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Lr. No. RPP-SM-JV/RRW/276 **Date: 12-02-2025**

To,
The Team Leader,
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Project: Major up-gradation of Raipur Railway Station of SECR on Engineering, Procurement and Construction (EPC) mode.

Subject: Submission of Methodology for 1A (Rear Side Station Building).

Ref.: 1. LOA issued vide Lr No: Raipur Division – Gati Shakti / DyCE-GSU-R-T-18-23- 24/00634660101437 dt 20-Apr-24.
2. EPC Contract Agt No: SECR/R/GS/2024/0005 dt

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Methodology for Construction of station buildings (in plot 1A) is attached herewith submitted (15 pages).

This is for kind information and perusal please.

Thanking You and assuring you of best services always.

For RPP - SATHYAMOORTHY (JV)

ABHISHEK GARG

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Abhishek Garg
Project Co-ordinator
(Authorized Signatory)

Encl.: As Mentioned above

Copy to:
1. CPM/GSU/R for kind information please.
2. Dy CE/GSU/R for kind information please
3. Head Office, RPP Infra Projects Ltd, Email- tender.bo@rppipl.com and project@rppipl.com - For information please.

Methodology for Construction of Rear Side Station Building (1A)

1. Based on the levels in the surrounding area and the PF-7 level, FFL for 1A will be proposed and the approval of the same from the Authority will be obtained. Based on such frozen FFL, Architectural drawings. While proposing the FFL, road levels etc will be taken into consideration.

2. Building outer border will be marked on ground. Tentative outer border for foundation excavation also will be marked on ground.

3. Assuming that the outer border of foundation is fully barricaded (considering extra margin of about 2 M for safety purpose), plan for movement of road traffic and movement of passengers during construction of 1A will be made. Within the available space limitations, suitable temporary circulating area also will be proposed.

4. Complete area may not be blocked at once. Depending on the construction sequence, part area will be blocked initially and this will be gradually extended to cover full area.

5. Major facilities that are exissting in 1A area are 2/4 wheeler parking and PRS/UTS building. Temporary UTS/PRS building will be constructed duly getting the plan and location plan approved by AE. After the Temporary UTS/PRS building is made operational, existing PRS building will be demolished. Similarly, temporary parking area will be developed with the approval of AE and existing parking will be shifted to temporary parking area.

6. UG utilities within this area will be identified by cross trenching. And these utilities will be shifted duly getting the shifting plan approved by AE.

7. After barricading the appropriate area and after developing temporary circulating area and temporary road, excavation will start for building construction.

8. Then, excavation will start for building construction.

9. In parallel, designs (structural, MEP etc) will be prepared and approval of Authority will be obtained. And the construction will continue.

10. All layouts will be marked and levels will be controlled by contractor's survey team using TS and the control points established for this purpose.

11. All safety norms such as PPE's, safe working at height, making proper working platforms, etc. shall be followed while executing the work.

12. Excavation will be done by using JCBs and Excavators duly making ramp areas into the excavated areas for easy movement of men and material.

13. Re-bars will be cut and bent as per the approved structural drawings and they will be applied with a coat of Sika Rustop (or any other approved anti corrosive product) before they are placed in position.

14. After obtaining the clearance for the reinforcement tied in position, the ply board shuttering or steel plate shuttering is placed as per dimensions shown in the drawing.

15. The shuttering boards are aligned in horizontal and vertical by using cup lock arrangement, u-jacks, base plates and MS Pipes.

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16. All gap joint in shuttering shall be filled with POP, Foam sheet or Taping.

17. Shuttering oil shall be applied on shuttering before fixing.

18. The Concrete shall be placed in position using chutes and buckets. Depending on the site convenience, concrete pump also will be used.

19. Concrete is laid as per scheme discussed within Site Execution, Quality and Safety Members.

20. The poured concrete is vibrated with concrete vibrator as per site requirements and then finally finished to required level with Trowel/finisher.

21. De-shuttering will be done as per following timelines;

Formwork	Deshuttering Period
Sides Of Column	16 – 24 Hrs.
Sides Of Footings	16 – 24 Hrs.
Sides Of Slab	16 – 24 Hrs.
Slab Supports 1) Spanning Up To 4.5 M 2) Spanning Over 4.5 M	 7 Days 14 Days
Beam Supports 1) Spanning Up To 6 M 2) Spanning Over 6 M	 14 Days 21 Days
Cantilever	21 Days

22. Sequence of concreting and location of stopper shall be decided and clearly marked on drawings available on site.

23. Moisture correction for sand shall be calculated and net quantity of water to be added per bag of cement shall be decided to maintain water cement ratio as per mix design.

24. Availability of necessary raw materials and equipment shall be ensured.

25. Concrete will be batched as per the approved mix design.

26. Appropriate shuttering agent/ shuttering oil should be applied on formwork.

27. Checklist / QA card should be appropriately filled taking into account all the points are maintained properly at site.

28. In case of site produced concrete, concreting shall be preferably done on weight basis. However, if volume batching has to be resorted to, conversion into volume shall be done.

29. Pharma of correct sizes shall be prepared and maintained in proper condition in such cases.

30. Sufficient concrete handling, compaction (vibrators) and curing arrangements with respect to size of the pour, depth of pour, spacing of reinforcement etc. must be ensured before starting concrete if site produced concrete or before ordering concrete from approved supplier.

31. Checking of various activities such as reinforcement, cover blocks, embedded electrical conduits, plumbing lines, inserts etc. shall be done as per drawing.

32. During concrete, concrete slump will be checked for its conformity with design slump. Cubes will be casted during concreting for cube strength checking as per the IS code.

33. Dewatering of area where concreting has to be done, shall be carried out if required. Also area shall be cleaned of any dirt, debris, waste material, binding wires etc.

34. The concrete pipeline of pump shall be checked to ensure whether there is any leakage of slurry, which may affect the pump ability of concrete.

35. During concreting it must be checked whether there is any slurry leakage from the shuttering and corrective measures should be taken immediately because this may affect finishing because of honeycombing and final performance of the concrete and aesthetics.

36. Variation in pipe diameter of pump and amount of bends in the pipeline should be restricted to minimum.

37. The supports/props must be checked during concreting to avoid bulging and potential failure of shuttering because of the weight of wet concrete.

38. Pouring height must be restricted as per the site condition with suitable methods to avoid segregation of concrete.

39. Availability of sufficient equipment and manpower for compaction of concrete must be ensured.

40. Vibrator needle size shall be appropriate as per the spacing of the reinforcement and workability of the concrete. Influence radius should be checked by visual observation.

41. Over vibration of concrete should be avoided, which may lead to deposition of slurry at the top leading to crazing cracks any time during hardening. Over vibration may also lead to bleeding resulting in plastic settlement and subsequent cracks.

42. Footings:

    a) PCC should be done in level as per given size in drawing with Line Dori marking.

    b) Demarcation of foundation should be done with correct orientation of column as per center line plan.

    c) All footings shall rest on PCC of M15/M10 Grade concrete, having minimum thickness of 150mm / 75mm or as per drawing.

    d) Concrete shall be cast in max 300 mm layers and vibrated by 60 mm. vibrating needle.

43. Column and Shear Walls:

    a) Platform erected for labour for concreting shall be independent of column shuttering.

    b) Minimum height of starters shall be 6″ to 9″ and shuttering shall be of fabricated steel / steel channels or plywood. Concrete within shall be suitably vibrated and cured.

c) Formwork for starters of column / shear walls when erected shall be checked using theodolite / line Dori for the correctness of dimensions and orientation (including offsets if any).

d) Thick Mortar slurry of 1:1 cement sand mix shall be poured at base of columns to prevent honeycombing. This mortar slurry shall have water cement ratio 0.05 less than that recommended for concrete mix.

e) Concrete for columns shall be cast and vibrated in layers of 450mm.

f) Column concreting shall be done up to lowest level of beam bottom at the junction.

g) Concrete key shall be made at top surface of column for better bond with next pour/ 20mm metal packing shall be done on top of concrete surface for proper bonding with next pour / chipping of top surface for removal of laitance.

44. Slab and Beams:

a) Concrete from hoist shall be unloaded on GI Sheet or MS tray.

b) Walking platforms shall be provided for easy movement of labor without disturbing the reinforcement.

c) Level marking having height equal to thickness of slab shall be used while slab concreting is in progress.

d) Concreting area for the day shall be well demarcated and concreting shall commence from the farthest end and proceed towards direction of hoist. In case of pumping, proper planning should be done for placing of concrete.

e) Slab top levels shall be checked during and after finishing with levelling instrument for controlling the thickness of slab.

f) Care shall be taken not to over/under vibrate the concrete. While withdrawing vibrator needle no hole shall be visible in concrete.

g) Concrete shall be placed in layers not exceeding 450mm deep in deep beams and placed to the full depth in slab sand small beams. Each layer shall be placed and well compacted before the preceding layer has taken its initial set and in a manner that will entirely prevent any cold joint forming between the layers.

h) If concrete is being placed by pump or crane bucket, concrete should not be poured directly in to the beams.

i) If grade of concrete for slab and columns is different, column portion shall be cast first before slab concreting starts. Care shall be taken to prevent formation of cold joint at junction i.e. portion adjoining columns shall be cast before initial setting starts in columns. Welded wire mesh or equivalent shall be used as stoppers to prevent excess concrete from columns to flow into beams.

j) Construction joint in beams shall be provided as per drawings or in absence of such drawings, where shear force is zero. Cement sand slurry of 1:1 with bonding agent shall be used at construction joints to create better bonding between old and new concrete. At construction joints, new concrete shall be over-vibrated for proper bonding with old. Wooden stoppers with step shall be provided at construction joints in such a way so as to facilitate their easy removal.

k) Slab panels shall be covered with wet Hessian cloth, tarpaulin or plastic sheets immediate after concreting, after initial set occurs, to prevent formation of shrinkage cracks.

45. Protection of Concrete:

a) Newly placed concrete shall be protected from rain, sun and wind by approved means viz: Hessian cloth, plastic sheets etc.

b) Concrete placed below the ground level shall be protected against contamination from falling earth, during placing.

c) The area in and around the actual place of the concreting shall be kept sufficiently dry, by constructing sufficiently watertight forms/ cofferdam around the area to be concreted, to prevent loss of mortar through walls.

d) Continuously dewatering the area throughout the period of concreting and till initial set of concrete occurs with the help of dewatering pumps shall not be resorted to.

46. After removal of shuttering:

a) Honeycombs should not be observed. If observed, the same should be rectified as discussed in subsequent paragraphs.

b) No wooden pieces / debris should be observed embedded in RCC.

c) Offsets should not be present.

d) Deep pockets should not be observed beyond rebar in columns / beams.

47. Curing:

a) Curing is the process of preventing the loss of moisture from the concrete whilst maintaining a satisfactory temperature regime. For all concrete works, curing shall be start immediately after de shuttering and for slab and raft surface immediately after initial setting of concrete by sprinkling or covering with wet hessian cloth.

b) Exposed surfaces of concrete shall be kept continuously in a damp or wet condition by ponding or by covering with a layer of sacking, canvas, hessian or similar materials and kept constantly wet for at least 7 days from the date of placing concrete in case of ordinary Portland Cement and at least 10 days where mineral admixtures or blended cements are used.

c) The period of curing shall not be less than 10 days for concrete exposed to dry and hot weather conditions.

48. Columns:

a) Curing shall be done keeping the concrete surface wet by covering it with moist double Hessian cloth.

b) Curing shall continue for at least 10 days.

49. Slabs:

a) Curing of slabs shall be done as mentioned above.

b) Ponds shall be made within 24 hours of slab casting and till then slab shall be cured

by spraying water.

c) Ponds shall be made at column locations first to cover from all sides and then to cover other portions of slab.

d) Care shall be taken to see to it that ponds are completely filled with water throughout the recommended period for curing.

e) Vertical faces of the beams and area of slab outside ponds shall be cured by covering with wet Hessian cloth.

f) In case where ponding is not done, whole slab should be covered with wet hessian cloth and care should be taken to keep it moist always.

50. Footings:

a) Flat portion of footings shall be cured by covering it with wet double Hessian cloth.

b) For flat portions of Rafts, curing shall be done in a similar way as that for slab and vertical faces shall be cured similar to the columns.

51. Casting and testing of Cubes: For the assessment of compliance of ready-mixed concrete or site mixed concrete, the point and time of sampling shall be at discharge from the producer's delivery vehicle to pump or site or discharge from mixer respectively.

Sampling Frequency:

No	Quantity of Concrete in the Work (m^3)	Number of Samples
1	1-5	1
2	6-15	2
3	16-30	3
4	31-50	4
5	51 and above	4 plus one additional sample for each additional 50 m^3 or part thereof

52. The following steps should be observed for Test Cubes:

a) Check if moulds are cleaned & lightly oiled.

b) In assembling the mould for use, the joints between the sections of mould shall be thinly coated with mould oil and a similar coating of mould oil shall be applied between the contact surfaces of the bottom of the mould and the base plate in order to ensure that no water escapes during the filling.

c) Ensure angle between adjacent internal faces & between internal faces shall be 90°C +0.5°C.

d) Thoroughly remix the sample shoveling into a heap

e) Fill the mould with concrete in 50 mm layers

f) 35 tamps for each of the three layers in 150 mm mould or vibrating table

g) After filling each layer tamp sides with a wooden mallet to expel out any entrapped air

h) The workability of concrete at time of filling cubes should be between 75 -100 mm.+

i) Remove surplus concrete & number the moulds for identification & record details.

j) Cover each mould with damp cloth / Hessian cloth immediately after initial set.

k) Store at a place free from vibration. Protect the cube moulds at all times from high / low temperatures & driving winds.

l) Complete sampling & cube making certificates or records.

m) After de-moulding the cubes shall be immediately submerged in clean, fresh water or saturated lime solution and kept there until taken out just prior to test (Temperature 24°C to 30°C).

n) The specimens shall not be allowed to become dry at any time until they have been tested.

o) The testing machine may be of any reliable type, of sufficient capacity for the tests and capable of applying the load at the rate of 140 kg/cm2/minute. The permissible error shall be not greater than ± 2 % of the maximum load.

p) The bearing surfaces of the testing machine shall be wiped clean and any loose sand or other material removed from the surfaces of the specimen which are to be in contact with the compression platens.

q) The specimen shall be placed in the machine in such a manner that the load shall be applied to opposite sides of the cubes as cast, that is, not to the top and bottom.

r) Average of three values shall be taken as the representative of the batch provided the individual variation is not more than ± 15% of the average.

53. The following information shall be included in the report on each test specimen:

a) Identification mark.

b) Date of test.

c) Age of specimen.

d) Date of casting.

e) Weight of specimen.

f) Density of the specimen.

g) Maximum load.

h) Compressive strength.

54. Safety Precautions: All safety norms such as PPE's, safe working at height, making proper working platforms, etc. shall be followed while executing the work.

55. Rectification/Attention of Honeycombing:

56. Equipment for rectifying Honeycombing:

a. Paint brush, Trowel, Float, Hand chisel, hammer, wire brush, Mortar pan etc.
b. Grouting material (Non shrink grout materials or equivalent.)

57. Causes of Honeycomb:

a) **Improper workability of concrete** – Using stiff concrete which is hard to place.
b) **Additional water cement ratio** than the allowable limit on site for workability – As we discussed earlier, the excess amount of water cement ratio will result in separation of aggregates from the mortar.
c) **The improper vibration of concrete** – Applying excess vibration will lead mortar to leak through the frameworks and leaves the aggregates to settle down.
d) **Placement of concrete from height** – When we pour concrete from a certain height the aggregates and mortar get separated and settle down partly which causes honeycombs in concrete.
e) **Typical Spots** – Places like beam to beam or beam to column joints (as shown in picture) should be taken care while placing concrete. Because lapping of one or more layers of reinforcements makes the concrete hard to penetrate through them.
f) **Presence of Coarse Aggregates** – Using the improper bigger size of aggregates in concrete makes the smaller particles hard to penetrate through them and leaves the concrete voids.
g) Less cover to reinforcement bars.
h) Concrete already set before placing .
i) Form work not watertight/rigid.
j) Improper placement of bars at column and beam junction.
k) Steel congestion not allowing concrete flow to all corner.

58. Controlling Of Honeycomb:

a) Before any concrete pour, sufficient nos. needle vibrators & high frequency needle will be deployed up-to the end of concrete pour.
b) Manual compaction with wooden mallet at the rate of one person per 1.5 meter running length of structural member will be deployed for compaction at the bottom portion of the structural member case of column and walls.

59. Prevention of Honeycomb:

a) Mix shall be cohesive and rectify accordingly,
b) In case of dense reinforcement proper methods like chute, funnel shall be used,
c) Proper placing arrangement to be made for concreting,
d) Concrete fall should be kept minimum,
e) Use a mix with appropriate workability for the situation in which it is to be placed,
f) Ensure the mix has sufficient fines to fill the voids between the coarse aggregate,
g) Ensuring the concrete is fully compacted and placing methods minimize the risk of segregation,
h) Ensure that the formwork is rigid, the joints are watertight and penetrations through the formwork, are properly sealed,
i) At places of junction of columns and beams concrete with strictly 20mm and down aggregates should be used with slightly more water-cement ratio to avoid honeycombs. Taping with wooden hammer the sides of shuttering from outside during concreting and vibrating will help minimizing honeycombs to a great extent in

case of columns and beams. Use of thinner needle say 25mm or less with vibrator at intricate places of concreting will also help in reducing honeycombs to a great extent,

j) Taping with wooden hammer on the sides of shuttering from outside during concreting will aid in minimizing honeycombs to a great extent.

60. Rectification of Honeycomb (in brief):

Surface Preparation:

- Remove all porous, honeycombed and unsound or defective concrete by chipping.
- Keep the surface properly wet before starting the repair.
- Clean the holes to remove chipping dust, and other foreign materials.
- Wash the surface thoroughly after trimming and cleaning.

Procedure for Minor Honeycomb:

- Prepare a dry pack mix of one part of cement and two parts of sand with only enough water to produce a mortar which will stick together on being molded into a ball by slight pressure of the hands.
- Pack the dry pack material in the repairing place, should be placed and packed well compacted.
- Use trowel to finish the repaired surface to improve the appearance & Cure the surface in the usual way.

Procedure for Medium Honeycomb:

- It shall be treated with GP1 / GP 2 “material manufactured by FOSROC Chemicals.
- Mixing above mentioned special mortar for at least 05 minutes with required amount of water (or as per instruction printed on the bag), required to attain dough like consistency so that it can be hand packed.
- This special mortar is to be packed with trowel in the honeycombed concrete. Ramming/poking will be done & finished with trowel to match existing concrete surface.
- Wet curing will be done for at least 7 days on the treated surface.

(Procedure for Major Honeycomb):

- It shall be treated with “POLYALK –EP “material manufactured by Sunanda Chemicals or approved by Engineer In-Charge. (Mix of 1 Kg. of POLYALK EP, ready to use).
- Mixing above mentioned special mortar for at least 03minutes with required amount of water required to attain dough like consistency so that it can be hand packed.
- This special mortar is to be hand packed in the honeycombed concrete. Ramming will be done by wooden mallet & finished with trowel to match existing concrete surface.
- Wet curing will be done for 7 days on the treated surface

MASONRY WORKS

61. There are various types of materials used for masonry works such as bricks, blocks (solid / hollow), cellular light weight concrete blocks, fly ash lime bricks etc. The mortar used for above masonry consisting of cement, sand natural as well as crushed, fly ash, water and admixtures.

62. Bricks shall be either hand moulded or machine moulded, made from suitable soil and shall be free from cracks, flaws and free lime. Bricks may have well defined frog of 10 mm to 20 mm depth and covering about 15% of surface area as per relevant BIS. Bricks shall have smooth rectangular faces with sharp corners and show.

63. Masonry work shall be as per approved construction drawings unless directed otherwise. Cement mortar ratio (Cement: Sand) in masonry work shall be as per secification or approved drawings. Unless otherwise specified, brickwork shall be done in English bond with frog upwards & No continuous vertical joint should be allowed to developed anywhere, except for brick on edge and half brick thick walls. All outer load bearing walls shall be of minimum 230 mm thickness or more as per design/drawing, in cement mortar 1:6, all partition walls shall be 115 mm thick in cement mortar 1:4.

64. Bricks shall normally be soaked 6 hours in water before use and the mortar shall be used before it shows any signs of setting or stiffening.

65. The mixing operation shall be carried out manually or mechanically as per site conditions. Cement and sand shall be mixed dry in required proportions. The required quantity of water shall then be added and the mortar mixed to produce a workable consistency. Only as much quantity of cement mortar as would be sufficient for 30 min of work shall be mixed at a time, the method of mixing is specified as follows-

66. Mechanical Mixing: Cement and sand in specified proportions shall be mixed dry thoroughly in a mixer. Water shall than be added gradually and wet mixing continue for at least three minutes. Only the required quantity of water shall be added which will produce mortar of workable consistency. Only the quantity of mortar, which can be used within 30 minutes of mixing, shall be prepared at a time. Mixer shall be cleaned with water each time before suspending work.

67. Manual Mixing: Measured quantity of sand shall be spread and leveled on clean water – tight platform and cement shall be added on top. Cement and sand shall be thoroughly mixed dry by being turned over and over, backwards and forwards, several times till the mixture is of a uniform color. The quantity of dry mix which can be used within 30 minutes shall then be mixed for at least two minutes with just sufficient quantity of water to bring the mortar to a still paste of necessary working consistency.

68. Walls shall be constructed in regular and level course throughout the entire length. All cross walls buttresses, counter forts and steps shall be constructed in course with the main walls embedded into them. Where such bonding is not possible necessary grooves and tooting shall be left in the brickwork for subsequent bonding.

69. The joints in faces, which are to be plastered or pointed, shall be raked to at least 12 mm, while the mortar is still green.

70. The verticality and horizontality of courses shall be checked with plumb bob and spirit level respectively.

71. Brick work shall not be raised more than 12 single courses or 90 cm per day.

72. Curing shall be done up to 10 days.

73. Pre Masonry Checks:

- Before starting masonry, it should be ensured that all electrical conduiting works should be complete through beams.

- Cleaning of slab surface should be done where masonry work to be carried out and centerline of brick work should be marked on the slab. Dimensional checking should be done for room dimensions and diagonals.
- Soaking of bricks in stack should be done by immersing in water or by sprinkling with water on the previous day of laying.
- Only required nos. of bricks should be carried to the work place to carry out the activity.
- Saw dust / sand bags should be stacked over / around beam and column locations and unloading of bricks at work place should be done over it to avoid damages due to unloading.
- Stacking of bricks should be done near beams and column locations and maximum 100 bricks should be stacked over an area of 1 sq. m.
- Concrete surface should be cleaned of all nails, embedded wooden pieces, etc. using wire brush before layout for masonry.
- Adequate hacking of surface should be done to concrete surface (base slab as well as adjacent column surface). An approved bonding agent (e.g., Hacked plast) may be applied to concrete surface in place of hacking for bonding.
- Line out for masonry work should be done before starting actual laying of masonry. Checks for dimensions and right angle should be done as per drawing. Discrepancies in dimensions shall be adjusted on site in consultation with site engineer to finalize lineout.
- The contractor shall take all measures to ensure the safety of the work and working people. Proper scaffolding shall be provided to allow easy approach to every part of the work. Overhead work shall not be allowed. Making holes of any kind for the purpose of supporting the scaffolding shall not be permitted. The scaffolding shall be sound and strong to withstand all loads likely to come upon it.

74. During Masonry Checks:

- Mortar for masonry should be mixed in desired proportions in M. S trays only. In absence of M. S trays, mortar should be prepared in sunk or by creating a circular bund of bricks / blocks. This should be done to avoid loss of cement slurry while preparing mortar. Batching of sand should be strictly done by pharma's (measuring boxes).
- It is essential that proper water cement ratio is maintained in mix. After mixing, mortar should not show excess bleeding water.
- First layer of brick work should be laid as per layout marked with position of frog upwards and first layer of block work with a mortar of one grade higher. If necessary, first layer of block shall be laid with concrete, so that all the subsequent layers can be laid in full block height and no cutting of blocks is required while laying top course below beams.

- Subsequent layers of bricks should then be laid over first layers, care being taken so that each layer is truly horizontal and joint thickness is not more than 15mm horizontal as well as vertical.

- Use of mortar should be made within 30 minutes of preparation and any mortar which has set should not be mixed with fresh mortar.

- Mortar should be dashed on column surfaces as work progresses for proper adhesion. Gap of 20 mm shall be left between column surface and masonry. Use of trowel for filling gap between column surface and masonry works should be avoided.

- In a day's work, brick/block work should not be constructed more than 1.2m height for 6"/9" walls and 0.9 m height for 4" walls at the most. At the end of the day, joints (horizontal & vertical) should be raked to a depth of 10 mm with the help of raking needle.

- Minimum curing period recommended is 10 days depending on type of cement and climatic conditions.

- Special precaution should be taken at the junction of 9" to 4" wall by properly interlocking bricks and at the junction of brick.

- This imparts additional strength to the brick / block work. Such bands need not be provided for 6" and higher thickness of walls for normal room heights up to 3 m.

- Local lintels should be cast before fixing door frames as per drawing with sufficient bearing on masonry walls. Recommended bearing of lintels on masonry is 6" and anchoring of lintels to columns should be done by drilling holes (minimum 4" deep inside columns).

- Bottom edge of brick / block work should be raked and 15 mm portion away from walls should be filled with lean mortar for expansion of tiles.

- Door frames should be preferably be fixed while masonry is being constructed, to avoid gaps between door frame and masonry surface.

- When door frames are to be fixed after masonry construction, temporary brick pieces should be filled to the entire length of holdfasts and to the height equal to two courses of bricks at the positions of holdfasts during construction of masonry and while fixing door frames.

- It is recommended that for 4" and less partition walls, electrical switch boxes should not be placed back-to-back since while making grooves from both sides for embedded electrical conduiting, the masonry wall gets weakened.

- During masonry work, strong supervision is required for achieving good workmanship and quality work.

75. Post Masonry Checks:

- Date of construction (DOC) should be marked on masonry to monitor curing. Curing shall be carried out by wetting the brick masonry for 7-10 days.

- It is recommended that chases in masonry should be made using round wheel cutter with light chiseling so that masonry works is not damaged. Also chases in masonry lesser than 6" thick should be done after plastering work is complete.

- Depth of chases should be only 5 mm more than diameter of electrical conduits to be embedded. Excessive chasing weakens the masonry. No chasing shall be done in RCC structural member.
- After conduits are put in chases, chases are rendered with non-shrink grout with fibers and chicken mesh is fixed over it.
- In case of any major defects such as major differences in level, plumb of masonry, dismantling shall be carried out as per instructions from QA Department.

PLASTERING WORKS

76. Preparatory Work:

    a) Surface to be plastered shall be thoroughly clean all dust or loose material like all the nails, binding wire, concrete projections, and wooden pieces from concrete surface and brick/block masonry, dust, oily spots, and green algae, if any, shall be cleaned/removed from concrete and brick masonry surface using wire brush.

    b) RCC / PCC coping for all sills and parapet tops shall be completed before commencement of external plaster.

    c) Masonry chiseling for electrical conduits or any other purpose shall be sealed with non-shrink material with chicken mesh fixed over it, well before plastering of the surface.

    d) The Joint shall be raked to depth 12.5 mm minimum.

    e) Care shall be taken not to damage masonry edges while raking. All surfaces to be plastered shall be thoroughly wetted for 24 hours before commencing plaster and shall kept damp during the progress of work.

77. Mortar: The mixing of mortar shall be done in mechanical mixer or manual as per site condition and volume of scope of works.

78. Mechanical Mixng: Cement and sand in the specified proportion shall be mixed dry thoroughly in mixer. Water shall then be added gradually and wet mixing continued for at least three minutes. Only the required quantity of water shall be added which will produce mortar of workable consistency. Only the quantity of mortar which can used within 30 minutes of its mixing shall be prepared at the time.

79. Hand Mixing: The measured quantity of sand levelled on clean water tight platform and cement bags emptied top. The cement and sand heap shall be thoroughly mixed dry by being turned over and over, backward and forward, several times till mixture is of a uniform color. The quantity of dry mix, which can be used within 30 minutes, then be mixed in a masonry trough with just sufficient quantity of water to bring to stiff paste of necessary working consistency.

80. Execution of Plaster works:

a) It is recommended to carry out external plastering before internal plastering to prevent rapid drying and shrinkage of internal plastered surfaces.

b) Minimum gap of 7 days shall be maintained between completion of brick masonry and commencement of internal plaster application.

c) For application of cement sand plaster, thorough wetting of masonry should be done 2 days before commencement of plastering, masonry surface shall leave to attain Saturated Surface Dray (SSD) condition.

d) Bulges from concrete surfaces on external beams shall be chipped of so as to bring entire masonry surface as well as outer surface of members in one line.

e) Curtain cloths or plastic sheets may be provided on external sides to prevent rapid drying and shrinkage cracks of plastered surfaces due to wind or sunlight.

f) Proper scaffolding shall be provided to allow easy approach to every part of work, take all measures to ensure the safety of the work and working people. In case no hole in masonry should be done for supporting for scaffolding.

g) In addition, line dories also stretched horizontally as well as vertically along the sills, soffits and jambs of openings, windows, ventilators, chajjas, and any projections kept for architectural effects.

h) Plumbing pipe holes shall be made in masonry, diameter of hole being 1” more than the pipe diameter all round.

i) Level pads of sizes not less than 2”x 2” shall be made on the wall and if required on celling also serve as finished reference level surface. The distance between level pad shall not exceed 6’ in any direction so that their surface alignment can be checked with help of aluminum straight.

j) Level pad shall also check for vertical alignment with the help of plumb bob, for right angle with help of right angle and for diagonal dimension of room with the help of tape.

k) Chicken mesh /fiber mesh /expanding metal shall be applied in adjoining surfaces i.e., Brick / Block Masonry and concrete.

l) Chicken wire mesh shall be of 20 gauges, with 12mm hexagonal holes and minimum 6” wide in the form of strip, Chicken mesh after stretching shall be fixed at 9” intervals by drilling / punching holes in masonry and concrete and then nailing with metal washers. Minimum overlap for chicken mesh shall be 4”.

m) Surface preparation (a) All the nails, binding wire concrete projection and wooden piece shall be removed from concrete surface and brick masonry. (b) All the dust oil spots and green algae if any shall be cleaned from concrete and brick masonry with the of wire brush.

n) At place of work where sufficient natural day light is not available artificial light shall be made available.

o) All electrical chases shall be properly rendered with non-shrink grout and application of chicken fiber mesh over it and cured properly for 7 days before starting.

p) All conduit drops shall be checked concealed with plaster. All the ceiling points and wall points shall be checked for level and dimension as per drawing or client requirement if any. It shall be ensured that all electrical boxes are protected with plastic sheet packing before plaster.

q) Grooves, if any, shall be of uniform depth and width throughout.

r) Window reveals (external horizontal portion of window sill) shall be given outward slope to drain out the rain water.

s) All external ornamental features shall show equal offsets, line, level, right angles etc.

t) Wherever tiling is to be done at a later stage, roughening of plastered surfaces shall be carried out for better bonding of tiles.

u) Window frames, sills, door frames, electric switch boxes, taps, plumbing fittings, glass etc. shall be cleaned immediately.

v) Date of plastering shall be clearly marked on the plastered surfaces to monitor curing period.

81. Curing: Curing shall be done, so as to keep plastered surfaces continuously wet for a period of 7-10 days depending on type of cement and climatic conditions.