

## SPECIAL CONDITIONS OF CONTRACT: TECHNICAL SPECIFICATIONS

### 1. GENERAL

- 1.1 All the works pertaining to water supply and drainage will have to be done through the agency of licensed plumber and all work have to be carried out in confirmation with the current by laws of Municipal Corporation.
- 1.2 The contractor will make his own arrangements for obtaining the supply of water necessary for the work. The contractor, with the permission of the Railways, may be allowed to take water from existing Railway pipe lines for which he will have to pay 1% water charges on the cost of the items for which water is required from the Railway.
- 1.3 Where any raw material for execution of the Contract is procured with the Assistance of Government either by issue from Government stock or purchase under arrangements made or permits or licenses issued as trustee for Government. The contractor shall hold the said materials as trustee for Government and use such materials economically & solely for the purchase of the contract against which they are issued and not disposed of them without the permission from the Government and return if required by the purchaser all the surplus or unserviceable materials that may be left over with him after the completion of contract on it's termination for any reasons whatsoever on his being paid such price as Government may fix with due regard to the conditions of materials. The freight charges for the return of the materials according to direction of the purchaser shall be borne by the contractor. In the event of the breach, the aforesaid conditions the contractor shall in addition to throwing himself open to action for contravention of terms of the licencee for the permits and for criminal breach of trust be liable to account to Government for all money advantages or profits resulting or in the usual course should have resulted to him by reason of such breach.
- 1.4 All surplus excavated soil and spoils to be released by dismantlement of existing structures, if any should be laid out of Railway premises to the nearest Municipal or Private dumps at the Contractor's cost and accepted rates will be deemed to include this operation notwithstanding any provision included in the Unified standard schedule of rates **2011** as amended from time to time.
- 1.5 In respect of concrete work concrete mixer internal and external vibrator and other mechanical equipment should be used by contractor as directed by the Engineer and no extra will be paid to the contractor on this account.

### 2. Codal provisions:

The concrete and reinforcement work is to be carried out by and large as per the latest amended version of the relevant IRS and IS codes.

In case of any discrepancy or disagreement between different specifications to be followed for any item of work, the following reference shall be made in order of precedence as they appear below:

- i. Provisions in tender document
- ii. IRS codes of practice/standard specifications
- iii. IS codes
- iv. Provision of any other relevant code.

However the above precedence can be changed by the Engineer in charge and his decision with respect to the applicability/order of priority shall be final and binding. Contractor will be responsible to arrange adequate copies of each of the relevant codes/specifications/manuals at site of work at his own cost.

### 3. CONCRETE

#### 3.1 Cement

The required quantity of cement for execution of work shall be procured by the contractor from the producer/their authorized stockyard, the qty. of such cement shall confirm to Rly. Specification.

- (a) Cement bags should bear the following in ledger markings.
  - 1) Manufacturer's name.
  - 2) Registered Trade Mark of manufacturer, if any
  - 3) Type of Cement.
  - 4) Weight of each bag in kg. or No. of Bags/Tonne.
  - 5) Date of manufacture, generally marked as week of the year/year of manufacture, e.g. 30/93 which means 30th week of 1993.
- (b) Cement to be used only from reputed manufactures like **Ambuja, Ultra Tech, ACC, Birla, L&T** or any other brand approved by Engineer-in-charge should only be used. Cement should not be older than 3 months from date of manufacturing. The contractor shall submit test certificate of the batch from manufactures.
- (c) To ensure quality control, test certificates from the manufacturers should be produced by the contractors, which should conform to the relevant specifications.
- (d) Railways may also take samples during the course of work & get the cement and steel tested to ascertain their conformity to specifications.
- (e) When such sampling is done, it should be as per IS specifications laid down in relevant IS Codes.
- (f) Minimum & Maximum cement content; water cement ratio shall be as per PCE Circular 208.
- (g) The total chloride content of all constituents of concrete as a percentage of cement in mix shall not exceed 0.06% (as chloride) for PSC members and 0.15% of RCC members.
- (h) Sulphate soluble (as SO<sub>3</sub>) shall not exceed 4% by weight of cement in the concrete.
- (i) Testing  
A sample shall be tested from every batch of cement delivered on site or once for every 1000bags whichever is more frequent. Tests shall be carried out for fineness, initial and final setting time, and compressive strength (IS: 4031) and the results approved by the Engineer before use of the cement in permanent works. Samples shall be taken immediately on receipt of cement at site. The methods and procedure of sampling shall be in accordance with IS: 3535. The Engineer may specify other forms of sampling and tests including chemical analysis, (IS: 4032) if in his opinion the cement is of doubtful quality. The cost of any testing shall be borne by the contractor.

- 3.1 a **Non Shrink Grout-** FOSROC, SIKA, MBT or equivalent as approved by Railways shall be used

### 3.2 Fine Aggregates (Sand).

i) Sand, if found too coarse, shall be suitably blended with finer sand obtained from approved resources to obtain the desired grading. The provision of two types of sand, their stacking separately and their mixing in the specified proportions shall beat the contractor's cost.

The sand shall not contain silt more than a total of 3% by weight and shale, clay, and other structurally weak particles a total of 2% by weight. Chloride content in washed sand shall not be greater than 0.04% by weight.

ii) The grading of the sand shall conform to IS: 383

Fine aggregates for the works shall be conforming to IS:383, obtained from approved Sources. The sand shall be screened on a 4.75 mm size screen to eliminate over-size particles.

### 3.3 Coarse Aggregates-

i) Coarse aggregates for the works shall be crushed stone aggregates conforming to IS: 383 obtained from approved sources. Only quarries having jaw crushers with choke feeding arrangement producing aggregates of nearly cubical shape shall be approved.

ii) Coarse aggregate containing flat or flaky pieces or mica shall be rejected.

iii) The aggregate shall be subjected to tests in accordance with IS:2386 as may be ordered by the Engineer.

iv) Aggregate shall be stored in such a way as to prevent segregation of sizes and avoid contamination with fines and other undesirable material.

v) Size of Coarse Aggregate

The size (maximum nominal) of coarse aggregates for concrete to be used in various components shall be given as Table 3.

Table 3

Components	Max. Nominal Size of Coarse Aggregate
i) PCC	40/20
ii) RCC solid type piers and abutments	40/20
ii) All other RCC work	20
iv) PSC work	20

The proportions of the various individual size of aggregates shall be so adjusted that the grading produces densest mix and the grading curve corresponds to the maximum nominal size adopted for the concrete mix.

### 3.4 Water:

a) Potable water of proper quality should be used.

b) The PH value shall not be less than 6.

c) Test frequency for water.- at every 100 cu m of concrete at site one sample shall be tested.

d) The permissible limits for solids shall be as follows :

	Permissible limits (Max.)
Organic	200 mg/lit.
Inorganic	3000 mg/lit.
Sulphates (SO <sub>4</sub> )	500 mg/lit.
Chlorides (Cl)	300 mg/lit.
Suspended matter	2000 mg/lit.
Alkalies	10 mg/lit.
Acidic material	mg/lit.

### **3.5 Concrete Admixtures**

#### **3.5.1 General**

Concrete admixtures are proprietary items of manufacture and shall be obtained only from established manufacturers with proven track record, quality assurance and full-fledged laboratory facilities for the manufacture and testing of concrete. Naphthalene or melamine based admixtures only shall be permitted. The admixtures shall be non-air-entrant type. The contractor shall provide the following information concerning each admixture after obtaining the same from the manufacturer:

- a) Normal dosage and detrimental effects, if any, of under dosage and over dosage.
- b) The chemical names of the main ingredients in the admixtures.
- c) The chloride content, if any, expressed as a percentage by the weight of the admixture.
- d) Values of dry material content, ash content and relative density of the admixture which can be used for Uniformity Tests.
- e) Whether or not the admixture leads to the entrainment of air when used as per the manufacturer's recommended dosage, and if so to what extent.
- f) Where two or more admixtures are proposed to be used in any one mix, confirmation as to their Compatibility.
- g) There would be no increase in risk of corrosion of the reinforcement or other embodiments as a result of using the admixture.
- h) Retardation achieved in initial setting time.
- i) **Admixture and Deshuttering oil-** FOSROC, SIKA or approved equivalent (compatibility of cement with admixture to be enclosed)

#### **3.5.2 Physical and Chemical Requirements**

Admixtures shall conform to the requirements of IS: 9103. In addition, the following conditions shall be satisfied:

- a) "Plasticisers" and "Super-Plasticisers" shall meet the requirements indicated for "Water reducing Admixture".
- b) The air content of freshly mixed concrete in accordance with the pressure method given in IS: 1199 shall not be more than 1 per cent higher than that of the corresponding control mix.
- c) There shall be no chloride content in admixture when tested in accordance with IS: 6925.
- d) Uniformity tests on the admixtures are essential to compare qualitatively the composition of different samples taken from batch to batch or from the same batch at different times.
- e) All tests relating to the concretes admixtures shall be conducted periodically at an independent laboratory and compared with the data given by the manufacturer.
- f) While qualifying the admixture the infra-red spectrograph plot should be given. Each batch of the supply should also be tested for I.R. spectrograph and prove the consistency of supply.

### **3.6 Storage of Materials**

#### **3.6.1 General**

All materials may be stored at proper places so as to prevent their deterioration or intrusion by foreign matter and to ensure their satisfactory quality and fitness for the work. The storage space must also permit easy inspection, removal and re storage of the materials. All such materials even though stored in approved godowns/places, must be subjected to acceptance test prior to their immediate use.

#### **3.6.2 Aggregates**

Aggregate stockpiles may be made on ground that is denuded of vegetation, is hard and well drained. If necessary, the ground shall be covered with 50 mm plank. Coarse aggregates, unless otherwise agreed by the Engineer in writing, shall be delivered to the site in separate sizes (2 sizes when nominal size is 25 mm or less and 3 sizes when the nominal size is 32 mm or more). Aggregates placed directly on the ground shall not be removed from the stockpile within 30 cm of the ground until the final cleaning up of the work, and then only the clean aggregate will be permitted to be used. In the case of fine aggregates, they shall have been tested and approved by the Engineer before use in the work.

#### **3.6.3 Cement**

Cement shall be transported, handled and stored on the site in such a manner as to avoid deterioration or contamination. Cement shall be stored above ground level in perfectly dry and water-tight sheds and shall be stacked not more than eight bags high. Wherever bulk storage containers are used their capacity should be sufficient to cater to the requirement at site and should be cleaned at least once every 3 to 4 months. Each consignment shall be stored separately so that it may be readily identified and inspected and cement shall be used in the sequence in which it is delivered at site. Any consignment or part of a consignment of cement which had deteriorated in any way, during storage, shall not be used in the works and shall be removed from the site by the Contractor. The Contractor shall prepare and maintain proper records on site in respect of delivery, handling, storage and use of cement and these records shall be available for inspection by the Engineer at all times.

The Contractor shall make a monthly return to the Engineer on the date corresponding to the interim certificate date, showing the quantities of cement received and issued during the month and in stock at the end of the month.

### **3.7 Design Mix**

**3.7.1** For all items of concrete only design mix shall be used. Prior to the start of construction, the Contractor shall get the mix design done from Reputed Govt. Engineering Degree College or from the NABL approved engineering Test laboratories as per IS: 10262 and submit to the Engineer for approval, the proportions of materials, including admixtures to be used. Water-reducing admixtures (including plasticisers or super-plasticisers) or silica fumes may be used at the Contractor's option, subject to the approval of the Engineer.

As per PCE circular 208 following conditions shall be followed for Mix Design

**Table 1**

**Guiding limits of Maximum Cement Content in Concrete Mix for works of  
ROB/RUB/FOB/Subways /Water ways Railway Bridges: -**

Concrete Mix Grade	M 15	M 20	M25	M 30	M 35	M 40	M 45 & above
Maximum Cement Content (kg/cum)	315	350	380	410	440	475	500

**Table 2**

**Guiding limits of Maximum Cement Content in Concrete Mix for works of  
Building/PF Shelter Foundation etc:-**

Concrete Mix Grade	M 15	M 20	M25	M 30	M 35	M 40 & above
Maximum Cement Content (kg/cum)	300	330	360	390	420	450

**Special Notes:**

1. *Mix Design shall be got done either from the reputed Govt. Engineering Degree Colleges or from the NABL approved Engineering Test Laboratories as per IS: 10262 and it shall be critically checked wrt. provisions of CBC or IS:456 as applicable.*
2. *All concrete mix designs shall be approved at level of Engineer-in-charge i.e. sectional DEN/Sr DEN/Dy CE.*
3. *While designing the concrete mix, the environment to which concrete may be exposed during its working life shall be judiciously decided. Very severe and Extreme exposure conditions shall be used with caution. The level of severity shall not be unreasonably high e.g. for RUB may not warrant Very severe or Extreme exposure conditions. While approving mix design, Engineer-in-charge shall apply due diligence to this aspect.*
4. *Depending upon exposure conditions, minimum grade of concrete, minimum Cement content and max w/c ratio in the Mix Design shall be applicable as per CBC or IS:456 as applicable. A summary of the codal provisions is given in Annexure in Table 3 and Table 4 for ready reference.*

**Annexure**

**Table 3**

**Minimum Grade of Concrete Mix, Minimum Cement Content and Maximum W/C in concrete for works of ROB/RUB/FOB/Subways /Water ways Railway Bridges as stipulated in IRS: CBC 2014.**

Environmental Exposure	Parameters	For Structural members of PSC and Important Bridges			For Structural members of Other Bridges and Sub-structure		CBC:2014 Reference Clause
	Structural Member	PCC	RCC	PSC	PCC	RCC	
<b>Moderate</b>	Minimum Grade	M-25	M-30	M-35	M-15	M-20	Table 4(b), Cl. 5.4.4
	Minimum Cement(kg/m <sup>3</sup> )	240	300	400	240	300	Table 4( c ), Cl. 5.4.5
	W/C (Maximum)	0.50	0.45	0.40	0.50	0.45	Table 4(a), Cl. 5.4.3
<b>Severe</b>	Minimum Grade	M-30	M-35	M-40	M-20	M-25	Table 4(b), Cl. 5.4.4
	Minimum Cement(kg/m <sup>3</sup> )	250	350	430	250	350	Table 4( c ), Cl. 5.4.5
	W/C (Maximum)	0.45	0.40	0.40	0.45	0.40	Table 4(a), Cl. 5.4.3
<b>Extreme</b>	Minimum Grade	M-35	M-40	M-45	M-25	M-30	Table 4(b), Cl. 5.4.4
	Minimum Cement(kg/m <sup>3</sup> )	300	400	440	300	400	Table 4( c ), Cl. 5.4.5
	W/C (Maximum)	0.40	0.35	0.35	0.40	0.35	Table 4(a), Cl. 5.4.3

**Max cement content- 500kg/cum [Cl 5.4.5] Pl refer Table 1 for guiding limits**



5. *Maximum Cement Content for different grades of concrete has been given in Tables 1 & 2 above but every efforts must be made to reduce the cement content by trying different proportioning of constituent materials and use of permitted plasticizers.*
6. *Payment for cement shall be made as per the quantity approved in Mix Design.*

The Guiding limits mentioned in Table 1 & Table 2 above for Maximum cement contents are prescribed for strict compliance. In case, it is not feasible to design the concrete mix with above limits, then the mix design shall be referred to HQ along with material test reports and mix design calculations for its review and approval.



**Table 4**

**Minimum Grade of Concrete Mix, Minimum Cement Content and Maximum W/C in concrete for works of Building/PF Shelter Foundation etc as stipulated in IS 456:2000**

Environmental Exposure	Parameters	Structural Member		IS 456: 2000 Reference Clause
		PCC	RCC	
Mild	Minimum Grade	M-15	M-20	Table 5, Cl. 6.1.2
	Minimum Cement(kg/m <sup>3</sup> )	220	300	Table 5, Cl. 8.2.4.1
	W/C(Maximum)	0.60	0.55	Table 5, Cl. 8.2.4.1
Moderate	Minimum Grade	M-15	M-25	Table 5, Cl. 6.1.2
	Minimum Cement(kg/m <sup>3</sup> )	240	300	Table 5, Cl. 8.2.4.1
	W/C(Maximum)	0.60	0.50	Table 5, Cl. 8.2.4.1
Severe	Minimum Grade	M-20	M-30	Table 5, Cl. 6.1.2
	Minimum Cement(kg/m <sup>3</sup> )	250	320	Table 5, Cl. 8.2.4.1
	W/C(Maximum)	0.50	0.45	Table 5, Cl. 8.2.4.1
Very Severe	Minimum Grade	M-20	M-35	Table 5, Cl. 6.1.2
	Minimum Cement(kg/m <sup>3</sup> )	260	340	Table 5, Cl. 8.2.4.1
	W/C(Maximum)	0.45	0.45	Table 5, Cl. 8.2.4.1
Extreme	Minimum Grade	M-25	M-40	Table 5, Cl. 6.1.2
	Minimum Cement(kg/m <sup>3</sup> )	280	360	Table 5, Cl. 8.2.4.1
	W/C(Maximum)	0.40	0.40	Table 5, Cl. 8.2.4.1

**Max cement content- 450kg/cum [Cl 8.2.4.2] Pl refer Table 2 for guiding limits**

### 3.7.2 Requirements of Consistency

The mix shall have the consistency which will allow proper placement and consolidation in the required position. Every attempt shall be made to obtain uniform consistency.

The optimum consistency for various types of structures shall be as indicated in Table 1, or as directed by the Engineer. The slump of concrete shall be checked as per IS:516.

Table 1

Sr.No.	Type	Slump (mm)
1	RCC structures with widely spaced reinforcement; e.g. solid columns, piers, abutments, footings, etc.	30 – 50
2	RCC structures with fair degree of congestion of reinforcement; e.g. pier and abutment caps.	50 – 75
3	PSC structures	75-125

### 3.8 Mixing Concrete:

a) Concrete shall be mixed in automatic batcher and mixer. Hand mixing shall not be permitted. The mixers or the plant shall invariably be fitted with water measuring devices. CONCRETE MIXERS like RM 600, ARGO- 2000, ARGO- 4000 or such micro processor controlled automatic batchers and mixers shall be used for concrete mixing. RMC from such micro processor controlled automatic batching and mixing plant can also be used. Contractor shall get approved the concrete mixer or the plant before the concreting work is taken in hand by Field officer.

b) Mixing shall be continued till materials are uniformly distributed and a uniform color of the entire mass is obtained, and each individual particle of the coarse aggregate shows complete coating of mortar containing its proportionate amount of cement.

c) The method of transporting and placing concrete shall be approved by the Engineer. Concrete shall be transported and placed as near as practicable to its final position, so that no contamination, segregation or loss of its constituent materials takes place.

d) When concrete is conveyed by chute, the plant shall be of such size and design as to ensure practically continuous flow. Slope of the chute shall be so adjusted that the concrete flows without any segregation of its ingredients. The delivery end of the chute shall be as close as possible to the point of deposit. Concrete shall not be moved by vibrators. The chute shall be thoroughly flushed with water before and after each working period and the water used for this purpose shall be discharged outside the formwork.

e) All formwork and reinforcement contained in it shall be cleaned and made free from standing water, dust, snow immediately before placing of concrete.

f) No concrete shall be placed in any part of the structure until the approval of the Engineer has been obtained. A Railway Engineer shall test check and give permission for pouring of concrete. (“PERMIT FOR POURING CONCRETE” IS ENCLOSED). If concreting is not started within 24 hours of the approval being given, approval shall have to be obtained again from the Engineer. Concreting then shall proceed continuously over the area between the construction joints.

g) Concrete shall be thoroughly compacted by vibration using electrically driven needle vibrators or other suitable means to produce a dense homogeneous void-free mass having the required surface finish. When immersion type vibrator needles are used, contact of needle with reinforcement and all inserts like ducts etc. shall be avoided. Additional vibrators in serviceable condition shall be kept at site so that they can be used in the event of breakdown.

### **3.9 FORM WORK**

Unless otherwise specified, formwork shall comply with the relevant IS codes. Contractor shall submit calculations for design of formwork and drawings of form work. The design and construction of form work shall take account of safety and of the surface finish required. Form work shall be constructed of timber ply or sheet metal of specified thickness as per approved design to prevent warping. The form work shall be sufficiently rigid and tight to prevent loss of grout or mortar from the fresh concrete or the formation of fins or other blemishes on the concrete. Foam of 10 mm thickness to prevent leakage of grout shall be provided at the junction of two shuttering plates and at the junction of shuttering plates with any other surface. Form work shall be treated /coated with a suitable non-staining agent /refined pale paraffin mineral oil/raw linseed oil after thoroughly cleaning the surface before the steel is fixed or concrete is placed.

#### **3.10 Spacer and cover blocks-**

The cover blocks should be manufactured in quality moulds, compacted on vibrating table and cured for 28 days and at least of the same quality as that of surrounding concrete. Size of the cover blocks- It shall be 50 X 50 X 50 mm cubical or cylindrical as per Design.

**3.11 Binding wires** - Corroded binding wires are not permitted. 18 SWG G.I. wire shall be used as binding wire

#### **3.12 Water Curing**

Water for curing shall be as specified suitable for concreting. Only potable water shall be used. Exposed surface of concrete shall be kept continuously in a damp or wet condition by ponding or by covering with a layer of sacks, canvas, Hessian or similar materials and shall be kept constantly wet for a period of not less than 28 days from the date of placing of concrete.

**ANNEXURE-1**

**PERMIT FOR POURING CONCRETE**

I have checked the following :

1. The R/F is as per the drg. & treated - Yes/No
2. The form work is leakproof and sponge provided at joints - Yes/No
3. The construction joint has been provided ( Hacking, jetting, cleaning) - Yes/No
4. The cover blocks are of approved quality & cured for 28 days - Yes/No
5. The mix design is as under for one mix.  
i) Cement = Kg. ii) Sand = iii) C.A.I. =  
iv) C.A. II = v) Water = vi) Admixture =  
vii) W.C. = viii) A.C. = ix) FA/CA =  
x) Slump =
6. The all in aggregate curve & concreting sequence is enclosed - Yes/No
7. Shri.....shall be I/C of concrete mixing and quality control  
Shri.....shall be I/C of concreting.
8. Material / equipment position as under.

Material	Cement M.T.	Sand Cum	CA I Cum	CA II Cum	Water Litres	Admixture Litres	Mixers Nos	Vibrators Nos.
Required								
Stock								

9. Since, the above items are in order, please allow me to pour the concrete,

i) Description of layer : .....

ii) Date & time of concreting : .....

( )  
Site Engineer

M/s.....

Site Engineer - Railways

I have checked the above items and find them in order / not in order. You are hereby allowed / not allowed to pour the concrete.

Reasons for not allowing :

1. ....

2. ....

3. ....

( )  
Site Engineer of Contractor

( )  
Site Engineer of Railway

M/s.....

### 3.13 Finishing

Immediately after removal of forms, exposed bars or bolts, if any, shall be cut inside the concrete member to a depth of at least 50 mm below the surface of the concrete and the resulting holes filled with cement mortar of dry pack consistency. All construction and expansion joints in the completed work shall be left carefully tooled and free from any mortar and concrete. Expansion joint filler shall be left exposed for its full length with clean and true edges. The finished surfaces of concrete after removal of formwork should be such that no touching up is required. All fins caused by form joints, if any, shall be ground using electric surface grinder. Immediately on removal of forms, the concrete work shall be examined by the Engineer before any defects are made good.

- a) The work that has sagged or contains honeycombing to an extent detrimental to structural safety or architectural appearance shall be rejected.
- b) Surface defect of a minor nature may be accepted. On acceptance of such work by the Engineer, the same shall be rectified as directed by Engineer.

**3.14 USE OF RMC:** - RMC may be allowed to be used from Reputed/approved sources.

### 3.15 Sampling and testing

3.15.1. Concrete for making 3 test cubes shall be taken from a batch of concrete at point of delivery into construction, according to procedure laid down in IS:1199.

3.15.2. A random sampling procedure to ensure that each of the concrete batches forming the lot under acceptance inspection has equal chance of being chosen for taking cubes shall be adopted.

3.15.3. 150 mm cubes shall be made, cured and tested at the age of 28 days for compressive strength in accordance with IS: 516. The 28 day test strength result for each cube shall form an item of the sample.

3.15.4. Frequency of testing for permeability: 2 sets of 3 sample each for per 100 m<sup>3</sup> of concrete.

#### 3.15.5 Test specimen and sample strength:

Three test specimens shall be made from each sample for testing at 28 day. Additional cubes may be required for various purposes such as to determine the strength of concrete at 7 days for any other purpose. The test strength of the sample shall be the average of the strength of 3 cubes. The individual variation should not be more than + 15 percent of average.

#### 3.15.6 Frequency

The minimum frequency of sampling of concrete of each grade shall be in accordance with Table 4.

Table 4

Quantity of Concrete in work, m <sup>3</sup>	No. of samples
1-5	1
6-15	2
16-30	3
31-50	4
51 and above	4 plus one additional sample for each additional 10 m <sup>3</sup> or part thereof.

At least one sample shall be taken from each shift of work.

#### 3.15.7 TEST CERTIFICATES:

Contractor will be required to produce test certificates for cement, steel and other materials for their conformity to the specifications at regular intervals as specified in IS specification. Necessary cost of testing shall be borne by the contractor only.

### 3.16 Defective Concrete

Should any concrete be found honeycombed or in any way defective which may be suspected to affect the performance of the structure, shall be rejected outright. However, some surface defects like minor honey combing etc. not affecting the structural properties shall on the instruction of the Engineer repaired as per the approved procedure.

### 3.17 Tolerance in Concrete Elements

#### A) Open Foundation

- a) Variation in dimensions. : + 50 mm , - 10 mm
- b) Misplacement from specified position in plan. : 15 mm
- c) Surface irregularities measured with 3m : 3mm

Straight edge.

#### B) Substructure

- a) Variation in cross-sectional dimensions. : + 10 mm, - 5 mm
- b) Misplacement from specified position in plan. : 10 mm
- c) Variations from plumb over full height. :  $\pm 10$  mm

#### C) PSC Structure

##### i) Precast Concrete Superstructure

- a) Variation in cross-sectional dimensions :  $\pm 5$  mm
- b) Variation in length overall : Shall not exceed + 10 mm  
or + 0.1 per cent of the  
span length, whichever is lesser.
- c) Variation in overall depth or width. : + 5 mm

## 4. SPECIFICATIONS AND SPECIAL CONDITION OF REINFORCEMENT

### 4.1 GENERAL

- a) Steel reinforcement bars used in the RCC/PSC works shall be Thermo Mechanically treated bars conforming to IS:1786-1985 (latest revision) manufactured only by primary manufactures viz **SAIL, TISCO, RastriyaIspat Nigam ltd, JINDAL**, or any other reputed company approved by Rly.Engineer.
- b) All reinforcement work shall be executed in conformity with the drawings supplied and instructions given by the Engineer and shall generally be carried out in accordance with the relevant Indian Standard Specifications (IS:2502).
- c) Inspection and Testing: Every bar shall be inspected before assembling on the works and any defective, brittle, excessively rusted or burnt bars shall be removed. Cracked ends of bars shall be cut out.

Physical Test:IS-2062, IS-432 (i) Upto 10 mm dia. One sample for 25 MT or part thereof.

(ii) Above 10 mm dia. One sample for 40 MT or part thereof.

#### **4.2 Lapping & Welding**

i) As far as possible, bars of the maximum length available shall be used. Laps shown on drawings or otherwise specified by the Engineer will be based on the use by the contract or of bars of maximum length. In case the Contractor wishes to use shorter bars, laps shall be provided at the Contractor's cost in the manner and at the locations approved by the Engineer. In any case laps provided will not be measured for payment purpose. The rate is inclusive of all such provision.

ii) As and when necessary, welded laps shall be provided as specified by the Engineer.

#### **4.3 Anticorrosive treatment of steel :**

Truncated inhibited cement slurry coating for dry climate is to be adopted for anticorrosive treatment of reinforcement steel as per the following procedure:

i) Cleaning of steel by wire brush for removal of dust and rust.

ii) Apply one coat of cement slurry {1 kg. Cement + 600 cc of inhibitor solution (Patent No.109784/67)} by dipping or brushing. Allow it to dry for 24 hours in shade. The water is not to be used. The inhibitor solution is prepared in ionized water.

iii) Apply second coat of cement slurry (same as above). Allow it to dry in shade. The coating is purely cement based with inhibitor solution and is passivating in nature .

#### **4.4 Measurement for payment :**

Reinforcement shall be measured in length separately for different diameter as actually used in the works excluding overlaps and over weights from the length so measured. The weight of reinforcement shall be calculated in tonnes. On the basis of standard weights as per IS:1732. Lengths shall include hooks at ends. Wastage, overlaps, coupling welded joints, spacer, bars, chairs, etc. and annealed G.I wire (18 SWG) for binding cover blocks shall not be measured and cost of these items shall be deemed to be included in the rates of reinforcement.

The cost inclusive of the bending placing binding reinforcement steel welding if required and fixing in position as shown on the drawings and as directed by the Engineer. It shall also include cost of all devices for keeping reinforcement in approved position, cost of jointing as per approved method and all wastage, overlaps and spacer bars.

#### **4.5 Structural steel work :**

All structural steel work shall be done as per relevant IS codes as may be applicable in addition to as given below:-

- i) IS:800:1988- Code for practice for general construction in steel
- ii) IS:2062:2006- Requirement of steel for use in structural work.
- iii) Chapter XVIII of Central Railway specification for materials and works 2007

Tests on steel samples will be carried out as per BTS specifications and cost of any testing shall be borne by the contractor.



**Construction Site Records**

In order to maintain accurate records of performance of contract, the Railway's representative will maintain the following registers at site:

1. Site Order Register – This register shall be for issuing work related instructions to the Contractor by Engineer or his Representatives. Verbal orders/instructions are confirmed by the SSE/ADEN in writing in the register. Contractor shall promptly acknowledge orders given therein and comply with them within a reasonable time. Contractor shall also record the compliance in above register. Railways representative shall report such issues that have not been complied by the Contractor in a reasonable time frame to his higher ups for its early remedy. Reply to the inspecting officers regarding compliance, needs to be communicated by the Contractor promptly. Contractor may also record his grievance, if any, in above register, which the Railway shall try to settle promptly. Proforma for the register is attached as Annexure-i.
2. Hindrance register- This register shall be maintained to record all hindrances encountered during execution of works in the contract. It shall indicate Nature of hindrance, Date of start of hindrance, Date of Removal of hindrance, Period of hindrance, Items of work that could not be executed because of this hindrance, impact of hindrance on overall delay etc. Hindrance register will form basis for grant of extension to the contractor with or without penalty. Proforma for the register is attached as Annexure-ii.
3. Drawings issue register-All records of issue of drawings viz. General Arrangement, Architectural, Structural, Plumbing, Sanitary etc to the contractor by the deptt. Shall be maintained in this register. If the contract warrants submission of drawings by the contractor such as those for temporary works, structural designs & drawings in Design & Built contract, as built/completion drawings etc, it shall also be entered into the register. This register will also form a basis for analysing delay in execution of works by either party to the contract. All drawings shall be always kept at site in a separate folder for ready reference. Proforma for the register is attached as Annexure-iii.
4. Technical Register- This register will show technical details at site of work indicating layout of work, foundation works, variation in structural dimensions from drawings, any technical details necessary for verification of measurements, hidden works etc. This register is also meant for recording details of "Approved Method Statement" for major important activities that require thorough detailing to ensure quality & safety of the work being executed. Proforma for the register is attached as Annexure-iv.
5. Piling register- A separate piling register indicating details of pile load test, location, size, depth of pile, strata encountered, time of start and end of boring, time of start and end of concreting, depth of socketing etc may be maintained. For small qty, piling details may be entered into Technical Register. Proforma for the register is attached as Annexure-v.

6. Tools & Plants Register- This register shall give details of tools and plants, equipment and machinery etc available at site duly indicating their condition and usage, date-wise.
7. Cement Register-This register will be maintained to record daily receipt and consumption of the cement duly indicating the balance quantity. The quantum of the work done for the cement issued on a particular date will also be maintained.MTC and reference of Material Passing Register shall also be maintained in this register. Performa for the register is attached as Annexure-vi.
8. Reinforcing Steel Register - This register will record the details of reinforcements and its location of use in structural members. MTC and reference of Material Passing Register shall also be maintained in this register. Performa for the register is attached as Annexure-vii.
9. Structural steel Register-This register will record the details of structural steel and its location of use in structural members. MTC and reference of Material Passing Register shall also be maintained in this register. Performa for the register is attached as Annexure-viii.
10. Material Passing & Testing Register – This register will show material brought at site, passed, rejected etc. with quantity, brand, specifications & test results etc in a tabular format.The records of sieve analysis of coarse& fine aggregates, impact or abrasion tests etc, admixture test etc shall also be maintained in this register or Material passing & testing register. The documents related to material passing shall be maintained in a separate folder for ready reference. Performa for the register is attached as Annexure-ix.
11. Concrete Cube register-All mix design shall have approval of sectional DEN/Sr DEN. The cube register shall maintain records of cube casting and testing for 7days and 28 days strength. Locations from where samples are taken shall be specifically mentioned. For concrete brought through RMC, samples shall be collected in presence of Engineer's representative and additional records of plant/source, transit mixtures, challan, time of travel, batching record, slump etc shall also be maintained in RMC Register. Source of RMC Plant shall have prior approval of sectional DEN/SrDEN. Performa for the register is attached as Annexure-x.
12. Labour Register/ Daily Progress Register/ Machinery Register-This register will be maintained to show daily strength of labour in different categories employed by the Contractor, machinery mobilized & description of work executed. Details of Contractor's Supervisor and Engineer shall also be maintained nit. It will also record category wise no. of labours engaged on the execution of work. Performa for the register is attached as Annexure-xi.
13. Programme Register - This register shall contain planning and progress of work in the form of Bar charts and/or PERT chart etc. The planning of work submitted by the contractor shall have approval of sectional DEN/Sr DEN. The planning shall be periodically reviewed and revised program or catch up program shall be submitted by Contractor for completion of works.
14. Daily Progress Register- Daily progress register shall indicate daily progress of work

done by the Contractor. It shall be got signed at least once in three days from Engineer in token of acceptance. Performa for the register is attached as Annexure-xi.


15. Ready Mix Concrete Register-Ready mix Concrete Register shall contain information regarding Name of Structure, detail of Transit Mixer, its loading, arrival at Site & Time of discharge completion, Slump, Ambient time concrete Temperature and reference of delivery Challan No. & batch Report No. Cement content as per approved mix design and as per Received batch report No. Shall also be maintained. Performa for the register is attached as Annexure-xii.
16. Log Book of events – All events are required to be chronologically logged in this book, date-wise and shift-wise.
17. QAP Compliance register- For all important works valuing more than Rs 15 crore, a "Quality Assurance Manual" covering Quality System, Inspection & Testing, Method statements for important items of works, Document & Data control, Quality Training etc shall be prepared before starting the work. The above manual shall be prepared by Contractor by employing professionals in the field and submitted to Engineer for his approval. The implementation and compliance of check points shall be maintained in QAP compliance register.
18. SHE compliance Register- For all important works valuing more than Rs 15 crore, a "Safety, Health and Environment (SHE) Manual" covering measures and practices to ensure safety of employees and workers, safety of worksites, Hazard Identification & Risk assessment (HIRA), Safety Training, Occupational health systems for well-being of employees in the work place, Environment protection, Pollution control and mitigation measures, compliance of related Acts/ Laws etc shall be prepared before starting the work. The above manual shall be prepared by Contractor by employing professionals in the field and submitted to Engineer for his approval. The implementation and compliance of important check points shall be maintained in SHE compliance register.
19. Schedule/ Paid/ Deviation Qty register- This register shall indicate Quantities in schedule, paid bill-wise, deviation/variation etc in a tabular form in the register to examine progress of work and also timely forecast of likely variations.
  - (a) Any other registers considered necessary by the Railway Engineer, shall also be maintained at site. Sectional DEN/Sr. DEN shall decide type of registers to be maintained at site at the time of commencement of work and approve the miswriting.
  - (b) Depending upon enormity and importance of project, some of above registers may be merged to reduce handling of large number of registers.
  - (c) While processing bills of contractor, a certificate shall be given by Rly's Supervisor that all prescribed registers have been maintained to the standard and records are Up to Date. All the registers duly completed and signed by Contractor's Engineer and Railway Supervisors should be sent to divisional office at the time of passing of first on account bill as well as with the final bill. The certificate shall also mention that

items or materials for which payment is proposed are meeting the specifications and records thereof have been duly maintained and there are no instructions pending for compliance.

- (d) The certificate shall be signed by the Contractor in token of his acceptance of Records of Registers. Sectional ADEN shall test check records and then countersign the certificate and submit the same to Sectional DEN/Sr. DEN along with Measurement Books for passing the bills. Sectional DEN/Sr.DEN should periodically visit the sites and may call for these records, for their scrutiny and comments.
- (e) Hindrance Register should invariably be sent along with the application for extension of time of completion of the work for the competent authority to take a decision.
- (f) All Registers, Proforma charts, etc. will be the property of the Railway.
- (g) All registers should indicate on first page, Name of Work, Name of Agency, CA No., Completion period, Date of commencement, Schedule date of completion, Extended date, if any, Contract value, Revised Contract value, Name of Rly's supervisor, Name of Contractor's Supervisor/Engineer, if any. The registers should be preferably machine numbered. Few pages (3-4) should be left in the beginning for the inspection remarks of higher up officers.
- (h) Registers as mentioned above will be maintained by the Engineer's Representative and shall be seen & signed regularly by the Contractor or his authorised Representative for compliance of instructions recorded the reinforce satisfactory completion of work.
- (i) One hard bound copy of the contract agreement and supplementary agreements, if any shall always be maintained at site for ready reference.
- (j) Copies of Geotechnical reports shall always be maintained at site for ready reference. All level books & survey records shall be duly preserved and maintained.
- (k) Once a month, for all works, colour photographs indicating various stages of execution of work shall be taken and developed by the Contractor at his own cost and same will be submitted to Railway in soft and hard copies and shall be the property of Railways.
- (l) The Contractor for his own purposes, may also maintain accurate records, plans and charts showing the dates and progress of all main operations and the Engineer and his representative shall have access to this information all the times. Records of tests made shall be handed over to the Engineer's representative after carrying out the tests.

## Annexure-I

1. 1<sup>st</sup> page shall be designated for General Information mentioned as under.

मध्यरेल Central Railway		मण्डलरेल(कायय)काकायलय DRM (W)'s office,(Division)..... Location.....
SITE ORDER BOOK		
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:.....	.....	
Railway's 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	Signature of Contractor's Authorised Representative/Engineer	


2. 3-4 pages shall be kept for remarks of higher inspecting officer shaving format as under.

Sr. No.	Date	Inspecting officers Name & Designation	Remarks	Initials

3. Performa for the Site Order Book shall be as under.

Sr. No.	Date	Instruction issued on the inspection of work with Signature & Designation	Contractor/Contractor's representative acknowledgment with Signature Name & Date	Compliance report by contractor's representative with Signature, Name & Date	Final remarks of the Railway Engineer with Signature, Designation & Date


1. 1<sup>st</sup> page shall be designated for General Information mentioned as under.

मध्यरेल Central Railway	मण्डलरेल(कायय)काकायलय DRM (W)'s Office,(Division)..... Location.....
	
HINDRANCE REGISTER	
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:.....	.....
<b><u>Railway's Officials</u></b>	
Senior Section Engineer.....	Contact No.....
Asst. Divisional Engineer.....	Contact No.....
Sr. Divisional Engineer.....	Contact No.....
Divisional Engineer.....	Contact No.....
<b><u>Contractor's Officials:</u></b>	
Contractor's Authorized Representative:.....	Contact No.....
Contract's Engineer.....	Contact No.....
Signature of SSE/Works	Signature of Contractor's Authorized Representative/ Engineer





1. 1<sup>st</sup> page shall be designated for General Information mentioned as under

मध्यरेल Central Railway	मण्डलरेल(कायय)काकायलय DRM (W)'s Office,(Division)..... Location.....
	
<b>DRAWING ISSUE REGISTER</b>	
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:.....	.....
<b><u>Railway's Officials</u></b>	
Senior Section Engineer.....	.Contact No.....
Asst. Divisional Engineer.....	.Contact No.....
Sr. Divisional Engineer.....	..Contact No.....
Divisional Engineer.....	..Contact No.....
<b><u>Contractor's Officials:</u></b>	
Contractor's Authorized Representative:.....	. Contact No.....
Contract's Engineer.....	Contact No.....
Signature of SSE/Works	Signature of Contractor's Authorized Representative/ Engineer


2. 3-4 pages shall be kept blank for remarks of higher inspecting officers having format asunder.

Sr. No.	Date	Inspecting officers Name & Designation	Remarks	Initials

3. Performa for the Drawing-issue Register shall be as under-

Sr. No.	Drwg. No. & Revision No. If Any	Details of Drwg.	Date of issue to the Contractor	Acknowledgement of Contractor/Remarks	Signature of Railway Engineer

1<sup>st</sup> page shall be designated for General Information mentioned as under

<b>मध्यरेल</b> <b>Central Railway</b>		<b>मण्डलरेल(कायय)काकायलय</b> <b>DRM (W)'s</b> <b>Office,(Division).....</b> <b>Location.....</b>
<b>TECHNICAL REGISTER</b>		
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:.....		
<b><u>Railway's Officials</u></b>		
Senior Section Engineer..... .Contact No.....		
Asst. Divisional Engineer..... .Contact No.....		
Sr. Divisional Engineer..... ..Contact No.....		
Divisional Engineer..... ..Contact No.....		
<b><u>Contractor's Officials:</u></b>		
Contractor's Authorized Representative:..... ....Contact No.....		
Contract's Engineer..... ....Contact No.....		
<div style="display: flex; justify-content: space-between;"> <div>Signature of SSE/Works</div> <div>Signature of Contractor's Authorized Representative/Engineer</div> </div>		

2. 3-4 pages shall be kept blank for remarks of higher inspecting officers having format asunder.

Sr. No.	Date	Inspecting officers Name & Designation	Remarks	Initials

3. Performa for the Technical Register shall be as under-

Sr. No.	Date	PARTICULARS (PERTAINING TO WORK-SITE) (SKETCH/DIAGRAMS/NOTE/INSTRUCTION/REF Drawings...Etc)	APPROVALS/COMMENTS/REMARKS OF (ENGINEER INCHARGE)	Contractor's Representative with Signature, Name & Date

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

Annexure-V

मध्यरेल

Central Railway



मण्डलरेल(कायय)काकायलय

DRM (W)'s

Office,(Division)....Location.....

**PILINGREGISTER**

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:.....

**Railway's 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

Signature of Contractor's  
Authorized Representative/ Engineer

2 3-4 pages shall be kept blank for remarks of higher inspecting officers having format as under.

Sr. No.	Date	Inspecting officers Name & Designation	Remarks	Initials


3 Performa for the Piling Register shall be as under-(one page should be assigned for one pile followed by its sketch)

Sr. No.	Pile No.	Date of Boring	Date of Casting	Concrete Grade	Datum level	Depth from Datum	Soketing in Rocks	Level of Pile bottom
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)

Cut off level	Payable Length	Liner top level	Liner bottom level	Payable length of liner	Sign. Of site engineer with date	contractor's representative with Signature, Name & Date
(10)	(11)	(12)	(13)	(14)	(15)	(16)



1. 1<sup>st</sup> page shall be designated for General Information mentioned as under

मध्यरेल	मण्डलरेल(कायय)काकायलय
Central Railway	DRM (W)'s Office,(Division).....Location..
	
CEMENT CONSUMPTION REGISTER	
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:.....	.....
<b><u>Railway's Officials</u></b>	
Senior Section Engineer.....	..Contact No.....
Asst. Divisional Engineer.....	..Contact No.....
Sr. Divisional Engineer.....	..Contact No.....
Divisional Engineer.....	..Contact No.....
<b><u>Contractor's Officials:</u></b>	
Contractor's Authorized Representative:.....	.....Contact No.....
Contract's Engineer.....	.....Contact No.....
Signature of SSE/Works	Signature of Contractor's Authorized Representative/ Engineer

2. On second page following notes to be recorded by SSE/Works **“Original copy of Receipts/ Challan shall be attested By SSE/Works mentioning the Name of Site** where it is to be used”. Photocopy of the same is to be kept on record.
3. 3-4 pages shall be kept blank for remarks of higher inspecting officers having format asunder.

Sr. No.	Date	Inspecting officers Name & Designation	Remarks	Initials

4. Performa for the Cement Consumption Register shall be as under-

Sr. No.	Date of Receipt	Source of receipt	Bill/ Challan No.	Manufactures Test Certificate Reference	Qty. Received (Bags)	Progressive total of Receipts (Bags)	Date of issue	Qty issued (Bags)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)

Qty Returned at the end of the day (Bags)	Net Qty Issued (Bags)	Progressive Total of issue (Bags)	Balance at the end of the day (Bags)	Items of work for Which issued (Bags)	Sign of Rly's Engineer with Date	Sign of contractor's Rep. With Date

मध्यरेल

Central Railway



मण्डलरेल (कायय) काकायलय

DRM (W)'s

Office,(Division).....

Location.....

## REINFORCEMENT REGISTER

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:.....

**Railway's 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 Authorized Representative:..... ....Contact No.....

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

Signature of SSE/Works

Signature of Contractor's  
Authorized Representative/ Engineer

2. On second page following notes to be recorded by SSE/Works “**Original copy of Receipts/Challan shall be attested By SSE/Works mentioning the Name of Site where it is to be used**”. Photocopy of the same is to be kept on record.

3. 3-4 pages shall be kept blank for remarks of higher inspecting officers having format asunder.


Sr. No.	Date	Inspecting officers Name & Designation	Remarks	Initials

4. Performa for the Reinforcement Register shall be asunder-

Sr. No	Date	Location/Member	Description & Diagram of bar Including bar indication	Dia. Of Bar	Spacing
(1)	(2)	(3)	(4)	(5)	(6)

Numbers Provided	Lap length	Total length	Total weight	Reference of Material Passing Register	Sign of Rly's Engineer with Date	Sign of Contractor's Representative. With Date
(7)	(8)	(9)	(10)	(11)	(12)	(13)

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

मध्यरेल	Central Railway		मण्डलरेल(कायय)काकायलय
			<b>DRM (W)'s</b> <b>Office,(Division).....</b> <b>Location.....</b>
STRUCTURAL STEEL REGISTER			
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:.....		.....	
<b><u>Railway's Officials</u></b>			
Senior Section Engineer.....		..Contact No.....	
Asst. Divisional Engineer.....		..Contact No.....	
Sr. Divisional Engineer.....		..Contact No.....	
Divisional Engineer.....		..Contact No.....	
<b><u>Contractor's Officials:</u></b>			
Contractor's Authorized Representative:.....		.....Contact No.....	
Contract's Engineer.....		.....Contact No.....	
Signature of SSE/Works		Signature of Contractor's Authorized Representative/ Engineer	

2. On second page following notes to be recorded by SSE/Works “**Original copy of Receipts/Challan shall be attested by SSE/Works mentioning the Name of Site where it is to be used**”. Photo copy of the same is to be kept on record.
3. 3-4 pages shall be kept blank for remarks of higher inspecting officers having format asunder.


Sr. No.	Date	Inspecting officers Name & Designation	Remarks	Initials

4. Performa for the Structural Steel Register shall be asunder-

Sr. No.	Date of Receipt	Designation of Item	Source of Receipt & Challan No./Bill No.	Quantity Receipt (MT)	Cum. Qty received(MT)
(1)	(2)	(3)	(4)	(5)	(6)

Details of MTC	Details of 3rd Party Test Report	Reference of Material passing Register	Item of work in which Consumed	Sign of Rly's Engineer with Date	Sign of Contractor's Representative. With Date
(7)	(8)	(9)	(10)	(11)	(12)

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

मध्यरेल	मण्डलरेल(कायय)काकायलय
Central Railway	DRM (W)'s Office,(Division).....Location.....
	
MATERIAL PASSING REGISTER	
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:.....	.....
<b><u>Railways Officials</u></b>	
Senior Section Engineer.....	..Contact No.....
Asst. Divisional Engineer.....	..Contact No.....
Sr. Divisional Engineer.....	..Contact No.....
Divisional Engineer.....	..Contact No.....
<b><u>Contractor's Officials:</u></b>	
Contractor's Authorized Representative:.....	.....Contact No.....
Contract's Engineer.....	.....Contact No.....
Signature of SSE/Works	Signature of Contractor's Authorized Representative/ Engineer

2. 3-4 pages shall be kept blank for remarks of higher inspecting officers having format asunder.

Sr. No.	Date	Inspecting officers Name & Designation	Remarks	Initials


3. Performa for the Material Passing Register shall be as under-

Sr. No.	Type of material & Date Of Receipt	Voucher No. & date	Source of receipt	Quantity Received	Name of Brand/Manufacturer
(1)	(2)	(3)	(4)	(5)	(6)

Batch No./ Heat No.	MTC with Date, Folio No. Of File & Result there of	Permissible range of value as per normative IS Code	Test Result from 3rd Party Lab	Approval/Rejection Remarks of ADEN	Sign of Rly's Engineer with Date	Sign of Contractor's Representative e. with Date
(7)	(8)	(9)	(10)	(11)	(12)	(13)



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

मध्यरेल	मण्डल रेल (कायय) काकायलय
Central Railway	DRM (W)'s Office,(Division).....Location.....
	
CONCRETE CUBE REGISTER	
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:.....	.....
<b><u>Railway's Officials</u></b>	
Senior Section Engineer.....	..Contact No.....
Asst. Divisional Engineer.....	..Contact No.....
Sr. Divisional Engineer.....	..Contact No.....
Divisional Engineer.....	..Contact No.....
<b><u>Contractor's Officials:</u></b>	
Contractor's Authorised Representative:.....	.....Contact No.....
Contract's Engineer.....	.....Contact No.....
Signature of SSE/Works	Signature of Contractor's Authorized Representative/ Engineer

2. 3-4 pages shall be kept blank for remarks of higher inspecting officers having format asunder.

Sr. No.	Date	Inspecting officers Name & Designation	Remarks	Initials


3. Performa for the Concrete Cube Register shall be asunder-

Sr.No	Date of Casting	Structural Location	Grade of Concrete ,Qty, & No. of Test required	Cube Identification No.	Weight of Cube	Proposed Date of Testing		7 days Compressive Strength			
						7 Days	28 Days	Load(KN)	Comp. Strength (N/MM <sup>2</sup> )	Accepted Comp. Strength(N/MM <sup>2</sup> ) (Clause 15.4 of IS:456)	Avg. of accepted Comp. Strength (N/MM <sup>2</sup> )
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)

Table to be continued.....

28daysCompressiveStrength				Acceptance of Concrete as per Clause 16 of IS:456	Signature	
Load(KN)	Comp. Strength(N/MM <sup>2</sup> )	Accepted Comp. Strength(N/MM <sup>2</sup> ) (Clause 15.4 of IS:456)	Avg. of accepted Comp. Strength(N/MM <sup>2</sup> )		Contractor's Representative	Railway's Representative
(13)	(14)	(15)	(16)	(17)	(18)	(19)

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

मध्यरेल	मण्डलरेल(कायय)काकायलय
Central Railway	DRM (W)'s
	Office,(Division)...Location.....
DAILY PROGRESS /LABOUR & MACHINERY REGISTER	
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:.....	.....
<b><u>Railways Officials</u></b>	
Senior Section Engineer.....	.Contact No.....
Asst. Divisional Engineer.....	.Contact No.....
Sr. Divisional Engineer.....	..Contact No.....
Divisional Engineer.....	..Contact No.....
<b><u>Contractor's Officials:</u></b>	
Contractor's Authorized Representative:.....	.....Contact No.....
Contract's Engineer.....	.....Contact No.....
Signature of SSE/Works	Signature of Contractor's Authorized Representative/Engineer

2. 3-4 pages shall be kept blank for remarks of higher inspecting officers having format as under.


Sr. No.	Date	Inspecting officers Name & Designation	Remarks	Initials

3. Performa for the Daily Progress/Labour/Machinery Registers shall be as under-

Date	Description of Work Executed	Labour Engaged		Machinery Mobilized
		Skilled	Unskilled	
(1)	(2)	(3)	(4)	(5)

Contractor Supervisor	Contractor Site Engineer	Approximate quantum of Work executed	Status of Registration of Labours in Shramik Kalyan Portal	Sign of Rly's Engineer with Date	Sign of Contractor's Representative. With Date
(6)	(7)	(8)	(9)	(10)	(11)

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

मध्यरेल	मण्डलरेल(कायय)काकायलय
Central Railway	DRM (W)'s Office,(Division).....Location.....
	
<b>RMC REGISTER</b>	
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:.....	.....
<b><u>Railway's Officials</u></b>	
Senior Section Engineer.....	.Contact No.....
Asst. Divisional Engineer.....	.Contact No.....
Sr. Divisional Engineer.....	..Contact No.....
Divisional Engineer.....	..Contact No.....
<b><u>Contractor's Officials:</u></b>	
Contractor's Authorized Representative:.....	.....Contact No.....
Contract's Engineer.....	.....Contact No.....
Signature of SSE/Works	Signature of Contractor's Authorized Representative/ Engineer

2. 3-4 pages shall be kept blank for remarks of higher inspecting officers having format as under.

Sr. No.	Date	Inspecting officers Name & Designation	Remarks	Initials

3. Performa for the Ready Mix Concrete Register shall be as under-

Sr.No.	Date of Concreting	Location/Structural/Member	Estimated Quantity of Concreting	Transit Mixture No. & Qty.	Time of Loading
(1)	(2)	(3)	(4)	(5)	(6)

Time of arrival	Time of discharge Completion	Temperature		Slump		No. Of Cubes/Sample taken	Delivery Challan No. & its File Reference No.
		Ambient	Concrete	Reqd.	Actual		
(7)	(8)	(9)	(10)			(11)	(12)

Batch Report No. & its File Reference No.	Cement Content		Type of Cement and Grade	Sign of Rly's Engineer with Date	Sign of Contractor's Representative. With Date
	As per Approved Mix Design	As per Batch Report of RMC			
(13)	(14)	(15)	(16)	(17)	(18)

**Deployment of Contractor's Technical staff**

1. The Contractor shall place and keep on the works at all the times efficient and adequate competent staff to give the necessary directions to his workmen and to see that they execute their work in sound & proper manner and shall employ only such supervisors, workmen & labourers in or about the execution of any of these works as are careful and skilled in the various trades.

2. The contractor shall employ at least one qualified and competent Graduate Engineer at every worksite when cost of the work to be executed is Rs.2 Cr. or above and at least one Diploma holder Engineer where cost of the work to be executed is more than Rs.25 lakh but less than Rs.2 Cr. For large works numbers of Graduate/Diploma Engineers shall be suitably increased to ensure effective supervision of worksites. The number of engineers to be deployed by the contractor will be decided by Railway's 'Engineer' and conveyed to the contractor in writing. His decision will be final and binding on the contractor. In this contract, the contractor shall deploy following nos. of Qualified staff:

- (a) Graduate Engineers-[ --- \*]nos.
- (b) Diploma holders-[---- \*]nos.

***[\*Numbers to be mentioned by Railway's Engineer]***

3. For non-deployment of Graduate Engineer and Diploma Engineer a penalty of Rs 40,000pm and Rs 25,000pm or part thereof respectively shall be imposed in addition to the action being taken against contractor for non-deployment as per terms & conditions of the contract.

4. The contractor will submit the CV of the Engineers and Supervisors to be deployed at the site to the 'Engineer' who **(Sr.DEN/DEN)** will approve it based on the qualification, experience, past record etc. of the person, prevailing site conditions and the nature of the work to be executed. A certificate will be issued by the Contractor duly signed by him as well as by site Engineer to the effect that the site Engineer shall be deployed on the specific work only and is not deployed on any other site/project. The Contractor shall at once remove from the works any Engineer/supervisor who shall be objected to by the Engineer-in-charge. Fresh approval has to be taken for the contractor's Engineer/Supervisor in case of any change.

5. The name of the approved Engineer/s shall be reflected in the site registers/records

6. In the event of the Engineer being of the opinion that the Contractor is not employing on the works a sufficient number of staff and workmen as is necessary for proper completion of the works within the time prescribed, the Contractor shall forth with on receiving intimation to this effect deploy the additional number of staff and labour as specified by the Engineer within seven days of being so required and failure on the part of the Contractor to comply with such instructions will entitle the Railway to rescind the contract as per General Conditions of Contract.