CLIENT DOCUMENT

1. Conditions of Client
2. Conditions for both RMC & DMC
3. Batching Plant & Batching Equipment
4. Calibration & weighing equipment Accuracy
5. List of Equipment for site laboratory
6. Conditions for Cement & Steel
7. Soil Investigation Report
CONDITIONS OF CLIENT

1. The contractor shall execute the whole work in the most substantial and workman like manner in strict accordance with the specifications, approved design, drawings, particular specifications, special conditions, additional conditions and instructions of the Engineer-in-Charge.

2. Before tendering, the contractor shall inspect the site of work and shall fully acquaint himself about the conditions prevailing at site, availability of materials, availability of land and suitable location for construction of godowns, stores and camp, transport facilities, the extent of leads and lifts involved in execution of work.

3. The contractor shall at his own expense and risk arrange land for accommodation of labour, setting up of office, storage of materials, erection of temporary workshops, construction of approach roads to the site of work, including land required for carrying out of all jobs connected with the completion of the work. However, the departmental land to the extent available may be allowed to be used for these purposes free of rent without accepting any responsibility for the delay, if any, on this account. The contractor shall have to abide by the regulations of the authorities concerned and the directions of the Engineer-in-Charge for use of land available at the site of work. If it becomes necessary during construction to remove or shift the stored materials, shed, workshop, access roads, etc, to facilitate execution of the work included in this agreement or any other work by any other agency, the contractor shall remove or shift these facilities as directed by the Engineer-in-Charge and no claim whatsoever shall be entertained on this account.

   It shall be deemed that the contractor has satisfied himself as to the nature and location of the work, transport facilities, availability of land for setting up of camp, etc. The department will bear no responsibility for lack of such knowledge and the consequences thereof.

4. The contractor shall have to make approaches to the site, if so required and keep them in good condition for transportation of labour and materials as well as inspection of works by the Engineer-in-Charge. Nothing extra shall be paid on this account.

5. The contractor shall carry out true and proper setting out of the work in co-ordination with the Engineer-in-Charge or his authorized representatives and shall be responsible for the correctness of the positions, levels, dimensions and alignments of all parts of the structure. If at any time during the progress of the work any error appears or arises in the position, level, dimensions or alignment of any part of the work, the contractor on being asked to do so by the Engineer-in-Charge, shall rectify such error to the entire satisfaction of Engineer-in-charge. The checking by the Engineer-in-Charge or his authorized representatives shall not relieve the contractor of his responsibility for the correctness of any setting out of any line or level. The contractor shall carefully protect and preserve all bench marks, pegs and pillars provided for setting out of works.

6. All setting out activities concerning establishment of bench marks, theodolite stations, centre line pillars, etc. including all material, tools, plants, equipments, theodolite and all other instruments, labour, etc. required for performing all the functions necessary and ancillary thereto at the commencement of the work, during the progress of the work and
till the completion of the work shall be carried out by the contractor and nothing extra shall be paid on this account.

7. The contractor shall at his own cost submit samples of all materials sufficiently in advance and obtain approval of Engineer-in-Charge. The materials to be used in actual execution of the work shall strictly conform to the quality of samples approved by the Engineer-in-Charge and nothing extra shall be paid on this account. The acceptance of any sample or material on inspection shall not be a bar to its subsequent rejection, if found defective.

8. The contractor shall at his cost, make all arrangements and shall provide necessary facilities as the Engineer-in-Charge may require for collecting, preparing, packing, forwarding and transportation of the required number of samples for tests and for analysis at such time and to such places as directed by the Engineer-in-Charge. Nothing extra shall be paid for the above operations including the cost of materials required for tests and analysis. Testing charges, if any, will be borne by the department if the test passes. In case it fails, the same shall be borne by the contractor.

9. The necessary tests shall be conducted in the laboratory approved by the Engineer-in-Charge. The samples for carrying out all or any of the tests shall be collected by the Engineer-in-charge or on his behalf by any other officer of CPWD. The contractor or his authorized representative shall associate himself in collection, preparation, packing and forwarding of such samples for the prescribed tests and analysis. In case the contractor or his authorized representative is not present or does not associate himself in the aforesaid operation the results of such tests and consequences thereon shall be binding on the contractor.

10. Materials used on work without prior inspection and testing (where testing is necessary) and without approval of the Engineer-in-Charge are liable to be considered unauthorized, defective and not acceptable. The Engineer-in-Charge shall have full powers to require the removal of any or all of the materials brought to site by contractor which are not in accordance with the contract specifications or do not conform, in character or quality to the samples approved by the Engineer-in-Charge. In case of default on the part of the contractor in removing rejected materials, the Engineer-in-Charge shall be at liberty to have them removed at the risk and cost of the contractor.

11. The contractor shall make his own arrangement of water required for execution of work and get the water tested at his own cost with regard to its suitability for use in the works and get written approval from the Engineer-in-Charge before he proceeds with the use of same for execution of work.

12. The work shall be carried out in such a manner so as not to interfere or adversely affect or disturb other works being executed by other agencies, if any.

13. Any damage done by the contractor to any existing works or work being executed by other agencies shall be made good by him at his own cost.

14. The work shall be carried out in the manner complying in all respects with the requirement of relevant rules and regulations of the local bodies under the jurisdiction of which the work is to be executed and nothing extra shall be paid on this account.

Signature of Bidder with Seal  Page 3 of 23  EPI
Client Document
15. For completing the work in time, the contractor may have to work in two or more shifts and no claims whatsoever shall be entertained on this account, notwithstanding the fact that the contractor will have to pay to the labourers and other staff engaged directly or indirectly on the work according to the provisions of the labour regulations and the agreement entered upon and/or extra amount for any other reasons.

16. The contractor will have to make his own arrangement for obtaining electricity connection from the State Electricity Board and make necessary payment directly to the department concerned and/or install generators at the site of work, if required and nothing extra whatsoever will be payable on this account.

17. The drawings for the work issued by the Engineer-in-Charge during execution of work shall at all times be properly correlated before executing any work and no claim whatsoever shall be entertained for discrepancies in the drawings.

18. The contractor shall maintain in good condition all work executed till the completion of entire work entrusted to the contractor under this contract.

19. No payment shall be made to the contractor for damage caused by rain, whatsoever during the execution of works and any damage to the work on this account shall have to be made good by the contractor at his own cost.

20. The rates for all items of work, unless clearly specified otherwise, shall include the cost of all labour, materials, de-watering required, if any, and other inputs involved in the execution of the items.

21. Unless otherwise provided in the schedule of quantities, the rates tendered by the contractor shall be all inclusive and shall apply to all heights, depths, leads and lifts, except for additional height in centring and shuttering over a height of 3.5m.

22. No claim whatsoever for idle labour, additional establishments, costs of hire and labour charges for tools and plants etc, would be entertained under any circumstances.

23. For the safety of all labour directly or indirectly employed in the work the contractors shall, in addition to the provision of CPWD safety code and directions of the Engineer-in-Charge, make all arrangements to provide facility as per the provision of Indian Standard Specifications (Codes) listed below & nothing extra shall be paid on this account.

   2. IS 3696 Part II Safety Code for scaffolds and ladders Part II
   3. IS 764 Safety Code for excavation work.
   4. IS 4138 Safety Code for working in compressed air.
   5. IS 7293 Safety Code for working with construction machinery.
   7. IS 4130 Safety code for demolition of buildings.

24. The contractor shall take all precautions to avoid all accidents by exhibiting necessary caution boards and by providing red flags, red lights and barriers. The contractor shall be responsible for any accident at the site of work and consequences thereof.

Signature of Bidder with Seal
25. Royalty if any payable and all other incidental expenditure shall have to be paid by the contractor on all the boulders, metal shingle, earth, sand bajri, etc. collected by him for the execution of the work, direct to the concerned Revenue Authority of the State or Central Govt. and the amount paid shall not be reimbursed in any form whatsoever.

26. Other agencies working at site will also simultaneously execute the works entrusted to them and to facilitate their working, the contractor shall make necessary provisions e.g. holes, openings, etc. for laying/burying pipes, cables, conduits, clamps, hooks, etc. as may be required from time to time. The contractor shall extend full co-operation to other agencies for smooth execution of works by other agencies. The final finishing of the work is to be executed in co-ordination with other agencies as directed by the Engineer-in-Charge.

27. On account of security considerations, there could be some restrictions on the working hours, movement of vehicles for transportation of materials and location of labour camp. The contractor shall be bound to follow all such restrictions and adjust the programme for execution of work accordingly. Nothing extra shall be paid on this account.

28. Stacking of materials and excavated earth shall be done as per the directions of the Engineer-in-Charge. Double handling of materials or excavated earth if required shall have to be done by the contractor at his own cost.

29. In case of construction joints, the cost of applying cement slurry over the concrete surface before fresh concrete is laid as per para 5.4.4.4. of CPWD Specification 2009 is included in the relevant items of the schedule of quantities and nothing extra shall be paid on this account.

30. Unless otherwise specified in the Schedule of Quantities the rates for all items of work shall be considered as inclusive of working in or under water and/or liquid mud and/or foul conditions including pumping or bailing out liquid mud or water accumulated in excavations during the progress of the work from springs, tidal or river seepage, rain, broken water mains or drains and seepage from subsoil aquifier.

31. Water supply pipe lines shall not be embedded in floor. PVC pipe casing of next bigger diameter shall be provided in full width of wall (including finishing) when GI pipe line crosses the wall, to protect it from erosion. The gap between the PVC and GI pipes shall be sealed at the ends with polysulphide or other suitable sealent. Nothing extra shall be paid on this account.

32. Stone slabs for risers and treads of staircases and steps, where specified, shall be of single piece of required width and length. No joint shall be permitted. The holes of required shape and size shall be drilled in the single piece stone slabs of treads for fixing balustrades wherever necessary. Pattern of stone slabs for landings of staircase shall be decided by the Engineer-in-Charge. Nothing extra is payable on this account.

33. Stone slabs used for treads of staircase shall be provided with three machine cut grooves of size 3mm wide x 2mm deep, 25 mm apart near the nosing of the steps. Nothing extra is payable on this account.
34. To protect the flooring and steps of staircases during construction and until the completion of the work, finished/semi-finished surface of flooring shall be covered with a thick layer of plaster of Paris and this layer shall be maintained in good condition till its removal. The removal of the layer of plaster of Paris and cleaning the surface shall be done as and when decided by the Engineer-in-Charge. After the removal of plaster of Paris and cleaning of the surface, damage, if any, shall have to be made good by the contractor. No extra payment shall be made for protection with plaster of Paris, removal of plaster of Paris, cleaning and making good the damages.

35. The steel work in railing includes fish tailing of the section to be embedded in concrete and fixing the same.

36. In RCC work, to avoid displacement of reinforcement bars in any direction and to ensure proper cover, only factory made round / square type cover blocks should be used.

37. Nothing extra will be paid for centering, shuttering, reinforcement and RCC work for sloped slabs and beams, unless otherwise specified in the item.

38. Steel bars shall be stored about 30 to 45 cms above ground and where the storage is for more than 3 months, a coat of cement wash shall be given to the bars. Nothing extra shall be paid towards cost of application of cement wash.

39. Some restrictions may be imposed by the State Government on quarrying of sand, stones etc, from certain areas. For timely completion of work the contractor shall have to bring such materials from other quarries located elsewhere.

40. The contractor shall give five years guarantee in the prescribed proforma for water proofing items specified in the schedule of quantities. In addition to this 10% of the quoted cost of items shall be retained either in cash /fixed deposit or in the form of bank guarantee, which shall be released after the expiry of five years from the date of completion if no defects are found in water proofing or the defects are made good. This amount shall be adjusted against the expenses incurred on making good the defects if the contractor commits breach of guarantee.

41. In case of any difference in the Hindi version and English version in any of the condition of contract, English version shall prevail.

42. It is the responsibility of the contractor to obtain necessary no objection certificate, wherever required for approval of drawings, water supply, sanitary connection, electricity connection, completion certificate, occupation certificate, clearance from fire department etc.from Central Govt./ State Govt./ Development Authority / Municipal Corporation / Zilla Parishad / Local Bodies/ Village Panchayat or any other organization as applicable.

Nothing extra shall be paid to the contractor for obtaining such sanctions / approval / clearance from the above bodies. However, necessary requisition and letters required in this regard shall be given by the Department. The required fees and other statutory deposits as may be prescribed by the above bodies shall be borne by the Department.
43. To facilitate gas connection, holes (if required by the Engineer-in-Charge) including suitable rubber gasket shall be provided in the kitchen platform of RCC slab/granite/other stone slab etc. Nothing extra will be paid on the account and rates quoted for relevant items are inclusive of making such provision.

44. Concrete mixers to be used on the work shall have arrangement for weighing water and controlling water cement ratio.

45. If the actual weight of reinforcement and structural steel to be used in the work differs from standard tables the following procedure shall be followed for arriving at the quantity for payment.

   (a) If the actual weight is more than standard weight only standard weight shall be considered for payment.

   (b) If the actual weight is less than standard weight but within the permissible variation, only actual weight shall be considered for payment.

46. The contractor shall arrange to keep the premises neat and clean. The rubbish/malba and unserviceable materials shall be removed on day to day basis.

47. BAR CHART

   47.1 The contractor shall give scientifically analyzed detailed bar chart for all the activities of the work within 15 days from the date of issue of letter of acceptance of tender. The bar chart shall be prepared covering the physical milestones as envisaged in the tender documents. Nothing extra shall be paid for preparation/ modification of bar chart.

   47.2 While preparing the above detailed bar chart, effort shall be made to take all possible items of work simultaneously.

   47.3 Separate bar chart should be prepared exclusively for procurement of materials. The detailed bar chart should distinctly bifurcate the items of work and of materials required for the execution of that item. Both should not be clubbed together. For example, for internal plumbing work the bar chart should show the procurement of pipe and other fittings with start and finish dates and items of work with start and finish dates separately. Both items should be interlinked preceding and succeeding activity. The bar chart not indicating procurement items separately will not be accepted.

   47.4 Similarly bar chart should be prepared separately for arrangement of labour.

   47.5 The bar chart so finalized and accepted by department should be got reviewed by the department, once in a month regularly. Modified / revised bar chart shall be prepared in the event of not adhering to the targets mentioned in the earlier bar chart. The contractor shall augment additional resources, materials and man power for achieving the targets, so submitted in the revised bar chart.
47.6 In addition to the above bar chart, the contractor shall submit detailed programme of activities using MS projects or equivalent software. He shall furnish the details both in hard copies as well as soft copies. Nothing extra shall be paid on this account.

47.7 In case the above details are not furnished within 15 days as mentioned above, recovery @ Rs. 5000/- per day till its receipt by Engineer-in-Charge shall be effected from the first RA bill.

48. Third party quality assurance
   In case the department decides to engage third party quality assurance system, the same will be engaged by the department and the contractor will render necessary arrangement for the inspection of work similar to clause 16 of agreement.

49. Procurement of centring and shuttering:
   DELETED

50. Sample room and toilet:
   DELETED

51. The contractor shall bring ready mix concrete (RMC) from any reputed manufacturer such as Ultratech, ACC, Lafarge as approved by the engineer-in-charge. The Engineer-in-charge is at liberty to get the concrete mixing plant inspected by a third party expert to make sure that the mixing plant is functioning correctly and calibrations are done properly. Only 43 grade OPC conforming to IS: 8112 from any reputed manufacturer such as Ultratech, ACC, JPRewa, Vikram, Shri Cement, Birla Jute, CCI, India Cement, Zuari shall be used for production of RMC. The mix design with the ingredients of concrete to be used by the manufacturer of RMC shall be obtained from a recognized laboratory approved by the engineer-in-charge. The cost of samples, packaging, transportation, design and testing charges etc. shall be borne by the contractor. For any change in the quality and source of ingredients of a particular concrete, for which mix was designed and approved earlier, the mix has to be redesigned and approval obtained again. The engineer-in-charge shall have the right to reject the concrete if it does not meet the requisite specifications.

52. The word coarse sand in the nomenclature of items shall mean River sand or Sand manufactured by crushing Granite stones and sieved to obtain desired gradation which shall also conform to the CPWD specification 2009 Vol I Clause 3.1.3.3. Nothing extra will be paid or deducted if manufactured sand is used in place of coarse sand. 53

53. The word Fine sand shall mean only River sand conforming to the CPWD specification – 2009.

54. Unless otherwise specified, nothing extra, whatsoever shall be paid for executing the work as per the above SPECIAL CONDITIONS from serial number 1 to 53.
CONDITIONS FOR BOTH RMC AND DMC

1. The cost of packaging, scaling, transportation, loading, unloading, cost of samples and the testing charges for mix design in all cases shall be borne by the contractor.

2. The various ingredients for mix design / laboratory tests shall be sent to the lab / test houses through the Engineer-in-Charge and the samples of such ingredients sent shall be preserved at site till completion of work or change in Design Mix / Read Mix whichever is earlier. The sample shall be taken from the approved materials which are proposed to be used in the work.

3. For each change of source or quality / characteristic properties of the ingredients during the work, from that approved and used in the concrete mix, a fresh mix design shall be got done by the contractor. Revised trial mix test shall be conducted and shall be submitted by the contractor as per the direction of the Engineer-in-Charge.

4. The items of RMC and DMC shall be inclusive of all the ingredients including admixtures if required, labour, machinery T&P etc., (except shuttering which will be measured and paid for separately) required for a ready mix concrete of required strength and workability. The rate quoted by the agency shall be net and nothing extra shall be payable on account of change in quantities of concrete ingredients like cement aggregates and admixtures etc., as per the approved mix design.

5. Sampling and Testing

<table>
<thead>
<tr>
<th>Quantity of concrete delivered (cum)</th>
<th>Number of sample</th>
</tr>
</thead>
<tbody>
<tr>
<td>Less than 15</td>
<td>1</td>
</tr>
<tr>
<td>16 to 30</td>
<td>2</td>
</tr>
<tr>
<td>31 to 50</td>
<td>3</td>
</tr>
<tr>
<td>51 and above</td>
<td>Three plus one sample for each additional 30 cum or part thereof.</td>
</tr>
</tbody>
</table>
Batching Plants and Batching Equipment

Hoppers for weighing cement, mineral admixtures, aggregates and water and chemical admixture shall consist of suitable containers freely suspended from a scale or other suitable load measuring devices and equipped with a suitable discharging mechanism. The method of control of the loading mechanism shall be such that, as the quantity required in the weighing hopper is approached, the material may be added at a controllable rate and shut off precisely within the weighing tolerances specified in Annexure-A. The weighing hoppers for cement, mineral admixtures, aggregate shall be capable of receiving their rated load, without the weighed material coming into contact with the loading mechanism. The weighing hoppers shall be constructed so as to discharge efficiently and prevent the build up of materials. A tare adjustment up to 10 percent of the nominal capacity of the weigh scale shall be provided on the weighing mechanism so that the scale can be adjusted to zero at least once each day. Dust seals shall be provided on cement hoppers between the loading mechanism and the weigh hopper, and shall be fitted so as to prevent the emission of cement dust and not to affect weighing accuracy. The hopper shall be vented to permit escape of air without emission of cement dust.

Vibrators or other attachments, where fitted, shall not affect the accuracy of weighing. There shall be sufficient protection to cement and aggregate weigh hoppers and weighing mechanisms to prevent interference with weighing accuracy by weather conditions or external build-up of materials.

Where chemical admixture dispensers are used, they shall be capable of measurement within the tolerances in Annexure-AA and a calibrated container or weigh scale shall be provided to check the accuracy of measurement at least once a month.

Each control on the batching console and weigh-dial or display shall be clearly labeled with its function and where concerned with the batching of materials, the material type.

When pulverized fuel ash and other mineral admixtures are batched through the cement weigh system, the weighing device and discharge screw or other parts of the transfer system shall be empty when the weighing system has returned to zero reading or completed the batch.

Where a back weigh system is utilized to weigh materials a system shall be in place so as to prevent materials being loaded during the process of weighing.

Fully automatic production systems shall be fitted with control equipment to allow the correct operation of the plant to be monitored during weighing and batching. Automatic control systems on batching plants shall not commence batching until all hoppers have been emptied and / or tared and the scales zeroed unless such systems are designed to take account of build up in their programming.
ANNEXURE – AA

CALIBRATION AND WEIGHING EQUIPMENT ACCURACY

1. The following limits shall apply to all design-mixed concrete plants:

   A) The accuracy, sensitivity and arrangement of the weighing devices shall be such as to enable the materials to be batched within the following tolerances:

   1) Cement, mineral admixtures : Within + 2 percent of the quantity of the constituent being measured

   2) Aggregate, chemical admixtures : With + 3 percent of the quantity and water of the constituent being measured

   B) Analogue scales shall have scale increments not exceeding 5 kg for cement and mineral admixtures, 25 kg for aggregate and 2 kg for water.

   C) Preset controls shall be calibrated in increments not exceeding 5 kg for cement and mineral admixtures, 10 kg for aggregate and 2 kg for water.

     (i) Digital readouts shall have a scale increment not exceeding 2 kg for cement and mineral admixtures, 10 kg for aggregate and 1 kg for water.

     (ii) At the time of installation, or reconditioning, the accuracy of the indicated mass at any point on the scale shall be within 0.25 percent of the full scale reading.

     (iii) At any other time during operation the accuracy shall be within 0.50 percent of the full scale reading.

     (iv) Chemical admixture dispensers shall have scale increments not exceeding:

         | Range of Scale | Scale increment |
         |----------------|-----------------|
         | In kg/l        | in kg/l         |
         | 0.1 – 0.5      | 0.01            |
         | 0.5 – 1.0      | 0.02            |
         | 1.0 – 10.0     | 0.2             |
         | more than 10.0 | 0.4             |

     (v) All weighing and measuring equipment shall be tested and calibrated over its full working range at the following intervals:

         1) Mechanical / knife edge systems : At least once every two months
         2) Electrical /load cell systems : At least once every three months
Adequate and identified facilities shall be provided for the application of the test loads.

a. In the case of batch weighing systems, testing and calibration shall be based on the application test loads to the weigh hoppers.

b. Checks on continuous weigh systems shall be based on comparison of preset quantities with those actually produced.

c. To achieve the required accuracy of calibration, a minimum of 500 kg of stamped weights are required, except that for low capacity scales an acceptable limit on the total mass of calibration weights would be 20 percent of the scale capacity.

d. When calibration of weighing equipment is carried out all personnel involved should be competent and fully trained, the procedures should be fully documented, and special attention should be paid to the health and safety aspects of the procedure.
LIST OF EQUIPMENT FOR SITE LABORATORY

(a) FIELD EQUIPMENT

1. Balances
   (i) 7kg. To 10 kg. capacity, semi-self indicating type – accuracy 10 gm.
   (ii) 500 gm. capacity, semi-self indicating type – accuracy 1 gm.
   (iii) Pan balance – 5 kg. capacity – accuracy 10 gms.

2. Ovens-electrically operated, thermostatically controlled upto 110 degree centigrade – sensitivity 1 degree centigrade.

   (i) I.S. sieves – 450mm internal dia, of sizes 100mm, 80mm, 63mm, 50mm, 40mm, 25mm, 20mm, 12.5mm, 10mm, 6.3mm, 4.75mm, complete with lid and pan.
   (ii) I.S. sieves- 200mm internal dia (brass frame) consisting of 2.36mm, 1.18mm, 600 microns, 425 microns, 300 microns, 212 microns, 150 microns, 90 microns, 75 microns, with lid and pan.

4. Sieve shaker capable of 200 mm and 450mm dia sieves, manually operated with timing switch assembly.

5. Equipment for slump test-Slump cone, steel plate, tamping rod, steel scale, scoop.

6. Dial gauges, 25mm travel- 0.01 mm/division least count-2 nos.

7. 100 tonnes compression testing machine, electrical-cum manually operated.


   (i) 300mm x 250mm x 40mm – 2 nos.
   (ii) Circular plates of 250mm dia – 4 nos.

10. Concrete cube moulds 15x15x15cm – 60 nos.
(b) FIELD TESTING INSTRUMENTS

1. Steel tapes – 3m
2. Vernier calipers
3. Micrometer screw 25 mm gauge
4. A good quality plumb bob
5. Spirit level, minimum 30 cms long with 3 bubbles for horizontal vertical.
6. Wire gauge (circular type) disc
7. Foot rule
8. Long nylon thread
9. Dynamic penetrometer
10. Magnifying glass
11. Screw driver 30 cms long
12. Ball pin hammer, 100 gms
13. Plastic bags for taking samples
14. Moisture meter for timber
CONDITIONS FOR CEMENT AND STEEL

1.0 CEMENT

1.1 The contractor shall procure 43 grade (conforming to IS:8112) ordinary Portland cement as required in the work, from reputed manufacturers of cement having a production capacity of one million tonnes or more per annum such as ACC, Ultratech, J.P. Rewa, Vikram, Shri Cement, Birla Jute and Cement Corporation of India etc., as approved by the Ministry of Industry, Government of India and holding license to use ISI certification mark for their product. The tenderers may also submit a list of names of cement manufacturers which they propose to use in the work. The tender accepting authority reserves right to accept or reject name(s) of cement manufacturer(s) which the tenderer proposes to use in the work. No change in the tendered rates will be accepted if the tender accepting authority does not accept the list of cement manufacturers, given by the tenderer, fully or partially. Supply of cement shall be taken in 50 kg bags bearing manufacturer’s name and ISI marking. Samples of cement arranged by the contractor shall be taken by the Engineer-in-Charge and got tested in accordance with provisions of relevant BIS codes. In case test results indicate that the cement arranged by the contractor does not conform to the relevant BIS codes, the same shall stand rejected and shall be removed from the site by the contractor at his own cost within a week’s time of written order from the Engineer-in-Charge to do so. Every fresh cement batch should be brought to site atleast 30 days before they are to be used/consumed in the work.

1.2 The cement shall be brought at site in bulk supply of approximately 100 tonnes or as decided by the Engineer-in-Charge.

1.3 The cement godown of the capacity to store a minimum of 2 months requirement shall be constructed by the contractor at site of work for which no extra payment shall be made. Double lock provision shall be made to the door of cement godown. The keys of one lock shall remain with Engineer-in-Charge or his authorized representative and keys of the other lock shall remain with the contractor. The contractor shall be responsible for the watch and ward and safety of the cement godown. The contractor shall facilitate the inspection of the cement godown by the Engineer-in-Charge or his authorized representatives.

1.4 The cement shall be got tested by the Engineer-in-Charge and shall be used on the work only after satisfactory test results have been received. The contractor shall supply free of charge the cement required for testing including its transportation cost to testing laboratories. The frequency and details of the tests shall be decided by the Engineer-in-Charge depending on the quantum of supply in each batch. The cost of tests shall be borne by the contractor / Department in the manner indicated below:

(a) By the contractor, if the results show that the cement does not conform to the relevant BIS codes.

(b) By the Department, if the results show that the cement conforms to relevant BIS codes.
1.5 In case the cement consumption is less than theoretical consumption, recovery at rate prescribed in NIT shall be made.

1.6 Cement brought to site and cement remaining unused after completion of work shall not be removed from site without written permission of the Engineer-in-charge.

1.7 Damaged cement shall be removed from the site immediately by the contractor on receipt of a notice in writing from the Engineer-in-charge. If he does not do so within 3 days of receipt of such notice, the Engineer-in-charge shall get it removed at the cost of the contractor.

1.8 The cement bags shall be stacked on proper floors consisting of two layers of dry bricks laid on well consolidated earth at a level of at least one foot above ground. The stacks shall be in rows of 2 and 10 bags high with minimum of 0.6m clear. Bags should be placed horizontally continuous in each line. Actual size / shape of go down shall be as per site requirement and nothing extra shall be paid on this account. The decision of Engineer-in-charge regarding capacity shall be final.

1.9 Cement register for the cement shall be maintained at site. The account of daily receipts and issues of cement shall be maintained in the register in the proforma prescribed and signed daily by contractor or his authorized agent.

2.0 STEEL

2.1 The contractor shall procure TMT bars of Fe500D grade from primary producers such as SAIL, TISCO or RINL as approved by the Ministry of Steel. The TMT bars procured from Primary producers shall conform to manufacturer’s specifications.

In case of non-availability of steel from primary producers the contractor may be permitted by the Engineer-in-charge to use TMT reinforcement bars procured from secondary producers. If reinforcement bars are procured from secondary producers, the grade of the steel shall be Fe 500 D as per IS 1786:2008. The secondary producers must have valid BIS licence to produce HSD bars conforming to IS 1786: 2008. In addition to BIS licence, the secondary producer must have valid licence from either of the firms Tempcore, Thermex, Evcon Turbo & Turbo Quench to produce TMT bars. The TMT bars procured from secondary producers shall conform to the specifications as laid by Tempcore, Thermex, Evcon Turbo & Turbo Quench as the case may be.

The specifications of TMT bars procured either from primary producers or secondary producers, shall meet the provisions of IS 1786: 2008 pertaining to Fe500D grade of steel.

2.2 The contractor shall have to obtain and furnish test certificates to the Engineer-in-charge in respect of all supplies of steel brought by him to the site of work.

2.3 Samples shall also be taken and got tested by the Engineer-in-charge as per the provisions in this regard in relevant BIS codes. In case the test results indicate that the steel arranged by the contractor does not conform to the specifications as defined under para 2.1 above, the same shall stand rejected, and it shall be removed from the
site of work by the contractor at his cost within a week’s time of written orders from the Engineer-in-charge to do so.

2.4 The steel reinforcement bars shall be brought to the site in bulk supply of 100 tonnes or more or as decided by the Engineer-in-Charge.

2.5 The steel reinforcement shall be stored by the contractor at site of work in such a way as to prevent distortion and corrosion, and nothing extra shall be paid on this account. Bars of different sizes and lengths shall be stored separately to facilitate easy counting and checking.

2.6 For checking nominal mass, tensile strength, bend test, re-bend test, etc., specimen of sufficient length shall be cut from each size of the bar at random, and at frequency not less than that specified below:-

<table>
<thead>
<tr>
<th>Size of Bar</th>
<th>For consignment below 100 tonnes</th>
<th>For consignment over 100 tonnes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Under 10mm dia</td>
<td>One sample for each 25 tonnes or part thereof</td>
<td>One sample for each 40 tonnes or part thereof</td>
</tr>
<tr>
<td>10mm to 16mm dia</td>
<td>One sample for each 35 tonnes or part thereof</td>
<td>One sample for each 45 tonnes or part thereof</td>
</tr>
<tr>
<td>Over 16mm dia</td>
<td>One sample for each 45 tonnes or part thereof</td>
<td>One sample for each 50 tonnes or part thereof</td>
</tr>
</tbody>
</table>

2.7 The contractor shall supply free of charge the steel required for testing including its transportation to testing laboratories. The cost of tests shall be borne by the contractor / Department in the manner indicated below:

   a) By the contractor, if the results show that the steel does not conforms to relevant BIS codes.
   b) By the Department, if the results show that the steel conforms to relevant BIS codes.

2.8 In case the consumption is less than theoretical consumption, recovery at the rate prescribed in NIT shall be made.

2.9 The steel brought to site and steel remaining unused shall not be removed from site without the written permission of the Engineer-in-Charge.
REPORT ON SOIL INVESTIGATION FOR THE PROPOSED MEGA HOSTEL BUILDING AT NIT CALICUT

Introduction

The project consultant, C.R. Narayana Rao, Cheaani requested the Head of Civil Engineering Department, National Institute of Technology Calicut to take up the soil investigation for the proposed site of Mega Hostel Building at NIT Calicut. Based on the site inspection, it was decided to do augering work at six locations and conduct SPT at various depths of given borehole locations for determining the safe bearing capacity. It was also decided to do bore work at one location and conduct SPT at various depths up to hard strata. The locations of bore holes are shown in Fig.1.

Soil Profile

The soil profile obtained from given boreholes of 1 to 7 is presented in Figs.2 to 5. The results of Standard Penetration Tests conducted at different depths are also shown in the same figures. In four locations of bore holes (BH Nos. 1, 4, 5 & 6), the soil profile consists of soft lateritic soil and having low SPT resistance at 1.0 m depth of bore hole. However, in other three locations of boreholes (BH Nos. 2, 3, & 7), soil profile consists of hard lateritic soil with boulders and the SPT test was refusal at the depth of 1.0 m in the bore hole.

Recommendations

A study of the soil profile shows that the soil in the proposed building site is not problematic. For a footing of 1.0 m for various depths recommended SBC values to be adopted in the design is given below.

Mega Hostel II

<table>
<thead>
<tr>
<th>Depth (m)</th>
<th>1.0</th>
<th>1.5</th>
<th>2.0</th>
<th>2.5</th>
</tr>
</thead>
<tbody>
<tr>
<td>SBC (kN/m²)</td>
<td>170</td>
<td>170</td>
<td>170</td>
<td>170</td>
</tr>
<tr>
<td>Depth (m)</td>
<td>Soil profile</td>
<td>Soil description</td>
<td>SPT value</td>
<td></td>
</tr>
<tr>
<td>----------</td>
<td>----------------------------</td>
<td>--------------------------</td>
<td>-----------</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Soft Lateritic soil</td>
<td>1.5</td>
<td></td>
</tr>
<tr>
<td>1.5</td>
<td></td>
<td>Latentitic soil with clay</td>
<td>3.0</td>
<td></td>
</tr>
<tr>
<td>3.0</td>
<td></td>
<td>Weathered rock</td>
<td>5.0</td>
<td></td>
</tr>
<tr>
<td>5.0</td>
<td></td>
<td>Hard rock</td>
<td>7.0</td>
<td></td>
</tr>
<tr>
<td>7.0</td>
<td></td>
<td>Hard rock</td>
<td>8.0</td>
<td></td>
</tr>
<tr>
<td>8.0</td>
<td></td>
<td>End of boring</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Fig. 2**
### Borehole 2

<table>
<thead>
<tr>
<th>Depth (m)</th>
<th>Soil profile</th>
<th>Soil description</th>
<th>SPT value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Depth (m)</td>
</tr>
<tr>
<td>1.0</td>
<td></td>
<td>Laterite soil with boulders</td>
<td>1.0</td>
</tr>
<tr>
<td>1.5</td>
<td></td>
<td>Laterite soil with boulders</td>
<td>1.5</td>
</tr>
<tr>
<td></td>
<td></td>
<td>End of auguring</td>
<td></td>
</tr>
</tbody>
</table>

### Borehole 3

<table>
<thead>
<tr>
<th>Depth (m)</th>
<th>Soil profile</th>
<th>Soil description</th>
<th>SPT value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Depth (m)</td>
</tr>
<tr>
<td>1.0</td>
<td></td>
<td>Laterite soil with boulders</td>
<td>1.0</td>
</tr>
<tr>
<td>1.5</td>
<td></td>
<td>Laterite soil with boulders</td>
<td>1.5</td>
</tr>
<tr>
<td></td>
<td></td>
<td>End of auguring</td>
<td></td>
</tr>
</tbody>
</table>

Fig. 3
### Borehole 4

<table>
<thead>
<tr>
<th>Depth (m)</th>
<th>Soil profile</th>
<th>Soil description</th>
<th>SPT value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Depth (m)</td>
</tr>
<tr>
<td>1.0</td>
<td></td>
<td>Laterite soil</td>
<td>1.0</td>
</tr>
<tr>
<td>2.0</td>
<td></td>
<td>Laterite soil with clay</td>
<td>2.0</td>
</tr>
<tr>
<td>3.0</td>
<td></td>
<td>Laterite soil with clay</td>
<td>3.0</td>
</tr>
<tr>
<td>4.0</td>
<td></td>
<td>Weathered rock with laterite soil</td>
<td>4.0</td>
</tr>
<tr>
<td>4.75</td>
<td></td>
<td>Hard rock</td>
<td>4.75</td>
</tr>
<tr>
<td></td>
<td></td>
<td>End of auguring</td>
<td></td>
</tr>
</tbody>
</table>

### Borehole 5

<table>
<thead>
<tr>
<th>Depth (m)</th>
<th>Soil profile</th>
<th>Soil description</th>
<th>SPT value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Depth (m)</td>
</tr>
<tr>
<td>1.0</td>
<td></td>
<td>Soft Laterite soil</td>
<td>1.0</td>
</tr>
<tr>
<td>2.0</td>
<td></td>
<td>Laterite soil</td>
<td>2.0</td>
</tr>
<tr>
<td></td>
<td></td>
<td>End of auguring</td>
<td></td>
</tr>
</tbody>
</table>

Fig. 4
**Borehole 6**

<table>
<thead>
<tr>
<th>Depth (m)</th>
<th>Soil profile</th>
<th>Soil description</th>
<th>SPT value</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.0</td>
<td></td>
<td>Laterite soil with gravel</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Laterite soil</td>
<td></td>
</tr>
<tr>
<td>2.0</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.5</td>
<td></td>
<td>End of auguring</td>
<td></td>
</tr>
<tr>
<td>Depth (m)</td>
<td>N</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.0</td>
<td>17</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.0</td>
<td>52</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Borehole 7**

<table>
<thead>
<tr>
<th>Depth (m)</th>
<th>Soil profile</th>
<th>Soil description</th>
<th>SPT value</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.0</td>
<td></td>
<td>Hard Laterite soil</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>End of auguring</td>
<td></td>
</tr>
<tr>
<td>Depth (m)</td>
<td>N</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.0</td>
<td>R</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Fig. 5*