

SPECIFICATION FOR WORKS

1.0) The work should be carried out as per Delhi-CPWD specifications and Indian Railways Unified Standard Specifications-2021 as corrected upto date of opening of Tender, approved plans and drawings issued for the work and specification of work laid hereunder.

1.1) Concrete for all reinforcement concrete work/bridge work shall be weigh batched and machine mixed and vibrated using mechanical/electrical vibrators.

1.2) Necessary test certificate for the materials such as cement, reinforcement steel, HTS strands, Aggregates, sand, water and Cement Concrete Cube supplied by the contractor shall be produced from the Government Engineering colleges/IIT/NIT/SERC/approved Engineering colleges as directed by the Engineer in charge. The costs of such testing shall be borne by the contractor.

2.0) Setting out works: The contractor shall be responsible for the true and proper setting out of the works for correctness of the position, levels, dimensions and alignment of all parts of work and for provision of all necessary pegs, reference pillars, instrument, equipment and appliances and labour in connection therewith. If at any time during the progress of the work any error shall appear or arise in the position of levels, dimensions or alignments at any part of the works, the contractor on being required to do so by the Engineer in charge shall at his own expense rectify such errors to the satisfaction of the Engineer in charge and he shall carefully protect, preserve secure all bench marks site rails, pegs, reference pillars and other things used in setting out of the works.

2.1) The contractor shall have sufficient number of survey instruments such as Theodolites, leveling instruments, leveling staff etc and arrange to set out the alignment at his own cost and also establish necessary reference pillars as required and directed by the Engineer.

3.0) EARTH WORK: The classifications of soils in excavation shall be decided by the Engineer in charge and his decision shall be final and binding on the contractor. Merely the use of explosives in an excavation will not be considered as a reason for higher classification unless blasting is clearly necessary in the opinion of the Engineer in charge.

3.1) Excavation for foundation/foundation works etc shall include any wet excavation that may be met with and will be paid for under the respective items of USSOR, for the wet excavation or bailing out water with or without mechanical means or for any other precautions of work which may be found necessary during the course of execution. Even if any springs of water are met with, NO EXTRA PAYMENT will be made other than the respective items mentioned in the USSOR.

3.2) Whenever excavation for catch water is ordered, the excavated spoils should be spread, consolidated and sectioned to the required profile to form a bund on the downhill side of the catch water drain. Payment for excavation shall be made under the relevant items of Schedule as the case may be and no extra payment shall be made for consolidation and sectioning to profile for forming bund and catch water drain.

3.3) No payment will be made for any earthwork sinkage below ground level due to soil conditions and payment will be made only based on the original ground levels recorded before the commencement of the work and finished profile of the work. The contractor should study the site conditions before tendering.

4.0) No separate payment will be made for site clearance or jungle clearance or shrubs clearance, bush wood, grass or other obstructions including small trees of girth not exceeding 30 cm and the rates accepted in this contract are deemed to include all such costs except dismantlement of structure if any which will be paid for suitably under USSOR-2021 as per the rates accepted in the tender schedule.

5.0) Approval of Materials: Samples of all materials viz bricks, laterite, fine aggregate /sand, coarse aggregate, water, admixtures, paints, boulders, stones, cement, steel, wood required for doors, windows, ventilators, fittings and fastenings including locking arrangements as well as all sanitary and water supply fittings etc should be submitted as directed to Engineer in charge and shall be used in the work only after his specific approval. Approved samples should be deposited with the Engineer in charge or his representative.

5.1) The Railway will have the right to check the quality of any material required/ used for construction like cement, steel, sand, coarse aggregate, admixtures, bricks, timber and concrete cubes etc for its conformity with specification. The testing charges will have to be borne by the contractor. Sufficient cube moulds will have to be supplied by the contractor at his own cost.

6.0) CEMENT: The cement used shall be with the prior approval of the Engineer-in-charge.

Note 1: The rate of development of strength is slow in case of blended cement i.e. Portland pozzolana cement and Portland slag cement, as compared to ordinary Portland cement. This aspect should be taken care while planning to use blended cement. Accordingly stage of pre-stressing period of removal of form work and period of curing etc should be suitably increased.

Note 2: Compatibility of chemical admixtures and super plasticizers with Portland Pozzolana cement and Portland blast furnace slag cement shall be ensured by trials before use.

Note 3: Some other properties of concrete such as modulus of elasticity, tensile strength, creep and shrinkage are not likely to be significantly different. For design purposes, it will be sufficiently accurate to take the same value as those used for concrete made with OPC.

6.1) Cement to be used on the works should be procured from the main cement plants or from their authorized dealers and each consignment shall be covered with manufacturer's test certificate.

6.2) Cement bags in packings should bear the following information in legible markings:

- 1) Manufacturer's name, registered trade mark of manufacturer, if any.
- 2) Type of cement.
- 3) Weight of each bag in kg or number of bags/tonne.
- 4) Date of manufacture, generally marked as week of the year/year of manufacture. Example: 15/03 which means 15th week of 2003.

6.3) Test on cement to be conducted as per IS 4031 and as per Delhi CPWD specifications and IR unified Standard Specification for works matters. The tests which are to be conducted are:

- 1) Fineness
- 2) Soundness
- 3) Initial & final Setting time
- 4) Compressive strength
- 5) Consistency of standard Cement paste

6.4) Empty cement bags would be the property of the contractor and shall be disposed of by the contractor himself. In case the Railway is in need of empty cement bags, good and usable empty cement bags are to be supplied by the contractor at the rate of Rs.2/- per bag for empty cement gunny bags and Rs. 1.40 per bag for empty polythene/paper bags.

6.5) The cement shall be used within 3 months of manufacture. Cement stored longer than this period shall be used on works only after it is tested and found fit for use. The cost of such tests shall be borne by the contractor. The decision of the Engineer in charge as to whether the cement is fit for use in the work shall be final, conclusive and binding on the contractor.

6.6) For M 20 and higher mix of cement concrete, quantity of cement will be based on the design mix. For concreting under water 10% extra quantity shall be added and allowed towards extra consumption.

6.7) Railways also reserves the right to take samples during the course of work and get the cement tested at the cost of the contractor to ascertain the quality and confirm that it meets the specifications.

6.8) The cement consumption of the works which are not based on design mix shall be as per the IR-USSOR.

6.9) In case of free supply of cement in bags by the Railway empty cement bags shall be the property of the contractor and recovery at the rate of Rs.2/- per gunny bags and Rs.1.40 per polythene bag will be made from the contractor's bill.

6.10) Issue of cement for day-to-day work should be logged in a register which should be jointly signed by the contractor and Railways authorized representative. This register should show the issue made on the day and the description and quantity of work done.

7.0) STEEL: The reinforcement shall be any of the following with the prior approval of Divisional Engineer or as specified in the tender schedule:

- a) Grade I mild steel and medium tensile steel bars conforming to IS: 432 (Part I);
- b) High strength deformed steel bars conforming to IS: 1786;
- c) Thermo mechanically treated (TMT) bars satisfying requirements of IS: 1786;
- d) Rolled steel made from structural steel conforming to IS: 2062 Gr A and Gr B.

7.1) TMT Reinforcement bars shall be procured from the approved producers who are fulfilling the "Schedule Of Technical Requirements For Supply of TMT Reinforcement Bars To IR (STR)" (Document No. WK-G-8.1-1 Ver.1.3) specified by RDSO vide letter No. WKS/67/VD/TMT dt. 21.02.2022 or their authorized stock yards. Re-rolled steel will not be accepted. Each batch of steel shall be covered with manufacturer's test certificate.

7.2) In addition to test certificate produced by the tenderer/contractor, Railway may draw samples and send for testing independently at Railway's own laboratory or through outside institutions, cost of which shall be borne by the contractor. The decision of the Engineer as to the necessity of such test shall be final and binding on the contractor. The testing of material and the frequency shall be done as per IR Delhi-CPWD specifications and Standard Specifications in the approved Engineering Colleges as mentioned in 1.2.

7.3) Quantity for Payment of steel (reinforcement) will be calculated from the nominal or actual unit weight whichever is less according to schedule of the lengths given/computed from drawing. Allowance for laps will be limited to the minimum required as per approval of Divisional engineer. No extra amount will be paid for wastage or for cut rods if any, which would be the property of the contractor.

7.4) The rate quoted for cement and steel shall be inclusive of the cost of procurement handling, transportation to the site of work storage, wastage etc. including bending/cutting and tying/fixing of reinforcing steel.

8.0) All removed/released materials will be the property of Railway and are to be handed over to Senior Section Engineer (SSE)/ works, as directed.

9.0) The contractor should make his own arrangements for the required binding wire for all RCC works including the works under USSOR 2021 items though it is mentioned otherwise in the USSOR 2021 rates. No extra payment will be made for binding wires.

10.0) Any temporary structures required for storage of cement and steel has to be provided by the tenderer at his cost and this should be removed after the completion of the work. The Railway will provide suitable land, for construction of the above temporary sheds free of charge if land is available nearby. Double lock arrangements for the temporary stores shed should be provided. The land should be vacated within 15 days after completion of work.

11.0) Aggregate: The aggregate shall conform to IS: 383 and shall before use be got tested through one of the approved testing institutions and the result submitted in accordance with Appendix A of IS 383. The testing of material and the frequency shall be done as per Delhi CPWD specifications and IR Unified Standard Specifications for works & Materials in the approved Engineering Colleges as mentioned in the tender document.

11.1) Coarse aggregate shall be crushed stone, angular in shape and gravel shall not be used. The testing of material and the frequency shall be done as per Delhi CPWD specifications and IR Unified Standard Specifications for works & Materials in the approved Engineering Colleges/Polytechnic Colleges as mentioned in the tender document.

11.2) Fine aggregates shall be resulting from natural disintegration of rock which has been deposited by streams or glacial agencies. The testing of material and the frequency shall be done as per CPWD specifications and IR Unified Standard Specifications for works & Materials in the approved Engineering Colleges as mentioned in the tender document.

12.0) Water: Water to be used in making and for curing concrete shall conform to IS: 456.

12.1) The contractor shall arrange for water supply necessary for the work. Ordinarily no water will be supplied by Railways to the Contractor either for drinking purpose or for execution of the work and the rate quoted shall include the cost of arranging water supply.

12.2) However if surplus water is available from nearby Railway source, contractor may be allowed to draw water for his work on payment of necessary water charges as fixed by railway administration. Necessary arrangement of drawl of water by pumping, laying of pipe line and storage arrangement etc shall be done by contractor at his cost. The decision of Divisional Engineer as to availability of spare Water will be final conclusive and binding on the contractor.

13.0) Form work: Form work shall conform to the shapes, lines and dimensions shown in the drawings and shall be so constructed and supported as to remain sufficiently rigid and water tight to prevent loss of mortar and water from the concrete and shall be able to carry all the loads and forces during the casting as well as later.

13.1) For important works steel shuttering with tubular steel centering shall be used in accordance with the manufacturer's/designer's instructions.

13.2) All panel joints, corners and seams should be made water tight by using approved sealing materials. Also the steel form should be thoroughly cleaned before use.

13.3) Form faces should be treated with releasing agent to prevent concrete sticking to the forms and thereby aid in stripping. Only approved type of releasing agent with prior permission of the Engineer in-charge shall be used. Use of black oil or grease is totally prohibited.

13.4) Ample access should be provided within the form work for proper cleaning up, placement, consolidation and inspection of concrete.

13.5) Duct/Pipes/ channels etc that may be required to be laid in the concrete/masonry of bridge/building shall be laid by the contractor as per direction of Engineer during the progress of the work without any extra cost. The ducts/pipe/channels and conduits bent to shape along with fixtures will be supplied by the Railway free of cost.

14.0) Construction joints: The surface of the construction joints should be cleaned properly and prepared so as to ensure adequate bond with the concrete placed below or adjacent to it and to obtain the required water tightness. Any approved method of cleaning for removal of laitance, bleed water and fines by using wire brush, water jetting, green cutting, sand blasting may be used with the prior approval of the Engineer in charge.

15.0) Concrete: The concrete shall be produced and laid in the manner as given in IRS Concrete Bridge Code 1997 (Second Revision) for General Bridge construction corrected upto date and IS 456.

15.1) The concrete shall be of controlled quality with nominal maximum size of coarse aggregate limited to 20 mm unless specified otherwise in the schedule.

15.2) Batching of different ingredients for production of concrete shall be done by weight only. A modern, mechanized or automatic weigh batcher shall be used for the weighing aggregates and cement. The weigh batch shall have accuracy of + 3%. Modern high speed mixer or any other mixer approved by the Engineer shall be used for mixing concrete. The concrete shall be consolidated by means of vibration with approved type needle/form/surface vibrators.

15.3) The contractor should submit concrete mix design before starting the work and obtain the approval of Divisional Engineer/DRM(Works) Tiruchchirappalli Division, Southern Railway before the execution of work. This mix design should be based on the procedure given in IS: 10262. In case source of cement/type change a new mix design shall be submitted for approval.

15.4) On approval of mix design by Divisional Engineer test cubes shall be cast and tested for strength. Only if test cube strength passing acceptance criterion given in IS:10262, the actual concreting shall start. If any change in Mix Design in adopted for RMC, the same should be approved by Engineer-in-Charge.

15.5) The minimum grade of plain cement concrete shall be M 20 and that of Reinforced cement concrete shall be M25 and only approved design mix shall be used for the concrete unless specified otherwise in the tender schedule.

15.6) The minimum grade of concrete shall be M-40 for pre tensioned pre-stressed concrete structure.

15.7) The minimum quantity of cement to be used for all building works & Bridges, as per IR Concrete Bridge Code.

15.8) Maximum water cement ratio: The limits for maximum water cement ratio for design mix shall be based on environmental conditions as per IR Concrete Bridge Code.

15.9) The limits for maximum water cement ratio for different environmental conditions shall be as per IR Concrete Bridge Code.

15.10) Samples from fresh concrete shall be drawn as required in para 8.7.2 of IRS Concrete Bridge Code 1997. The test cubes should be cast at regular intervals and tested to assess the strength of concrete. Record of strength obtained on test cubes shall be maintained at site and these strengths/other parameters should satisfy the acceptance criterion given in para 8.7.6 of IRS Concrete Bridge Code 1997. Unless the details as required above are submitted, the bill of item of concreting shall not be passed. In case of large projects the contractor should establish cube testing equipment at or near the site of work. The cost of casting of cubes and their testing will have to be borne by the contractor. In case the cube so cast fail the acceptance criteria laid in the code or found porous or honeycombed the work will be rejected after

inspection of by the engineer and such works shall be replaced by contractor at his cost. This will be without prejudice to any other remedial measures prescribed under the contract.

15.11) In case the contractor desires to use a curing membrane instead of water curing, he may do so after submitting the necessary data and after the same is approved by the Engineer in charge. No extra payment on this account would be admissible. It should be noted that no additional payment would be made for curing/vibrating the concrete at different heights and the contractor should make his own arrangements for the provision of necessary staging/scaffolding etc and carry out curing/vibrating at all levels as directed by the Engineer in charge.

15.11.1) The rate for concreting is inclusive of curing to the satisfaction of Engineer in charge. In case contractor fails to do curing, the concreting done by him is liable to be rejected. If curing is not being done to satisfactory standard, the Engineer at his discretion may get it done at the contractor's cost without any notice to him as the curing cannot wait for any such notice time, etc. The Engineer's decision shall be final and binding as to whether satisfactory curing is being done or not. The cost of curing will be recovered from the 'ON ACCOUNT BILLS'.

15.11.2) Ready Mixed Concrete (RMC): Concrete produced by completely mixing cement, aggregates, admixtures, if any, and water at a Central Batching and Mixing plant and delivered in fresh condition at site of construction.

15.11.3) Ready Mixed concrete may be used, wherever required. It shall conform to the specifications of concrete, as laid down in IRS Bridge Code, IS: 4926 (Specification for Ready Mixed Concrete) may be referred.

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

15.11.5) Time period for delivery of concrete: The concrete shall be delivered completely to the site of work within 1 ½ Hr (when the atmospheric temperature is above 20 degree C) and within 2 Hrs (when the atmospheric temperature is at or below 20 degree C) of adding the mixing water to the dry mix of cement and aggregate or adding the cement to the aggregate, whichever is earlier. In case, location of site of construction is such that this time period is concerned inadequate, increased time period may be specified provided that properties of concrete have been tested after lapse of the proposed delivery period at the time of finalizing mix design.

15.11.6) Transportation of ready mixed concrete: The ready mixed concrete shall be transported in concrete transit agitators conforming to IS: 5892 (Specification for concrete transit mixers and agitators). Agitating speed of the agitators during transit shall not be less than 2 revolution per minute nor more than 6 revolution per minute.

16.0) Any excess quantity of cement and steel left over after completion of the work will have to be disposed of by the contractor and cannot be taken over by the Railway.

17.0) No Electrical power supply will be made for the work. However Railway may supply Electrical power subject to availability of capacity on payment of energy charges as determined by Divisional electrical Engineer on the usual terms and conditions for such supply. The decision of DEE Tiruchchirappalli as to availability of spare capacity will be final conclusive and binding on the contractor. IN case supply is made available contractor has to make his own arrangement at his cost for drawl of power including fixing of distribution board with energy meter and necessary cabling etc.

18.0) The tenderer for carrying out any construction work in Tamilnadu must get themselves registered from the Registering Officer under Secion-7 of the Building and Other Construction Workers Act, 1996 and rules made thereto by the Tamilnadu Govt and submit certificate of Registration issued from the Registering Officer of the Tamilnadu Govt. (Labour enforcement Dept.). For enactment of this Act, the

tenderer shall be required to pay cess @ 1% of cost of construction work to be deducted from each bill. Cost of material shall be outside the purview of cess, when supplied under a separate schedule item.”

19.0) Contractor will be required to dispose off, the resultant debris, part or full load by his own transport and labour, within Railway land at nominated locations and as directed by Engineer-in-charge. If the contractor fails to dispose off the debris, the concerned executed item from which the debris have been released, may not be paid.

20.0) The Railway will be at its discretion and for the duration of the contract, make available free of charge, land at site for the construction of contractor's site office, stores, etc., required for the execution of contract. Cleaning and leveling the ground, construction of the temporary roads, stores, office, etc., as required, shall be done by the contractor at his own cost, to the satisfaction of the Engineer-in-charge. No land for the accommodation of his staff and labour shall be made available by the Railway. After completion of the work or before, if directed by the Engineer-in-charge, land use by the contractor shall be restored to the same condition as it was originally handed over to him, at Contractor's own cost.

21.0) It is sole responsibility of the Contractor for safety of his labour and proper security of his materials, tools and plants, etc., while executing the work and during the entire contract period.

22.0) All materials shall be stacked sufficiently clear off the tracks and shall remain without any possibility of infringing the minimum fixed structure dimensions. Materials shall also not be unloaded or stacked over signal wires, cables, or other gears, or any such items, to avoid interference to the existing running tracks.

23.0) Wherever the road vehicles / machinery are required to work in the close vicinity of railway track, yards or on platforms, the work shall be so carried out, that there are no infringements to the Railway's Schedule of Dimensions. For this purpose, the area where the road vehicles / machinery are required to ply, shall be demarcated and acknowledged by the contractor. Special care shall be taken for turning/reversal of road vehicles / machinery without infringing the running track. Barricading shall be provided wherever justified and feasible as per the site condition. Such works are to be carried out under the strict supervision of the Engineer-in-charge or other nominated Railway personnel deployed.

24.0) STATUTORY DEDUCTIONS/TAXES/LEVIES:

Statutory deductions in payments will be made as per relevant clause of standard General Conditions of Contract - April 2022.

(i). Tax: Income tax will be deducted at source including the surcharge, if any, at the rates notified by the Income Tax Department from time to time and TDS certificate will be issued in form No.16 for such deductions with each bill.

(ii). Conservancy Charges: Conservancy charges as per rates in force during the period of work will be recovered from the contractor through running /final bills.

(iii). Other Taxes/Levies: All rates quoted in the tender shall be deemed to be inclusive of all taxes, duties, royalties, octroi, cess, etc., payable by the contractor to the Govt. or any public body and no additional amount/rate or claim will be entertained on this account by the Railways. Also no claim whatsoever will be accepted by Railways on account of revision of tax rates, new taxes of statutory nature by State/Central Govt. The various provisions given in part II of Standard General Conditions of Contract are applicable.

25.0) The tenderer is expected to quote the rates duly inspecting the physical site conditions of the jurisdiction covered in the section, nature of the various works involved and various provisions given in the tender document.