.
2	Balance	
	a. Pan balance – upto 10kg capacity (with 1.0gm least count)	1 No.
	b. Electronic/Digital balance upto 10 Kg capacity (with 1.0gm least count)	1 No.
3	Concrete cube testing machine - 200 Tonne capacity	1 No.
4	Slump testing apparatus with tamping rod	2 Nos.
5	Concrete cube moulds 150 x 150 x 150mm	12 Nos.
6	Levelling instrument with tripod & 2 Nos. of 4m high levelling staff	1 No.
7	Weigh batch mixing unit	1 No.
8	Screw gauge, Vernier caliper, Sprit level, Measuring tapes etc	1 No.

The above list is only tentative. Before commencement of work, the actual requirement will be given by the Engineer in charge depending on the nature of work. All equipment's and apparatus should be of IS approved brands and in case IS brand is not available these should be of well-known brands as per decision of the Engineer-in-charge.

## Annexure – “8”

List of Equipment to be provided by Contractor in site Laboratory  
(For value of work costing above Rs. 5.0 Crs)

Sl.No	Details	Nos.
1	Full set of IS sieves for testing of materials for Coarse aggregate, fine aggregate, soil and Blanket Materials as per IS code and as per RDSO guidelines along with sieve shaker and brushes.	1 No.
2	Balance	
	a. Pan balance – 10kg capacity (with 1.0gm least count)	1 No.
	b. Electronic/Digital balance 10 Kg capacity (with 1.0gm least count)	1 No.
3	Concrete cube testing machine - 200 Tonne capacity	1 No.
4	Slump testing apparatus with tamping rod	2 Nos.
5	Concrete cube moulds 150 x 150 x 150mm	12 Nos.
6	Levelling instrument with tripod & 2 Nos. of 6m high levelling staff	1 No.
7	Set of Soil testing equipment's as per IS codes	1 No.
8	Set of Cement testing equipment's as per IS codes	1 No.
9	Weigh batch mixing unit	1 No.
10	Screw gauge, Vernier caliper, Sprit level, Measuring tapes etc	1 No.
11	Rebound hammer apparatus	1 No.
12	Digital Camera	1 No.

The above list is only tentative. Before commencement of work, the actual requirement will be given by the Engineer in charge depending on the nature of work. All equipment's and apparatus should be of IS approved brands and in case IS brand is not available these should be of well-known brands as per decision of the Engineer-in-charge.



## System improvements for maintaining Site records in contracts for ensuring quality of work -reg.

### A. Common Registers to be maintained for both Buildings and Bridge works (18 registers).

#### SITE ORDER BOOK (E - 1123)

This book contains ..... Pages from page No.....to page No.....

Sd  
Sr.DEN/DEN

**Note:** 1. Site order book shall be opened for every agreement by Supervisor. The first entry should be of the date of mark out/commencement of work, which should be entered by Supervisor.

2. Pages should be machine numbered. The first page should indicate starting page and ending page and below which Sr.DEN/DEN will sign.

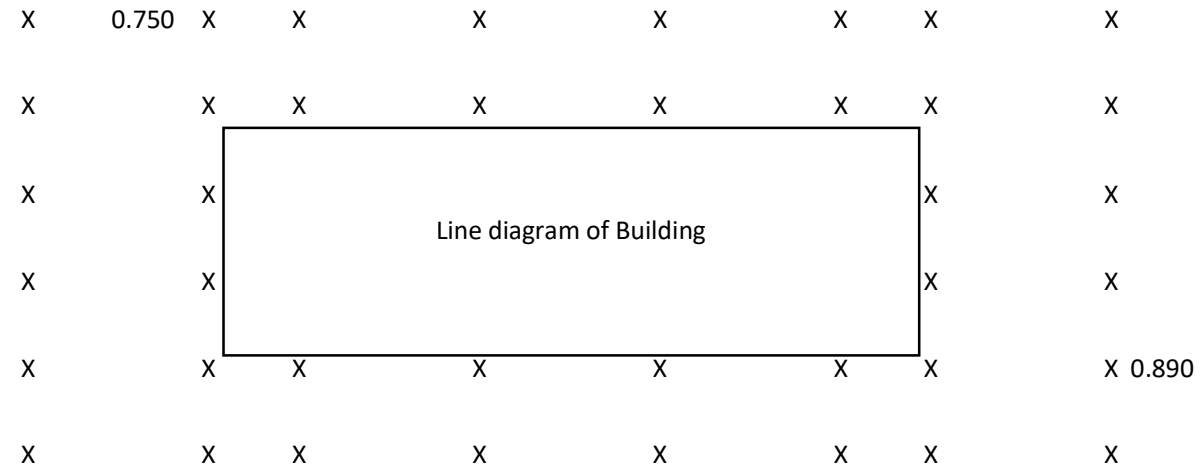
Sl.No	Date	Instruction issued, with Signature and Designation of the inspection Official	Signature of the Executive subordinate	Signature of Contractor/Authorised Representative	Compliance Particulars

## FIELD BOOK (E - 1122)

[illegible]

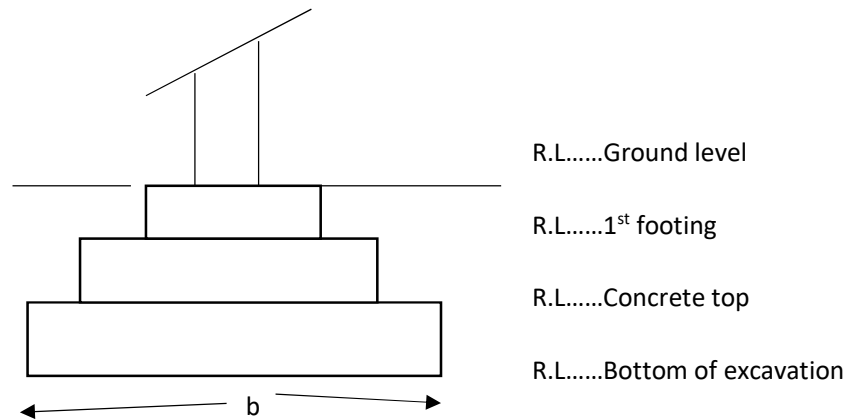
## TECHNICAL REGISTER

1 Plan with initial ground levels shall be recorded in the register.



2. All initial ground levels, final levels after excavation and earth work calculations shall be recorded in technical register.

3. Foundation cross sections at every change of section shall be drawn with all details.



### TECHNICAL REGISTER

4. Bar bending schedule for all reinforcement work shall be recorded.

S.No	Description	Shape of Bar	Dia. Of Bar	Cut length	No's Provided	Laps	Total Length	Total Weight	Remarks

5. Any modifications from standard drawing or agreement shall be recorded in Technical register.

6. Any items or measurements which has no separate register, shall be entered in technical register.

## QUALITY CONROL REGISTER

- Note : 1. A separate page shall be opened for each test.
2. Date of testing shall be recorded for every test.

### Cement :

Date	Test	Value
	Fineness	
	Soundness	
	Initial Setting time	
	Final setting time	
	Compressive strength	

### Steel :

Date of testing	S.No	Type and nominal Size of Bar	Carbon percent	Ultimate Tensile Stress	Yield Stress	Elongation Percent	Unit Weight

### Quality Control Register

Water :

Date	S.No	Characteristics	Value
	1	Turbidity	
	2	Colour Haten units	
	3	Taste and odour	
	4	PH value	
	5	Total dissolved solids (mg/l) max.	
	6	Total hardness as CaCo3 (mg/l) max.	
	7	Chlorides as Cl2(mg/l) 250	
	8	Sulphates as SO4(mg/l) max.	
	9	Fluorides as F(mg/l) max.	
	10	Nitrates as NO3(mg/l) max.	
	11	Calcium as Ca(mg/l) max.	
	12	Iron as Fe(mg/l) max. 0.3	
	13	Zinc as Zn(mg/l) max. 5.0	
	14	Mineral Oil(mg/l) max. 0.01	
	15	Copper as Cu(mg/l) max. Toxic materials	
	16	Arsenic as As(mg/l) max.	
	17	Cadmium as Cd (mg/l)	
	18	Lead as Pb(mg/l) max 0.05	
	19	Residual free chlorine	

## QUALITY CONTROL REGISTER

Coarse Aggregate :

Date	Test	Value
	Deleterious materials & Organic impurities	
	Aggregate crushing value	
	Aggregate impact value	
	Aggregate abrasion value	
	Soundness	

Sieve Analysis

IS Sieve Designation	Percentage passing for single sized aggregate of nominal size.						Percentage passing for graded aggregate of nominal size.			
	63 mm	40 mm	20 mm	16 mm	12.5 mm	10 mm	40 mm	20 mm	16 mm	12.5 mm
80 mm										
63 mm										
40 mm										
20 mm										
16 mm										
12.5 mm										
10 mm										
4.75 mm										
2.36 mm										

### Quality Control Register

**Fine Aggregate :**

Deleterious materials & Organic impurities:

Sieve Analysis

Date	IS Sieve Designation	Percentage passing
	10 mm	
	4.75 mm	
	2.36 mm	
	1.18 mm	
	600 microns	
	300 microns	
	150 microns	

**Bulkage of sand :**

Date of testing	Initial weight of Speciman	Weight after dried in oven	Difference in weight

Surface moisture content can be taken from IS 456 - 2000



### Quality Control Register

Bricks :

Date	Test	Value
	Compactness	
	Water absorption	
	Afforescences	
	Dimensions	
	Uniform colour (Yes / No)	
	Sharp, square corners and edges (Yes / No)	
	Free from cracks, chipped surfaces and broken corners (Yes / No)	

# Quality Control Register

Concrete

Compressive strength of Cubes :

Sl.No	Date of Casting	Grade of Concrete	Description of Work	07 Days Compressive Strength				Average	Minimum Strength Required
				Due Date for 7 Days Strength	Test Results 07 Days				
					a	b	c		
1	2	3	4	5	6	7	8	9	10

28 Days Compressive Strength				Average	Minimum Strength Required	Sign of Rly. representative	Sign. Of Contractor	Remarks
Due Date for 28 Days Strength	Test Results 28 Days							
	a	b	c					
11	12	13	14	15	16	17	18	19

## Quality Control Register

### Slump Test :

Date of Testing	Location from Where Concrete Specimen collected	Slump value		
		Specimen 1	Specimen 2	Specimen 3

### Timber :

Date	Description of Door/Window/Ventilator	Well-seasoned (Yes/No)	Free from defects (Yes/No)				
			Rots	Fungus attack	Split or twist	Dead knot	Sap wood

## CEMENT REGISTER

[illegible]

# STEEL REGISTER

NOTE:1. Separate page shall be opened for each diameter of bar.

[illegible]

## WOOD WORK REGISTER

[illegible]

Anti-corrossive Treatment Register.

Date	Reciepts			Quantity consumed on date	Balance Quantity	Signature		Description of the item of work for which Material is consumed	Remarks
	Brand Name	Bill No.& Date	Quantity received			Railway Engineer	Contractor/ Authorised Representative		

### OTHER CONSUMABLE ITEMS REGISTER

Note :

1. A separate page shall be opened for each material.

[illegible]



**DAILY PROGRESS  
REPORT**

Date	Activity (1)	Activity (2)	Activity (3)	Activity (4)	Signature		Remarks
					Railway Engineer	Contractor/ Authorised Representative	
Example: 17/06/2005	Earth work excavation at....location, approximate volume of work done....	M20 RCC work at ....location, approximate volume of work done.....	.....				

NOTE: In major works number of items of work being operated at a time, in such cases each item of work shall be recorded in separate column with proper details.

**DAILY CONTRACTOR'S LABOUR REGISTER**

[illegible]

## TOOLS AND PLANTS OF CONTRACTOR - REGISTER

[illegible]

### Hindrance Register

[illegible]

Drawing issue Register

Sl. No.	Drg. No. & Revision No. if any	Details of Drg.	Date of issue to the Contractor	Acknowledgement of Contractor/ Remarks	Signature of Railway Engineer
1	2	3	4	5	6

## Piling Register

[illegible]

## Structural Steel Register

[illegible]

## RMC Register

[illegible]



**B. Registers to be maintained exclusively for Bridge works (09 Registers).**

GROUTING RECORD														
Bridge No:														
Section:														
Span No.				Grout Mixer No.				Date of Casting						
Girder No.				Type of Grout Mixer				Date of Pre-stressing						
Drawing No.				Pressure Gauge No.				Date of Calibration						
Grout Pump No.				Temperature				W/C Ratio						
Date of Grouting														
Cable			Blockages - Yes/No				Time		Grouting OBS		Cement Consumption		Grouting Pressure	
No.	Length (M)	Duct Dia (mm)	Inlet	Outlet	Vents	Duct	Start	Finish	Vents	Outlets	Theo	Actual	Theo	Actual
1		75												
2		75												
3		75												

CABLE PROFILE RECORDS																												
Bridge No:																												
Section:																												
Span Details												Date of Casting																
Girder No.												Date of Pre-stressing																
Drawing No.																												
Cable profile ordinates DATE		DISTANCE (X)	X12=	X11=	X10=	X9=	X8=	X7=	X6=	X5=	X4=	X3=	X2=	X1=	X0=	X1=	X2=	X3=	X4=	X5=	X6=	X7=	X8=	X9=	X10=	X11=	X12=	
CABLE NO:4		As per GAD																										
		As per Site																										
CABLE NO:3		As per GAD																										
		As per Site																										
CABLE NO:2		As per GAD																										
		As per Site																										
CABLE NO:1		As per GAD																										
		As per Site																										

[illegible]

Pile Passing Register

Date of Casting	Location	Pile No.	Checking parameters								
			Dia. of Shaft	Depth of Shaft from Bottom of Pile Cap	No. of bulbs if applicable	Dia. of Lower bulb if applicable	Dia. of Upper bulb if applicable	Horizontal Alignment	Vertical Alignment	Deviation	Direction
1	2	3	4	5	6	7	8	9	10	11	12

Remarks (Passed/Failed)	Defects (If any)	Date of Rectification	Date of Re-Checking	Whether washed the bore to bring specific gravity of slush less than specified or not	Whether the Reinforcement is as per approved Drawings	Cover blocks and spacer rings are provided	Final Remarks (Passed/Failed)	Sig. of Rly. Representative	Sig. of Contractor	Sig. of ADEN/AXEN	Remarks
13	14	15	16	17	18	19	20	21	22	23	24

## Well Passing Register

PIER/ ABUTMENT NO: SHAPE OF WELL :

SIZE OF WELL: INITIAL CUTTING EDGE LEVEL :

### A) DURING DAILY SINKING:

Date	Tilt	Shift	Whether Tilt is within Permissible Limit	Whether Shift is within Permissible Limit	Correction Measures adopted for Tilt and Shift	After Correction		Depth of Sinking from Bottom of Well Cap	Daily Progress of Well Sinking			Total Depth of Sinking	Signature of Railway Representative	Signature of Contractor	Remarks
						Tilt	Shift		Starting Time	Ending Time	Depth of Sinking				
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16

### B) PASSING OF WELL

Date	Final Tilt	Final Shift	Final Level of Cutting Edge	Actual Depth of Sinking from Bottom of Well Cap	Depth of Sinking as per Approved Drawing	Signature of Railway Representative	Signature of Contractor	Remarks
1	2	3	4	5	6	7	8	9

### C) BOTTOM PLUGGING

Date	Final Level of Cutting Edge	Final Level of Bottom Plugging	Depth of Bottom Plugging below Cutting Edge	Final Level of top of Bottom Plugging	Approval of Chief Engineer before Bottom Plugging is obtained or Not
1	2	3	4	5	6

## Record of Load Testing of Foundation

### C) General Load Test

Date	Time	Initial Load in MT	Load added in MT	Total Load in MT	Settlement in MM (Dial Gauge Reading)			Remarks	Sig. of Rly. Representa tive	Sig. of Contract or
					No.1	No.2	Average			
1	2	3	4	5	6	7	8	9	10	11

### D) Routine Vertical Load Test on Pile (IS: 2911- Part-4)

- 1) Date of Casting of Pile under test :
- 2) Date of Testing of Pile :
- 3) Diameter of Pile :
- 4) a) Safe load on Pile :  
b) Design load for testing of pile :
- 5) Driven depth of pile :
- 6) Pile No. :
- 7) Cement used :
- 8) Concrete Grade :
- 9) Cube Strength of :  
7 Days :  
28 Days :
- 10) Reinforcement used :
- 11) Type of Jack :
- 12) Pressure Gauge make :
- 13) Dial Gauge make and type :
- 14) Least count of Pressure Gauge :
- 15) Diameter of Jack Ram :
- 16) Area of Ram for 3 Jacks :
- 17) No. of Dial Gauges :
- 18) Least Count of Dial Gauge :
- 19) Duration of Stage Load increments :
- 20) Load Increment :
- 21) Maximum Settlement :
- 22) Rebound :
- 23) Net Settlement :

Record of Load Testing of PSC Girders

Br. No.	Girders		Least count of Dial Gauge	Load for Testing	Max Permitted Deflection	Max Observed Deflection
	Foot path side	Ballast retainer side				
1	2	3	4	5	6	7

Sl. No.	Day	Time	Loading/ Unloading	Dial Gauge Reading					
				End of Span Girders		Middle of Span Girders		End of Span Girders	
				D1	D2	D3	D4	D5	D6
1	2	3	4	5	6	7	8	9	10

Temperature Correction	Net Deflection						% Recovery	Average % Recovery of Deflection for the Span
	End of Span Girders		Middle of Span Girders		End of Span Girders			
	D1	D2	D3	D4	D5	D6		
11	12	13	14	15	16	17	18	19

CAMBER REGISTER	
Bridge No:	
Section:	


A C B

SPAN	GIRDER NO.	A	B	C	CAMBER IN 'mm' $\{(A+B)/2\} - C$	Remarks
S1	G1					
	G2					
	G3					
S2	G4					
	G5					
	G6					
S3	G7					
	G8					
	G9					
S4	G10					



PRESTRESSING CUM ELONGATION RECORD									
GIRDER STRESSING REPORT									
Bridge No:									
Section:									
Date of casting				Date of Stressing					
Girder No.				Cable No.					
Span Details				Cube Strength					
LRPC STRAND DETAILS		DESIGN DATA (AS PER DRAWING)							
S.No.		GFC DWG No./Rev.No.							
Actual MOE of strand				Thea MOE of strand					
Actual Area of C/s of Strand				Thea Area of C/s. of Strand					
Pre stressing Jack Details				Design Elongation					
Pre stressing Jack Ram Area				Design Stressing Load					
Jack Efficiency									
Modified Elongation			=	$\frac{\text{Design Elongation} \times \text{Theo Area of C/s Strand} \times \text{Thea MOE of Strand}}{\text{Actual area of Strand (A)} \times \text{Actual Modulus of Elasticity } E}$					
Tolerance in Elongation	Max (+5%)								
	Min (-5%)								
Modified Pressure (KG/CM2)			=	Stressing load in Ton x1000					
				Ram Area x Jack eff.					
Tolerance in Pressure	Max (+5%)								
	Min (-5%)								
S.No.	Pressure (KG/CM2)	ELONGATION							Remarks
		Jack No . ( LHS End)			Jack No . ( RHS End)				
		Piston Reading (MM)	Elongation (MM)	Cummulative Elongation (MM)	Piston Reading (MM)	Elongation (MM)	Cummulative Elongation (MM)		
1									
2									
		Lock Pressure =							
A	Zero correction in (MM)			Zero correction in (MM)					
B	Slip after Locking (MM)			Slip after Locking (MM)					
	Slip after 24 Hrs			Slip after 24 Hrs					
C	Net Elongation each End			Net Elongation each End					

## **B. CONDITIONS FOR EXECUTION OF EARTH WORK**

1. Specifications for earth works as per mentioned in IRUSS shall be followed Comprehensive guidelines & specifications for Rly formation as per specifications vide No. RDSO /2020/GE:IRS-0004,Sept.-2020 shall be followed.
2. Rate to be quoted by the contractors should be inclusive of Royalty, seignorages, taxes etc., complete as applicable is to the state concern.
3. Contractor required to quote the rate duly considering the royalty, seignorage charges as applicable in Telangana, Andhara Pradesh, Karnataka & Maharastra state and revision thereof from time to time.
4. B.C. Soil of any kind shall not be permitted. Tenderer should note that proper quality of earth may not be available at some locations. Hence, tenderer has to be careful and visit the location before quoting the tender.
5. The cess work will be carried out at the locations as indicated in the name of the works. If any change of quantity/location is required, prior approval of concerned Sr.DEN/ DEN before operation of this item and reasons for change of location shall be kept on record.
6. The Contractors are advised to inspect the site and availability of road facility / approaches before quoting their rate.
7. No extra payment will be made for jungle clearance and repairs to service road or for formation of road if required for leading/transporting of earth to cess location.
8. Payment for the earth work will be made to the quantity arrived based on cross sectional measurements duly making deductions as per specifications.
9. Before executing the work, concerned ADEN/SSE (Works/P.Way) should submit numbered level books from Divisional office and obtain numbering and signature of concerned Sr. DEN/ DEN, after that only initial levels should be recorded in level books and submitted to divisional office with Initial and proposed levels along with graph sheets duly signed by concerned SSE (Works/P.Way), ADEN and Contractor.
10. After completion of earth work, new level books should be collected from Divisional office and final levels should be recorded and the same should be submitted to Divisional office along with graph sheets duly signed by SSE(Works/P.Way), ADEN and Contractor.

- 11). The soft copy of graph sheets and calculations also submitted to Divisional office along with hard copy and shall be uploaded in IRWCMS along with running bills.
- 12). Concerned SSE (Works/P.Way) has to certify on each graph sheet that the slope provided is 2:1.
- 13). If level books not submitted vide above note No.1, 2 & 3, the bills cannot be considered by Divisional office.

As per Hqrs letter No.W.CE/Br.Rehab/2019 dt 14.08.2019 and No.W.CE/Br.Rehab/2019 dt:25.09.2019 the field executives can avail the services from any of the below laboratories or NABL approved or ISO certified laboratories near by the locations.

Sl.No	Name of the laboratory
1	Hyderabad test labs &Engineering Services ,Hyderabad
2	M/S Mangalam Consultancy Services Hyderabad
3	Ravi labs Hyderabad
4	Civil tech labs Hyderabad
5	S.K Consultancy and Laboratory Secunderabad
6	Amaravati labs ,Guntur
7	Sterdant Technoclinic Pvt Hyderabad



भारत सरकार Government of India  
रेल मंत्रालय Ministry of Railways  
रेलवे बोर्ड (Railway Board)



सं.2021/Tele/5(2)/3-Part(1)(3425647)

नई दिल्ली, दिनांक: 12.06.2023

The GM/CMD/MD/PCAO/CAO,  
All Indian Railways, KRCL, PUs, CORE, COFMOW  
(As per standard list)

The DGs/Directors  
RDSO, NAIR, All CTIs

**Sub.: Procedure for undertaking digging work in the vicinity of Signalling, Electrical and Telecommunication cables**

**Ref.: JPO issued vide Board's letter No.2003/Tele/RCIL/1Pt.IX dated 24.06.2013 (Telecom Circular No.17/2013)**

\*\*\*\*

A Joint Procedure Order (JPO) for undertaking digging work in the vicinity of underground Signalling, Electrical and Telecommunication cables was issued last vide Board's letter No.2003/Tele/RCIL/1Pt.IX dated 24.06.2013 (Telecom Circular No.17/2013). Notwithstanding the provisions contained in the JPO for protection of cables, a significant number of cable-cut incidents and practical difficulties in implementation of certain provisions of the said JPO were reported.

Board, therefore, constituted a committee of SAG officers to revisit the JPO. Based on the recommendations of the committee, Board (MI) has approved broad guidelines for procedure to be adopted by Zonal Railways for protection of cables while undertaking digging work in their vicinity (**Annexure**). These guidelines are in supersession of JPO issued vide reference above.

Zonal Railways are requested to issue local instructions/guidelines/JPO implementing these broad guidelines within a month of issue of this letter. Zonal Railways may also ensure that these local instructions/guidelines/JPO are also made part of all tenders for works in the vicinity of cables in accordance with the instructions issued by Civil Engineering Dte of Railway Board vide letter No.2023/CE-I/EDCE(G)/Misc. Dated 18.04.2023.

DA: As above

*(Signature)*  
12/6/23  
(राकेश रंजन)

कार्यकारी निदेशक (दूरसंचार विकास)

दूरभाष: 011-47843012, 030-43012

ई.मेल: edtd@rb.railnet.gov.in

Copy to:

1. PSO to M(I) for kind information of Member/Infra
2. ED/SD, EDEE/M, EDCE/G, ED/GS/C-II for information & ensuring implementation of guidelines in letter & spirit
3. PCSTE, PCE & PCEE, All Indian Railways

**Annexure****Guidelines for protection of cables while doing work its vicinity**

1. Cable route marking for all types of cable must be made available block section wise on Railnet.
2. Before allowing the contractor to work near the tracks, the work executing agency (like SrDSTE/SrDEN/SrDEE or DyCSTE/DyCEE/DyCE etc.) shall ensure that the permission has been granted by the division to the contractor in accordance with the local instructions / JPO to work in the vicinity of the cables. Zonal railways shall devise suitable mechanism and timelines for the obtaining/granting such permission.
3. In case of works being taken up by the State Government, National Highway Authority etc., zonal railways shall devise mechanism for shifting the cables or for proper protection of cables before granting permission to work.
4. The engineering control shall keep all the information regarding any works being done near the track. S&T and electrical control shall obtain this information from engineering control. These controls shall coordinate among themselves to ensure that no work is done in the vicinity of the track without proper permission.
5. The concerned SE/P.Way/SE/Works/SE/Sig/SE/Tele SE/Electrical (TRD or G) or RailTel supervisors supervising the work of the contractor shall ensure that the existing emergency sockets are not damaged due to their importance in providing communication during accident/emergency.
6. For all new works, cable shifting should be a mandatory part of DPR and estimate. For ongoing works, Zonal Railways may sanction works for cable shifting if necessary through contingency/supplementary/revised estimate where provision does not exist. However, in case zonal railways decide not to shift cables (due to any reason) then protection of cable shall be ensured by the zonal railways during execution of the work.
7. Penalty to be imposed for damages to cable shall be as under:

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





8. Penalty should be levied on the contractor when they work without permission or resort to careless working without making arrangements for protecting cables and other utilities. Based upon the local conditions and practices, zonal railway shall devise its own conditions for examining and levying penalty. For each cable cut, a joint report at the level of supervisors should be prepared on the same day and it should become the basis for levying penalty and fixing responsibility. Joint note should be forwarded by SrDSTE/SrDEE to the executive in-charge of the work. The executive in-charge of the work should act and decide on the cable cut case within 15 days under information to SrDSTE/SrDEE as the case may be. There should be provision of appeal by contractors within one month of notice for levying penalty at ADRM level. Decision of ADRM shall be final and binding upon both parties.
9. Railways will not lodge FIR with RPF in cases of works being executed by authorized contractors of Railways who have been duly permitted to execute the works.
10. Zonal Railways shall issue local instructions/JPO for protection of cables while undertaking works in the vicinity of railway tracks in line with this guideline. Zonal Railways shall also ensure that such instructions become part of their tender document within one month of the issue of the local instructions. Suitable action against erring officials shall also be incorporated in these instructions if the same is not adhered to.



भारत सरकार Government of India  
रेल मंत्रालय Ministry of Railways  
(रेलवे बोर्ड Railway Board)



No. 2023/CE-I/EDCE(G)/Misc.

New Delhi, Dated: 18.04.2023

The General Managers,  
All Zonal Railways.

**Sub: Instructions for incorporating the JPO, Circular etc. provisions in the Tender Document for all Works requiring digging work close to Railway signaling, telecom, electrical etc. cables**

**Ref: (i) No.2010/Tele/3(5)/I Pt (3346793) New Delhi dated 29.09.22**  
**(ii) Telecom Circular 17/2013 containing JPO for undertaking digging work in vicinity of Cables**

Due to increase in cable cuts, a letter dated 29.09.22 under reference (i) above was written by Member-(Infra) to all GMs advising the following:

- Zonal Railways to take necessary steps to ensure strict compliance of JPO for undertaking any digging work in the vicinity of cables.
- Proper coordination among various departments undertaking any work near/along the track.
- Provision of utility relocation in the estimates and if the same is not existing, then the use of contingency provision for utility shifting/protection, apart from ensuring that the updated cable route plan are available and the marking of cable zone at sight is given before undertaking the work.

Further during Oral Evidence before PAC for one of the audit paras regarding recovery of penalty over SER and WCR for cable cut cases, PAC has taken a serious view of non implementation of JPO Provisions by Zonal Railways.

In view of above, it is advised that the provisions contained in circulars, JPOs regarding penalties should be included in all the Tender Documents for Works requiring digging close to Railway signaling, telecom, electrical etc. cables so as to bind them legally for ensuring recoveries from them.

18.04.2023  
(गौरव)

निदेशक सिविल इंजी.(जी)/रेलवे बोर्ड  
[Rly No. 030-47598, MTNL No. 011-23047598]  
e-mail address: dceg@rb.railnet.gov.in