

**RESERVE BANK OF INDIA
PROJECT MANAGEMENT CELL (EZ)
KOLKATA**

PROPOSED

TENDER FOR STRUCTURAL REHABILITATION WORKS

AT

8th Council House Street Office building

Name of Tenderer _____

Address _____

Due Date of Submission

30.9.2005

Tender for
FOR
PROPOSED
TENDER FOR STRUCTURAL REHABILITATION WORKS
AT
8th Council House Street Office building

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Tender Forwarding Letter

To,
Shri H.N. Prasad
Regional Director
Project Management Cell (EZ)
Reserve Bank of India
Kolkata 700001

Place :
Date :

Dear Sir,

TENDER FOR STRUCTURAL REHABILITATION WORKS **at 8th C H Street Office building, Kolkata-1**

The Reserve Bank of India, hereby, invites you to tender for the above work.

The tender forms can be had from Project Management Cell (EZ) , 4th floor Reserve Bank of India, 15 N S Road, Kolkata –700 001 on payment of Rs. 500/- up to 27.9.2005, during normal working hours. Your tender duly filled in, signed and sealed, should be addressed to **Shri H N Prasad, Regional Director**, Reserve Bank of India, 15 N S Road, Kolkata 700 001 by name as so to reach him not later than 2 P.M. on 30.9.2005.

3. The Bank discourages the stipulation of any additional conditions by the tenderer. However, in case the tenderer wishes to include any condition/clarification/covering letter while tendering for the work, he will have to submit the same in duplicate along with Part I of tender in a separate sealed cover. The part II of tender in duplicate duly filled in as such without any enclosure shall have to be submitted in another sealed cover clearly indicating thereon as to which cover contains the Part I and which contains Part II of tender. The cover containing the forwarding letters/Demand Draft (EMD)/clarification/condition called Part-I will be opened on 30.9.2005 at 3:00 PM on the schedule date of opening of the tenders in the presence of tenderers or their authorized representatives who shall be in a position to clarify all the conditions stipulated by the tenderers. The clarifications/conditions etc. if any will be examined and after discussions with all the tenderers, the conditions that are acceptable to the Bank will be intimated to the tenderers. The tenderer shall withdraw all his conditions, which are not acceptable to the Bank and can in lieu quote a percentage above or below or at par with their tendered amounts already submitted in a separate sealed cover, called as part-II of the tender. The quoting of such a percentage above or below or at par with their tendered amount shall have a definite bearing on the condition/s the tenderers have to withdraw or additional benefit liable to be received as per conditions accepted by the Bank. The above letter containing should be submitted in duplicate in a sealed cover on or before a date fixed subsequently and advised to the tenderers. This letter together with the second sealed cover containing the tender called Part-II will be opened in presence of the representatives of contractors/firms on the due date advised.

4. Please note that this letter will form part of the contract document and that the contents of this letter shall be supplemental to the conditions in the tender and not in derogation thereof except to the extent specifically provided herein.

5. Bank reserves the right to accept or reject any or all the tenders, either in whole or in part, without assigning any reasons for doing so.

Yours faithfully

p. Regional Director, West Bengal & Sikkim

Form of Tender

**Shri H.N. Prasad
Regional Director
Project Management Cell (EZ)
Reserve Bank of India
Kolkata 700001**

Place :
Date :

Dear Sir,

Having examined the drawings, specifications, designs and schedule of quantities relating to the works specified in the memorandum hereinafter set out and having examined the site of the works specified in the said memorandum and having acquired the requisite information relating thereto as affecting the tender, I/W hereby offer to execute the works specified in the said memorandum within the time specified in the said memorandum at the rates mentioned in the attached schedule of quantities and in accordance in all respects with the specifications, designs, drawings and instructions in writing referred to in Conditions of Tender, the Articles of Agreement, Special Conditions, Schedule of Quantities and Conditions of Contract and with such materials as are provided for, by and in all other respects in accordance with such conditions so far as they may be applicable.

Memorandum

(a)	Description of work	Tender for structural rehabilitation works at 8 th C H Street Office Building, Kolkata
(b)	Estimated cost (Rs.)	14.00 Lakhs
(c)	Earnest Money (Rs.)	28000/-
(d)	Percentage, if any, to be deducted from bill	5%
(e)	Time allowed for completion of the works from tenth day after the date of written order to commence work	6 months

2. Should this tender be accepted, I/We hereby agree to abide by and fulfill the terms and provisions of the said Conditions of Contract annexed hereto so far as they may be applicable or in default thereof to forfeit and pay to the Reserve Bank of India the amount mentioned in the said conditions.
3. I/We have deposited a sum of Rs. 28000/- as Earnest Money with the Reserve Bank of India, which amount is not to bear any interest. Should I/We fail to execute the contract when called upon to do so, I/We do hereby agree that this sum shall be forfeited by me/us to the Reserve Bank of India.
4. The lists showing the particulars of large works carried out and the names of manufacturers of specialized items as required under clauses 17 and 25 of the Special Conditions are enclosed.

5. Turnover of the firm for the last 3 years (year wise) is as under:

Year	Turnover
2000 – 2001	
2001 – 2002	
2002 - 2003	
2003 - 2004	

6. The particulars of our clients for which we have carried out works as per the eligibility criteria for the tenderers are as under:

(Note: Please attach separate sheets for each client)

	Client 1	Client 2	Client 3
Name of the Client and its complete Postal Address:			
Name and Job-title of the Contact Person (under whom the work(s) have been carried out) along with his/her Telephone No(s)., Fax No(s)., etc.			
Project name, location and address			
Name(s) and the Value(s) of the work(s) awarded.			
Date(s) of award and the scheduled date(s) of completion of the work(s)			
Value(s) of the work(s) executed / completed satisfactorily along with date(s) of virtual completion of the work(s)			
Time allowed for completion and actual time taken. Reasons for the delay, if any, and whether any penalty was imposed on the firm?			
Whether supervision was done departmentally by the technical employees of the client or by the Project Management Consultants / Architects appointed by them?			
Whether any kind of litigation / Arbitration was resorted to for finalising the payments / considerations?			
Any other information about your client which you consider will be useful for us.			

7. Technical set up of our firm is as under:

Strength of qualified/ skilled persons	
No. of persons qualified for project management techniques viz. PERT, CPM and re-scheduling the activities etc. for timely completion of the project.	
No. of qualified graduate Engineers having experience not less than 5 years to supervise the manufacturing of furniture at works.	
No. of managerial staff as graduates and each having experience not less than 10 years of resource planning, material management etc at works.	
No. of qualified engineering graduate/ diploma holders each having experience not less than 5 years expected to supervise the work at site for timely completion of work..	
No. of skilled workmen and semi-skilled helpers expected to assemble the furniture at site for timely completion of work.	
No. of un-skilled labourers expected to handle the materials at site for timely completion of work.	

8. Our bankers are (full address)

(i)	
(ii)	

The names of partners of our firm are :

(i)	
(ii)	

Name of the partner of the firm authorized to sign

OR

Name of person having power of Attorney to

sign the Contract (certified true copy of the Power of Attorney should be attached)

Yours faithfully,

Signature of Contractor

Signatures and addresses of witnesses

	Signature	Address
(i)		
(ii)		

Articles of Agreement

ARTICLES OF AGREEMENT made on the _____ day of _____ between the Reserve Bank of India, having its Central Office at Mumbai 400001 (hereinafter called "the Employer") of the one part and M/s. _____ (hereinafter called "the Contractor") of the other part.

WHEREAS the Employer is desirous of carrying out Structural rehabilitation works at 8th council house street office building and has caused drawings and specifications describing the works to be done to be prepared by Project Management Cell (EZ) , RBI Kolkata its Architects.

AND WHEREAS the said Drawings numbered 1 to 2 inclusive, the Specifications and the Schedule of Quantities have been signed by or on behalf of the parties hereto.

AND WHEREAS the Contractor has agreed to execute upon and subject to the Conditions set forth herein and to the Conditions set forth in the Special Conditions and in the Schedule of Quantities and Conditions of Contract (all of which are collectively hereinafter referred to as "the said Conditions") the works shown upon the said Drawings and/or described in the said Specification and included in the Schedule of Quantities at the Respective rate therein set forth amounting to the sum as therein arrived at or such other sum as shall become payable there under (hereinafter referred to as "the said Contract Amount").

NOW IT IS HEREBY AGREED AS FOLLOWS

1. In considerations of the said Contract Amount to be paid at the times and in the manner set forth in the said Conditions, the Contractors shall upon and subject to the said Conditions execute and complete the work shown upon the said Drawings and described in the said Specifications and the Schedule of Quantities.
2. The Employer shall pay the Contractor the said Contract Amount or such other sum as shall become payable, at the times and in the manner specified in the said Conditions.
3. The term "Architect" in the said Conditions shall mean Project Management Cell (EZ) , RBI Kolkata for the purpose of architectural planning and designing etc. of the buildings/structures to be constructed under this contract. In the event of their ceasing to be Architects for the work mentioned in this contract for whatever reason such other person or persons as shall be nominated by the Employer for that purpose will function as "Architects".
- 3(a) The Reserve Bank of India will administer and directly arrange for supervision of works, certification of bills, making payments and implementation of various terms, conditions and stipulations of the contract (except for the scope of work as defined under clause 3 above). For this purpose the term "Architect" in the said conditions regarding execution of work, quality of construction, quality of materials, progress and completion of the project etc. shall mean the Superintending Engineer or any other person designated for the purpose by the Reserve Bank of India. As far as the operation of the provision under clause 34 of the contract viz. clause relating to settlement of disputes through arbitration, the term "Architect" shall be read as Principal Chief Engineer/ Officer-in-Charge of Premises Department, Reserve Bank of India, Central Office, Mumbai.

4. The said conditions and Appendix thereto shall be read and construed as forming part of this agreement, and the parties hereto shall respectively abide by, submit themselves to the said Conditions and perform the agreements on their part respectively in the said Conditions contained.
5. The term "Structural Consultant" refers to Prof. S Saraswati, Department of Construction Engg, Jadavpur University or in the event of their ceasing to be the Consultants for this project, such other person or persons as may be appointed by the Architect with the approval of the Employer.
6. The plans, agreement and documents mentioned herein shall form the basis of this Contract.
7. This Contract is neither a fixed Lump Sum Contract nor a Piece Work Contract but a Contract to carry out the work in respect of the entire Structural rehabilitation works at 8th council house street office building to be paid for according to actual measured quantities at the rate contained in the Schedule of rates and Probable Quantities or as provided in the said Conditions.
8. The Contractor shall afford every reasonable facility for the carrying out of all works relating to civil works, installation of sanitary work and fittings, permanent water supply, electrical installations, fittings, lifts, telephone, air conditioning and other ancillary works in the manner laid down in the said conditions and shall make good any damages done to walls, floors etc. after the completion of such works.
9. The Employer reserves to itself the right of altering the Drawings and nature of the work by adding to or omitting any items of work or having portions of the same carried out without prejudice to this contract.
10. Time shall be considered as the essence of this Contract and the Contractor hereby agrees to commence the work soon after the site is handed over to him or from tenth day after the date of issue of formal work order as provided for in the said Conditions whichever is later and to complete the entire work within 6 months subject nevertheless to the provisions for extension of time.
11. All payments by the Employer under this Contract will be made only at Kolkata
12. All disputes arising out of or in any way connected with this agreement shall be deemed to have arisen at Kolkata and only Courts in Kolkata shall have jurisdiction to determine the same.
13. That the several parts of this Contract have been read by the Contractor and fully understood by the Contractor. The Contractor shall not be entitled for the payment for the quantities beyond the tendered quantities unless ordered for by specific written instructions from the Bank's Senior Engineer.

IN WITNESS WHEREOF the Employer and the Contractor have set their respective hands to these presents and two duplicates hereof the day and year first hereinabove written.

IN WITNESS WHEREOF the Employer has set its hands to these presents through its duly authorized official and the Contractor has caused its common seal to be affixed hereunto and the said duplicate/ has caused these presents and the said two duplicate hereof to be executed on its behalf, the day and year first hereinabove written.

If the contractor is a partnership or an individual.

If the contractor is a company.

Signature Clause

SIGNED AND DELIVERED by the Reserve bank of India by the hand of Shri

(Name and designation)

In the presence of

(1)

Address

(2)

Address

Witness

SIGNED AND DELIVERED by

In the presence of

(1)

Address

(2)

Address

Witness

THE COMMON SEAL OF

Was hereunto affixed pursuant to the resolutions passed by its Board of Directors at the meeting held on _____ in the presence of

(1)

(2)

Directors who have signed these presents in token thereof in the presence of

(1)

(2)

SIGNED AND DELIVERED BY the Contractor by the hand of Shri _____ and duly constituted attorney.

If the party is partnership firm or an individual should be signed by all or on behalf of all the partners.

If the Contractor signs under its common seal, the signature clause should tally with the sealing clause in the Articles of Association.

If the Contractor is signing by hand of power of Attorney, whether a company or individual.

General Instructions to Contractors and Special Conditions

1. Sealed tenders in two parts should be addressed to Shri H N Prasad, Regional Director, Project Management Cell (EZ) , 4th floor, Reserve Bank of India , 15 N S road, Kolkata (by name) and super scribed “**Tender for Structural rehabilitation works at 8th council house street office building**” and sent so as to reach him not later than 2 pm on 30.9.2005. .
2. No tender will be received after 2 pm on 30.9.2005 under any circumstances whatsoever.
- 3a The Part I of tenders will be opened at 3 pm on 30.9.2005 at his office by Shri H N Prasad, Regional Director, Project Management Cell (EZ) , 4th floor, Reserve Bank of India , Kolkata

The Bank discourages the stipulation of any additional conditions by the tenderer. However in case the tenderer wishes to include any condition/clarification/covering letter while tendering for the work, he will have to submit the same in duplicate along with Part I of tender in a separate sealed cover. The part II of tender in duplicate duly filled in as such without any enclosure shall have to be submitted in another sealed cover clearly indicating thereon as to which cover contains the Part I and which contains Part II of tender. The cover containing the forwarding letters/Demand Draft (EMD)/clarification/condition called Part-I will be opened on 30.9.2005 at 3:00 PM on the schedule date of opening of the tenders in the presence of tenderers or their authorized representatives who shall be in a position to clarify all the conditions stipulated by the tenderers. The clarifications/conditions etc. if any will be examined and after discussions with all the tenderers, the conditions that are acceptable to the Bank will be intimated to the tenderers. The tenderer shall withdraw all his conditions, which are not acceptable to the Bank and can in lieu quote a percentage above or below or at par with their tendered amounts already submitted in a separate sealed cover, called as part-II of the tender. The quoting of such a percentage above or below or at par with their tendered amount shall have a definite bearing on the condition/s the tenderers have to withdraw or additional benefit liable to be received as per conditions accepted by the Bank. The above letter containing should be submitted in duplicate in a sealed cover on or before a date fixed subsequently and advised to the tenderers. This letter together with the second sealed cover containing the tender called Part-II

will be opened in presence of the representatives of contractors/firms on the due date advised.

- 3b Tenders shall remain open to acceptance by the Bank for a period of three months from the date of opening the Part II of the tender which period may be extended by mutual agreement and the tenderer shall not cancel or withdraw the tender during this period.
- 3c The tenderer must use only the forms issued by the Bank to fill in the rates.
- 4a The tender form must be filled in Hindi/English and all entries must be made by hand and written in ink. If any of the documents is missing or unsigned, the tender may be considered invalid by the Bank at its discretion.
- 4b Rates should be quoted both in figures and words in columns specified. All erasures and alterations made while filling the tender must be attested by initials of the tenderer. Overwriting of figures is not permitted and failure to comply with either of these conditions will render the tender void at the Bank's option. No advise of any change in rate or conditions after the opening of the tender will be entertained.
- 4c Each of the tender documents should be signed by the person or persons submitting the tender in token of his/their acquainted himself/themselves with the General Conditions of Contract, Specifications, Special Conditions, etc. as laid down. Any tender with any of the documents not signed will be rejected.
- 4d The tender submitted on behalf of a firm shall be signed by all the partners of the firm or by a partner who has the necessary authority on behalf of the firm to enter into the proposed contract. Otherwise the tender may be rejected by the Bank.
- 5. The Reserve Bank of India does not bind itself to accept, the lowest or any tender and reserve to itself the right to accept or reject any or all the tenders, either in whole or in part, without assigning any reasons for doing so.
- 6a Intending tenderers shall pay as Earnest Money Deposit a sum of **Rs. 28000/-** by a demand draft issued by a Scheduled Bank in favour of **Reserve Bank of India, Kolkata**. Demand draft may be directly attached to the tender. A tender, which is not accompanied by such demand draft as earnest money, will not be considered. The Earnest Money will be refunded to the tenderer if his tender is not accepted but without any interest.
- 6b Under no circumstances Earnest Money Deposit will be accepted in the form of fixed deposit receipt of Bank or Insurance Guarantee or cheque.

7. The Earnest Money Deposit of Rs. 28000/- paid by the successful tenderer when he submitted his tender shall be held by the Reserve Bank of India as security for the execution and due fulfillment of the contract. No interest shall be paid on the said deposit.
8. On receipt of intimation from the Employer of the acceptance of his/their tender, the successful tenderer shall be bound to implement the contract and within fourteen days thereof the successful tenderer shall sign an agreement in accordance with the draft agreement and the Schedule of Conditions but the written acceptance by the Reserve Bank of India of a tender will constitute a binding contract between the Reserve Bank of India and the person so tendering, whether such formal agreement is or is not subsequently executed.
- 9a In addition to the Earnest Money Deposit under Clause 7 and as further security for the due fulfillment of the contract by the Contractor 5% of the value of the work done will be deducted by the Employer from each payment to be made to the Contractors towards Retention Money until the Retention Money and Earnest Money Deposit together amounts to Rs. 70000/-. This total amount will be termed as Security Deposit. On the Architects' issuing a certificate of the completion of the works, the contractor would be paid 50% of the security deposit and the remaining 50% will be released by the Employer after rectification of the defects pointed out during the Defects Liability Period. The amounts retained by the Employer shall not bear any interest.
- 9b In case if the Contractors so request, the later 50% of the Security Deposit will be held in the form of a Bank Guarantee of an approved Scheduled Bank in the proforma to be got approved by the Employer until all the defects pointed out during the Defects Liability Period of 12 months are rectified to the satisfaction of the Architect, the amount to be held by the Bank by way of Bank Guarantee will be released after the issue of Virtual Completion Certificate. However, should the contracts dire the 50% of the Security Deposit held in cash by the Bank may be put in the fixed deposit account in the name of Reserve Bank of India for specified period (decided by the Bank) with any of the nationalised banks with the benefit of interest accrued thereon going to the contractor's account.

Security Deposit held in cash by the Bank may be put into Fixed Deposit Account in the name of Reserve Bank of India for specified period (decided by the Bank) with any of the Nationalised Banks with the benefit of the interest accrued thereon going to the contractor's account.

- 9c All compensation or other sums of money payable by the Contractor to the Employer under the terms of this Contract may be deducted from the security deposit if the amount so permits and the Contractor shall, unless such deposit has become otherwise payable, within ten days after such deduction make good in cash the amount so deducted.
10. The Contractor shall not assign the Contract. He shall not sublet any portion of the Contract except with the written consent of the Employer. In case of breach of these conditions, the Employer may cause the Principal Chief Engineer of the Bank to serve a notice in writing on the Contractor rescinding the Contract whereupon the security deposit shall stand forfeited to the Employer.
- 10a In partial modification to Clause No.10 above, the sanitary and plumbing installation work if any , however, shall have to be got executed only through a specialized firm possessing necessary license from the local Municipal Authorities/ other local Statutory Authorities like Director of Fire Services, Water Board etc. and for this purpose the tenderers shall furnish along with their tender, a short list of firms for organising sanitary and plumbing installations in the works executed and through one of such firms in the list as approved by the Bank.
11. The Contractor shall carry out all the work strictly in accordance with drawings, details and instructions of the Architect and the Structural Consultant. If in the opinion of the Architect or the Structural Consultant changed have to be made in the design and with the prior approval in writing of the Employer they desire the Contractor to carry out the same, the Contractor shall carry out the same without any extra charge. The Architect's decision in such cases shall be final and shall not be open to arbitration.
12. A Schedule of Probable Quantities in respect of each work and Specification accompany these Special Conditions. The Schedule of Probable Quantities is liable to alteration by omissions, deductions or additions at the discretion of the Architect. Each tender should contain not only the rates but also the value of each item of work entered in a separate column and all the items should be totaled in order to show the aggregate value of the entire tender.
13. The tenderer must obtain for himself on his own responsibility and at his own expenses all the information which may be necessary for the purpose of making a tender and for entering into a contract and must examine the drawings and must inspect the site of the work and acquaint himself with all local conditions, means of access to the work, nature of the work and all matters appertaining thereto.

14. The rates quoted in the tender shall include all charges for clearing of site before commencement as well as after completion, water, electric consumption, meters, double scaffolding, centering, boxing, staging, planking, timbering and pumping out water including bailing, fencing, hoarding, plant and equipment, storage sheds, watching and lighting by night as well as day including Sundays and holidays, temporary plumbing and electric supply, protection of the public and safety of adjacent roads, streets, cellars, vaults, ovens, pavements, walls, houses, buildings and all other erections, matters or things and the Contractor shall take down and remove any or all such centering, scaffolding, staging, planking, timbering, strutting, shoring etc. as occasion shall require or when ordered so to do and fully reinstate and make good all matters and things disturbed during the execution of work and to the satisfaction of the Architects. The rates quoted shall be deemed to be for the finished work to be measured at site. The rates shall also be firm and shall not be subject to exchange variations, labour conditions, fluctuations in railway freights or any conditions whatsoever. Tenderers must include in their rates sales tax, excise duty, octroi, sales tax on works contract and any other tax and duty or other levy levied by the Central Government or any State Government or local authority, if applicable. No claim in respect of sale tax, excise duty, octroi and other tax, duty or levy whether existing or future shall be entertained by the Employer.
15. **The Contractor should note that unless otherwise stated, the tender is strictly on item rates basis and his attention is drawn to the fact that rates for each and every item should be correct, workable and self supporting. The quantities in the Schedule of Quantities approximately indicate the total extent of work, but may vary to any extent and may even be omitted thus altering the aggregate value of the Contract. However, during actual execution of work if the quantities of any of the items of work exceeds by more than 25% of the tender quantities, the quantities of such items executed, by the authority of the Architects of the project and with the concurrence of the employer, in excess of 25% of the tender quantity shall be considered as an extra item of work for which the Contractors shall submit fresh rates supported by rate analysis worked on the actual cost basis plus 15% towards establishment charges, contractor's overhead and profit. The rates for all such items of work, being current ones, will not be eligible for price adjustment due to increase or decrease in prices of materials and labour**

rates as per escalation formula, if any, given in the tender. If any of the items of work is omitted from the accepted tender at the sole discretion of the employer, the contractor shall not be entitled to any claim on this account."

16. Time allowed for carrying out the work as mentioned in the Memorandum shall be strictly observed by the Contractor and it shall be reckoned from the 10th day after written order to commence the work, is issued.

The work shall throughout the stipulated period of the contract be proceeded with all due diligence and if the Contractor fails to complete the work within the specified period, he shall be liable to pay compensation as defined in clause 26 of the Conditions of Contract. The tenderer shall before commencing work prepare a detailed work programme which shall be approved by the Architect and employer.

17. Tenders will be considered only from recognized bonafide Contractors in trade concerned. Each tenderer shall submit with his tender a list of large works of a like nature he has executed giving details as to their magnitude and cost the proportion of work done by the Contractor in it and the time within which the works were completed.

18. The Contractor shall not be entitled to any compensation for any loss suffered by him on account of delays in commencing or executing the work, whatever the cause of delays may be, including delays arising out of modifications to the work entrusted to him or in any sub-contract connected therewith or delays in awarding contracts for other trades of the project or in commencement or completion of such works or in procuring Government controlled or other building materials or in obtaining water and power connections for construction purposes or for any other reason whatsoever and the Employer shall not be liable for any claim in respect thereof. The Employer does not appear liability for any sum besides the tender amount, subject to such variations as are provided for herein.

19. The successful tenderer is bound to carry out any items of work necessary for the completion of the job even though such items are not included in the quantities and rates. Schedule of instructions in respect of such additional items and their quantities will be issued in writing by the Architect with the prior consent in writing of the Employer.

20. The successful tenderer must co-operate with the other Contractors appointed by the Employer so that the work shall proceed smoothly with the least possible delay and to the satisfaction of the Architects.

21. The Contractor must bear in mind that all the work shall be carried out strictly in accordance with the Specifications made by the Architects and also in compliance of the requirements of the local public authorities and to the requirements of the Structural Consultant and no deviation on any account will be permitted.
- 22a The successful tenderer for General Building Work should make his own arrangement to obtain all materials required for the work including cement and steel.
- 22b While making the tender, the tenderer should base his rates for Pozzolana Portland (PPC) or ordinary Portland Grey Cement, and steel in the Schedule of Quantities at Rs. per metric tonne in bags in case of Pozzolana Portland (PPC) or ordinary Portland Grey Cement, Rs. 4500/- per metric tonne in the case of mild steel and Rs. 30000/- per metric tonne in the case of deformed steel, which rates are hereinafter referred to as "the basic prices". The said prices are ex-godown and are inclusive of excise duty, sales tax, octroi and all other duties levied by Government of any public body. (ex-godown referred to here will be the dealers Godown or Rail Head within the Municipal or city limits or the city where the work is being done).
- 22c In case during the currency of the Contract aggregate of the selling prices of approved authorized stockists, the excise duty, sales tax, octroi and all other duties levied by the Government or any public body goes above the basic prices of cement and steel referred to in sub-clause (b) above, the excess shall be borne by the Employer but the Contract shall not in any way be entitled to any sums by way of overhead costs, profits or otherwise whatsoever in respect of such excess, should this aggregate go below the said basic prices, the benefit shall go to the Employer, and in either case the corresponding adjustment shall be made in the Contractor's bill on production of all necessary vouchers duly certified by the Architects. Wastage in cement and steel shall be on the Contractors account. The Employer may, however in his absolute discretion, allow adjustment on account of price fluctuation, on the basis of material available to him which will be upto maximum of 5% of the billed quantities in the case of wastage of steel and upto the maximum of 3% of the theoretical consumption worked out based on the theoretical cement consumption factors adopted by CPWD. For items, which are not covered in the statement of the CPWD, coefficients as indicated in ACC handbook or as derived on the basis of theoretical calculations may be adopted for determining the wastage of cement. AS regards cement, in addition to keeping the Assistant Engineer posted with periodical purchase by production of invoices, the Contractor shall also furnish to him for his record the daily consumption of cement. Adjustment in

prices on account of cement shall be made only in respect of cement to be used on the site. It is clarified that no adjustment shall be made in respect of cement used or to be used in the manufacture of tiles, pipes and other manufactured items whatsoever. Similarly, the adjustment in prices for steel shall be made only for the steel to be used in RCC works. It is clarified that no adjustment shall be made in respect of items such as steel grills window/ventilator bars, doors, hoop iron or MS rods for partitions, wall plates for water tanks and other manufactured items whatsoever.

The Bank will not accept cut pieces of steel bars less than 3 metres in length from the Contractors.

- 22d If the wastage of steel is found to be more than allowable percentage viz. more than 5% and wastage in cement if found to be more than 3% of the theoretical consumption and/or if the steel and/or cement is found to be misused by the Contractors for any reason whatsoever, the cost involved in such excess consumption and/or misuse shall be recovered from the Contractors at double the market rate of the material at the time of recovery or at double the actual purchase rate by the Bank whichever is higher.
- 22e The Contractor shall pay and bear the cost of loading and unloading the cement and steel and transporting the same to the site as well as weighing and storage and all other charges and expenses whatsoever required for the completion of the items of work.
- 22f That in case the Employer is able to arrange for steel and/or cement for the works either from its own stocks or from the manufacturers or stockists or suppliers or otherwise the Contractor shall use the same in the works if so directed by the Architects.
- 22g The successful tenderer is bound to purchase the required materials for which the "Basic Price" has been stipulated (viz. as in the case "b" above) from the dealer or supplier approved and selected by the Bank and at the rate approved by the Bank from time to time.
23. The successful tenderer should make his own arrangements to obtain all materials required for the work including cement and steel.
- 23a In terms of this, procurement of materials for the work including cement and steel is the responsibility of the Contractors. While there will be no change in this condition, the Employer proposes to place order directly on supplier/ dealer on the basis of quotations approved by the Bank and to make direct payment to suppliers of cement and steel and progressively deduct the amount from the running account bills of the Contractors

subject to their furnishing and undertaking on stamped paper as per proforma in Annexure I.

24. The tenderer shall have to use materials of the makes/manufacturers specified in the list of material of approved brand and/or manufacture contained in this tender form.
- 25a The rate quoted by the Contractor shall include expenditure for providing all the water required for the work and the Contractor shall make his own arrangements for the supply of good quality water, including obtaining Municipal connection for his labour as well as for construction purpose and all charges for water shall be borne by him. If Municipal water is not available and should it become necessary for Contractor to bore well for obtaining water for construction purposed or to bring water from outside by tankers, the Employer shall not be liable to pay any charges in connection therewith.
- 25b The rate quoted in the tender shall also include electric consumption charges for power. If no power is available at the site, the Contractor shall have to make his own arrangements to obtain power connections and maintain at his own expense an efficient service of electric light and power and shall pay for the electricity consumed. The Employer, as well as the Architect, shall give all possible assistance to the Contractor to obtain the requisite permission from the various Authorities, but the responsibility for obtaining the same shall be that of the Contractor.
- 25c For water and electricity the Contractors for subsidiary trades appointed by the Employer shall be entitled to take connections from the temporary water and electric supply connection obtained by the General Building Contractor, at his cost. The subsidiary Contractors shall install a sub-meter for measuring electric consumption at their own cost and maintain the wiring installation in good condition as per the local rules and reimburse the actual consumption charges directly to the General Building Contractor. For water consumption, proportionate charges for consumption will be reimbursed by the sub-contractor to the General Building Contractor. In case of any dispute, the reimbursement charges shall be decided by the Architects, whose decision shall be final and without appeal.

If no such facility is available at the site of work and if available and found inadequate, it shall be the responsibility of the Contractor to make his own arrangements for obtaining water and power at his cost.
26. All Municipal fees for drainage and water connection for construction purposes shall be borne by the Contractor and fees if any payable for permanent connections shall be initially paid by the Contractor and the Employer will reimburse the amount on

production of receipts.

Electric supply connection fees for the permanent supply will be paid by the employer to the electric supply authority.

27. The Contractor shall strictly comply with the provision of safety code annexed hereto.
28. IS Code numbers wherever mentioned in the tender shall be the latest version of IS codes as on the date of opening of tenders.
29. The successful tenderer shall be required to submit the PERT/CPM chart for the various activities involved in this work including dependencies etc. and regularly monitor the progress of construction accordingly.
30. The security deposit of the successful tenderer will be forfeited if he fails to comply with any of the conditions of the Contract.
31. Contractor to inform himself fully
The Contractor shall be deemed to have carefully examined the work and sited conditions including labour, the general and special conditions, the specifications, schedules and drainage and shall be deemed to have visited the site of work, to have fully informed himself regarding the local conditions and carried out his own investigations to arrive at the rates quoted in the tender. In this regard he will be given necessary information available with the department but without any guarantee about its accuracy.

If the contractor shall have any doubt as to the meaning of any portion of the general conditions, or the special conditions or the scope of the work or the specifications and drawings or any other matter concerning the contract he shall in good time, before submitting his tender, put forth the particulars thereof and submit them to the Bank, Mumbai in writing in order that such doubts may be clarified authoritatively in writing before tendering. Once a tender is submitted the matter will be decided according to tender conditions in the absence of such authentic pre-clarification.

32. Errors, Omission and Descriptions
- 32a In case of errors, omissions and/or disagreement between written and scaled dimensions on the drawings or between the drawings and specification etc. the following order of preferences shall apply.
 - (i) Between actual scaled and written dimension (or description) on a drawing the later shall be adopted.
 - (ii) Between the written or shown description or dimensions in the drawings and the corresponding one in the specification the later shall be taken as correct.

- (iii) Between the written description of the item in the specifications and the detailed descriptions in the schedule of quantities of the same item, the later shall be adopted.
- 32b In case of difference between the rates written in figures and words, the rate adopted for working out the total amount of item in the original tender form, shall be taken as correct. In all other cases the correct rate would be that which is lower.
- 32c Between the duplicate/subsequent copies of the tender and original tender, the original shall be taken as correct.
- 32d In all cases of omissions and/or doubts or discrepancies in any item or specification a reference shall be made to the General Manager (Tech), Project Management Cell (EZ) , 4th floor, Reserve Bank of India, 15 N S Road, Kolkata 700 001 whose elucidation, elaboration or decision shall be considered as authentic. The Contractor shall be held responsible for any errors that may occur in the work through lack of such reference and precaution.

I/We hereby declare that I/we have read and understood the above instructions for guidance of tenderers.

Witness
Date

Signature of tenderer
Date

Safety Code

1. First aid appliances including adequate supply of sterilized dressing and cotton wool shall be kept in a readily accessible place.
2. An injured person shall be taken to a public hospital without loss of time, in cases where the injury necessitates hospitalization.
3. Suitable and strong scaffolds should be provided for workmen for all works that cannot safely be done from the ground.
4. No portable single ladder shall be over 8 meters in length. The width between the side rails shall not be less than 30 cm (clear) and the distance between two adjacent rungs shall not be more than 30 cm. When a ladder is used an extra mazdoor shall be engaged for holding ladder.
5. The excavated material shall not be placed within 1.5 meters of the edge of trench of half of the depth of trench whichever is more. All trenches and excavations shall be provided with necessary fencing and lighting.
6. Every opening in the floor of a building or in a working platform be provided with suitable means to prevent the fall of persons or materials by providing suitable fencing or railing whose minimum height shall be one metre.
7. No floor, roof or other part of the structure shall be so overloaded with debris or materials as to render it unsafe.
8. Workers employed on mixing and handling material such as asphalts, cement mortar or concrete and lime mortar shall be provided with protective footwear and rubber hand gloves.
9. Those engaged in welding works shall be provided with welder's protective eye-shields and gloves.
10.
 - (i) No paint containing lead or lead products shall be used except in the form of paste of ready made paint.
 - (ii) Suitable facemasks should be supplied for use by the workers when the paint is applied in the form of spray or surface having lead paint dry rubbed and scrapped.
11. Overalls shall be supplied by the Contractor to the painters and adequate facilities shall be provided to enable the working painters to wash during the periods of cessation of work.
12. Hoisting machines and tackle used in the works, including their attachments, anchorage and supports shall be in perfect condition.
13. The ropes used in hoisting or lowering material or as a means of suspension shall be of durable quality and adequate strength and free from defects.

The Conditions Hereinbefore referred to

Interpretation of Clause

1. In construing these conditions, the Specifications, Schedule of Quantities and Contract Agreement, the following words shall have the meanings herein assigned to them except where the subject or context otherwise requires.

- | | | |
|-----|---|--|
| (a) | Employer | Shall mean The Reserve Bank of India and shall include its assignees and successors |
| (b) | Contractor
In the case of a partnership firm | Contractor shall mean _____

and _____ trading as partners in the name and style of _____

and having a place of business at _____

and shall include the partners for the time being of the said firm and the legal representatives of a deceased partner. |
| | In the case of individual | Contractor shall mean _____
_____ trading in the name and style of _____

and shall include his heirs, successors and legal representatives. |
| | In the case of company | Contractor shall mean _____

a company incorporated under _____ and having its registered office at _____ and shall include its successors and assignees. |
| (c) | Site | Shall mean the site of the contract works including any building and erections thereon and any other land (inclusively) as aforesaid allotted by the Employer for the Contractor's use. |
| (d) | This Contract | Shall mean the Articles of Agreement, the Special Conditions, the Conditions, the Appendix, the Schedule of Quantities and Specification attached hereto and duly |

- signed.
- (e) Notice in writing Or written notice shall mean a notice in written, typed or printed characters sent (unless delivered personally or otherwise proved to have been received) by registered post to the last know private or business address or registered office of the addressee and shall be deemed to have been received when in the ordinary course of post it would have been delivered.
- (f) Act of Insolvency Shall mean any act of insolvency as defined by the Presidency Towns Insolvency Act, or the Provincial Insolvency Act or any Act amending such original.
- (g) Net Prices If in arriving at the contract amount the Contractor shall have added to or deducted from the total of the items in the Tender any sum, either as a percentage or otherwise, then the net price of any item in tender shall be the sum arrived at by adding or deducting from the actual figure appearing in the Tender as the price of that item a similar percentage or determining the percentage or proportion of the sum so added or deducted by the contractor the total amount of any Prime Cost items and provisional sums of money shall be deducted from the total amount of the tender. The expression “net rates” or “net prices” when used with reference to the contract or accounts shall be held to mean rates or prices so arrived at.
- (h) Works Shall mean _____

 for the Employer at _____

 as provided herein.

Words importing persons include firms and corporations. Words importing the singular only also include the plural and vice versa where the context requires.

2. The Contractor shall carry out and complete the said work in every respect in accordance with this Contract and with the directions of and to the satisfaction of the Architect. The Architect may in his absolute discretion and from time to time issue further drawings and/or written instructions, detailed directions and explanations which are hereafter collectively referred to as “Architect’s Instructions” in regard to :
- 2a The variation or modification of the design, quality or quantity of works or the addition or

- omission or substitution of any work.
- 2b Any discrepancy in the drawings or between the Schedule of Quantities and/or drawings and/or specification.
 - 2c The removal from the site of any material brought thereon by the Contractor and the substitution of any other material therefore.
 - 2d The removal and/or re-execution of any works executed by the Contractor.
 - 2e The dismissal from the works of any persons employed thereupon.
 - 2f The opening up for inspection of any work covered up.
 - 2g The amending and making good of any defects under clause 19 thereof.

The Contractor shall forthwith comply with and duly execute any work comprised such Architect's instructions provided always that verbal instructions, directions and explanations given to the Contractor or his representatives upon the works by the Architect shall, if involving a variation, be confirmed in writing by the Contractor within seven days, and if not dispensed from in writing within a further seven days by the Architect, such shall be deemed to be Architect's Instructions within the scope of the Contract.

Variations to be approved by Employer

Notwithstanding anything herein contained, the Architect or his representative shall not, without the prior concurrence in writing of the Employer, issue any instructions, verbal or in writing, which will result in the Employer having to pay the Contractor an additional sum greater than Rs.2500/- and all instructions issued to the Contractor should forthwith be brought to the notice of the Employer. The Contractor shall submit through the Architect a statement of variations giving quantity and rates duly supported by analysis of rates, vouchers etc. The rates on scrutiny and final acceptance by the Employer shall form a supplementary tender. The Employer shall not be liable for payment of such variations until these statements are sanctioned by it.

Drawings and Schedule of Quantities and Agreement

- 3. The Contract shall be executed in triplicate and the Architect, the Employer and the Contractor shall be entitled to one executed copy each for his use. The Contractor on the signing hereof shall be furnished by the Architects free of cost one copy of each of the said drawings and of the specification and one copy of all further drawings issued during the progress of the works. Any further copies of such drawings required by the contractor shall be paid for by him. The Contractor shall keep one copy of all drawings on the works and the Architect or his representative shall at all reasonable time have access to the same. Before the issue of the final certificate to the contractor he shall forthwith return to the Architect all drawings and specifications.

Contract to provide everything necessary at his cost

- 4. The Contractor shall provide at his cost everything necessary for the proper execution of the works according to the intent and meaning of the drawings. Schedule of Quantities and Specification taken together with whether the same may or may not be particularly shown or described therein provided that the same can reasonably be inferred there from and if the Contractor finds any discrepancy in the drawings or between the drawings, Schedule of Quantities and Specifications, he shall immediately and in writing refer same to the Architect who shall decide which is to be followed.

Authorities, notices and patents

5. The Contractor shall confirm to the provision of any Act of the Legislature relating to the work, and to the regulations and bye-laws of any authority, and of any water, electric supply and other companies and/or authorities with whose systems the structure is proposed to be connected and shall before making any variations from the Drawing or Specifications that may be necessitated by so conforming give to the Architect written notice, specifying the variation proposed to be made and the reason for making it and apply for instructions thereon. In case the Contractor shall not within ten days receive such instructions he shall proceed with the work conforming to the provisions, regulations or bye-laws in question, and any variation so necessitated shall be dealt with under Clause 13 thereof.

The Contract shall bring to the attention of the Architect all notices required by the said Acts, regulations or bye-laws to be given to any authority and pay to such authority, or to any public office all fees that may be properly chargeable in respect of the works, and lodge the receipts with the Architect.

The Contractor shall indemnify the Employer against all claims in respect of patent rights, and shall defend all actions arising from such claims, and shall himself pay all royalties, licence fees, damages cost and charges of all and every sort that may be legally incurred in respect thereof.

Setting out of works

6. The Contractor shall set out the works and shall be responsible for the true and perfect setting out of the same and for the correctness of the positions, levels, dimensions and alignment of all parts thereof. If at any time any error in this respect shall appear during the progress of the works or within a period of one year from the completion of the works, the Contractor shall, if so required, at his own expense rectify such error to the satisfaction of the Architect.

Materials and workmanship to confirm to descriptions

7. All materials and workmanship shall so far as procurable be of the respective kinds described in the Schedule of Quantities and/or Specifications and in accordance with the Architect's instructions, and the Contractor shall upon the request of the Architect furnish him with all invoices, accounts, receipts and other vouchers to prove that the materials comply therewith. The Contractor shall at his own cost arrange for and/or carry out any test of any materials which the Architects may require.

Contractor's superintendence and representative on the works

8. The Contractor shall give all necessary personal superintendence during the execution of the works, and as long thereafter as the Architect may consider necessary until the expiry of the "Defects Liability Period" stated in the appendix hereto. The Contractor shall also during the whole time the works are in progress employ a competent, qualified and experienced Engineer who shall be constantly in attendance at the works while the men are at work. Any directions, explanations, instructions or notices given by the Architect to such representative shall be held to be given to the Contractor.

Dismissal of workmen

9. The Contractor shall on request of the Architect immediately dismiss from the works any person employed thereon by him who may, in the opinion of the Architect, be incompetent or misconduct himself and such persons shall not be again employed on the works without the permission of the Architect.

Access to works

10. The Employer, the Architect and their respective representative shall at all reasonable times have free access to the work and/or to the workshops, factories or other places where materials are lying or from which they are being obtained and the Contractor shall give every facility to the Employer, the Architect and their representatives necessary for inspections and examination and test of the materials and workmanship. No person not authorized by the Employer or the Architect except the representatives of public authorities shall be allowed on the works at any time.

Assistant Engineer/Assistant Executive Engineer

11. The term "Assistant Engineer/Assistant Executive Engineer" shall mean the person appointed and paid by the Employer and acting under the orders of the Architects to inspect the works in the absence of the Architect, the Contractor shall afford the Assistant Engineer/ Assistant Executive Engineer every facility and assistance for inspecting the works and materials and for checking and measuring time and materials. Neither the Assistant Engineer/ Assistant Executive Engineer nor any representative of the Architect shall have power to set out works or to revoke, alter enlarge or relax any requirements of the Contract, or to sanction any day work, additions, alterations, deviations or omissions or any extra work whatever except in so far as such authority may be specially conferred by a written order of the Architect with the prior concurrence in writing of the Employer.
The Assistant Engineer/ Assistant Executive Engineer or any representative of the Architect, or the Employer shall have power to give notice to the Contractor or to his representative of non-approval of any work or materials and such work shall be suspended or the use of such materials shall be discontinued until the decision of the Architect is obtained. The work will from time to time be examined by the Architect, the Assistant Engineer/ Assistant Executive Engineer or the Architect's representative but such examination shall not in any way exonerate the Contractor from the obligation to remedy any defects which may be found to exist at any stage of the works or after the same is completed. Subject to the limitation of this clause the Contractor shall take instructions only from the Architect.

Assignment and sub-letting

12. The whole of the works included in the contract shall be executed by the Contractor and the Contractor or any part/share thereof or any interest therein without the prior written consent of the Employer, and no undertaking shall relieve the Contractor from the full and entire responsibility of the Contract or from active superintendence of the works during their progress.

Alterations, additions, omissions etc.

13. No alterations, omission or variation shall vitiate this Contract but in case the Architect thinks proper at any time during the progress of the works to make any alterations in, or additions to, or omissions from, the works or any alteration in the kind or quality of the materials to be used therein and shall give notice thereof under his hand to the Contractor. The Contractor shall alter, add to, or omit from, as the case may be in accordance with such notice, but the Contractor shall not do any work extra to or make any alterations or additions to or omissions from the works or any deviation from any of the provisions of the contract, stipulation, specification or contract drawings without the previous consent in writing of the Architect and the value of such extras, alterations, additions or omissions shall in all cases be determined by the Architect with the prior approval in writing of the Employer in accordance with the provisions of Clause 17 hereof, and the same shall be added to or deducted from the Contract Amount, as the case may be.

Schedule of Quantities

14. The Schedule of Quantities, unless otherwise stated shall be deemed to have been prepared in accordance with the standard method of measurement. Any error in description or in quantity or in omission of items from the Schedule of Quantities shall not vitiate this contract but shall be rectified and the value thereof, as ascertained under Clause 17 hereof, shall be added to, or deducted, from the Contract Amount (as the case may be) provided that no rectification or errors, if any, shall be allowed in the contractor's Schedule of Rates.

Sufficiency of Schedule of Quantities

15. The Contractor shall be deemed to have satisfied himself before tendering as to the correctness and sufficiency of his tender for the works and of the prices stated in the Schedule of Quantities and/or Schedule of Rates and prices which rates and prices shall cover all his obligations under the Contract, and all matters and things necessary for the proper completion of the works.

Measurement of Works

16. The Architect may from time to time intimate to the Contractor and the Employer that he requires the works to be measured and the Contractor shall forthwith attend or send a qualified Agent to assist the Architect or the Architect's representative or the Assistant Engineer/ Assistant Executive Engineer in taking such measurements and calculations and to furnish all particulars or to give all assistance required by any of them. Should the Contractor not attend or neglect or omit to send such agent then the measurement taken by the Architect or a person approved by him shall be taken to be correct measurements of the works. Such measurements shall be taken in accordance with the Mode of Measurements detailed in the Specifications. The Contractor or his Agent may at the time of measurement take such notes and measurements as he may require. All authorized extra works, omissions and all variations made without the Architect's knowledge, but subsequently sanctioned by him in writing (with the prior approval in writing of the Employer) shall be included in such measurements.

Prices for extras etc. ascertainment of

17. The Contractor may, when authorized, and shall, when directed, in writing by the Architects with the approval of the Employer add to, omit from or vary the works shown upon the drawings or described in the specification, or included in the Schedule of Quantities, but the Contractor shall make no addition, omission or variation without such authorisation or direction. A verbal authority or direction by the Architects shall, if confirmed by them in writing within seven days, be deemed to have been given in writing.
- No claim for an extra shall be allowed unless it shall have been executed under provisions of Clause 5 hereof or by the authority of the Architects with the concurrence of the Employer as herein mentioned. Any such extra is herein referred to as authorized extra and shall be made in accordance with the following provisions.
- 17a (i) The net rates or prices in the original tender shall determine the valuation of the extra work where such extra work is of similar character and executed under similar conditions as the work priced therein.
- (ii) Rates for all items, wherever possible, should be derived out of the rates given in the Priced Bill of Quantities.
- 17b The net prices of the original tender shall determine the value of the items omitted provided if omissions vary the conditions under which any remaining items of works are carried out the prices for the same shall be valued under sub-clause (c) thereof.
- 17c Where the extra works are not of similar character and/or executed under similar conditions as aforesaid or where the omissions vary the conditions under which any remaining items of works are carried out or if the amount of any omissions or additions relative to the amount of the whole of the contract works or to any part thereof shall be such that in the opinion of the Architect the net rate or price contained in the Priced Schedule of Quantities or tender or for any item of the works involves loss or expense beyond that reasonably contemplated by the Contractor or is by reason of such omission or addition rendered unreasonable or inapplicable, the Architect shall fix such other rate or price as in the circumstances he shall think reasonable and proper, with the prior approval in writing of the Employer.
- 17d Where extra work cannot be properly measured or valued the Contractor shall be allowed day work prices as the net rates stated in the tender of the Priced Schedule of Quantities or, if not so stated, then in accordance with the local day work rates and wages for the district, provided that in either case vouchers specifying the daily time (and if required by the Architect, the workman's name) and materials employed be delivered for verification to the Architect or his representative at or before the end of the week following that in which the work has been executed.
- 17e It is further clarified that for all such authorized extra items where rates cannot be derived from tender, the Contractors shall submit rates supported by rate analysis worked on the "actual cost basis" plus 15% towards establishment charges, contractor's overhead and profit. Such items will not be eligible for escalation. The measurement and valuation in respect of the Contract shall be completed within the "Period of Final Measurement" stated in the Appendix or if not stated then within six months of the completion of the Contract works as defined in Clause 21 thereof.

Unfixed materials when taken into account to be the property of the Employer

18. Where in any Certificate (of which the Contractor has received payment), the Architect has included the value of any unfixed materials intended for and/or placed on or adjacent to the works such materials shall become the property of the Employer and

they shall not be removed except for use upon the works, without the written authority of the Architect. The Contractor shall be liable for any loss of, or damage to, such materials.

Removal of improper work

19. The Architect shall, during the progress of works, have power to order in writing from time to time the removal from, the works within such reasonable time or times as may be specified in the order, of any materials which in the opinion of the Architect are not in accordance with the Specifications or instructions of the Architect, the substitution of proper materials, and the removal and proper re-execution of any work executed with materials and workmanship not in accordance with the drawings and specifications or instructions, and the Contractor shall forthwith carry out such order, the Employer shall have the power to employ and pay other persons to carry out the same, and all expenses consequent thereon, or incidental thereto, as certified by the Architect shall be borne by the Contractor, or may be deducted by the Employer from any money due, or that may become due to the Contractor.

Defects after virtual completion

20. Any defect, shrinkage, settlement or other faults which may appear within the "Defects Liability Period" stated in the Appendix hereto or , if none stated, then within twelve months after the virtual completion of the works, arising in the opinion of the Architect from materials or workmanship not in accordance with the contract, shall upon the directions in writing of the Architect, and within such reasonable times as shall be specified therein, be amended and made good by the Contractor, at his own and in case of default the Employer may employ and pay other persons to amend and make good such defects, shrinkage, settlements or other faults and all damages, loss and expenses consequent thereon or incidental thereto shall be made good and borne by the Contractor and such damage, loss, expenses shall be recoverable from him by the Employer or may be deducted by the Employer, upon the Architects' Certificate in writing, from any money due or may become due to the Contractor, or the Employer may in lieu of such amending and making good by the Contractor deduct from any money due to the Contractor, a sum, to be determined by the Architect equivalent to the cost of amending such work and in the event of the amount retained under Clause 31 thereof being insufficient, recover the balance from the Contractor, together with any expenses the Employer may have incurred in connection therewith. Should any defective work have been done or material supplied by any sub-contractor employed on the works who has been nominated or approved by the Architect as provided in Clause 12 and 22 thereof, the Contractor shall be liable to make good in the same manner as if such work or material had been done or supplied by the Contractor and been subject to the provisions of this Clause and Clause 2 hereof. The Contractor shall remain liable under the provisions of this Clause notwithstanding the signing of any certificate or the passing of any accounts, by the Architect.

Certificate of Virtual Completion and Defects Liability Period

21. The works shall not be considered as completed until the Architect has certified in writing that they have been virtually completed. The Defects Liability Period shall commence from the date of such certificate.

Nominated Sub-Contractors

22. All Specialists, Merchants, Tradesman and other executing any work of supplying and fixing any goods for which prime cost prices or provisional sums are included in the Schedule of Quantities and/or Specifications who may be nominated or selected by the Architect are hereby declared to be Sub-Contractors employed by the Contractor and are herein referred to as nominated Sub-Contractors.

No nominated Sub-Contractor shall be employed on or in connection with the works against the Contractor shall make reasonable objection or (save where the Architect and Contractor shall otherwise agree) who will not enter into a Contractor providing :

- (a) That the nominated Sub-Contractor shall indemnify the Contractor against the same obligation in respect of the Sub-Contract as the Contractor is under in respect of this contract.
- (b) That the nominated Sub-Contractor shall indemnify the Contractor against claims in respect of any negligence by the Sub-Contractor, his servants or agents or any misuse by him or them of any scaffolding or other plant, the property of the Contractor or under any Workmen's Compensation Act in force.
- (c) Payment shall be made to the nominated Sub-Contractor within fourteen days of his receipt of the Architect's Certificate provided that before any certificate is issued the Contractor shall upon request furnish to the Architect proof that all nominated Sub-Contractor's accounts included in previous Certificates have been duly discharged, the default whereof the Employer may pay the same upon a Certificate of the Architect and deduct the amount thereof from any sum due to the Contractor. The exercise of this power shall not create brevity of contract as between Employer and Sub-Contractor.

Other persons employed by Employer

23. The Employer reserves the right with the concurrences of the Architect to use premises and any portions of the site for the execution of any work not included in this Contract which it may desire to have carried out by other persons and the Contractor shall allow all reasonable facilities for the execution of such work but shall not be required to provide any plant or material for the execution of such work except by special arrangement with the Employer. Such work shall be carried out in such manner as not to impede the progress of the works included in the Contract and the Contractor shall not be responsible for any damage or delay which may happen to or occasioned by such work.

Insurance in respect of damages to persons and property

24. The Contractor shall be responsible for all injury or damage to persons, animals or things, and for all damage to property which may arise from any factor omission on the part of the Contractor or any Sub-Contractor or any nominated Sub-Contractor or any of their employees. The liability under this clause shall cover also inter-alia any damage to structures, whether immediately adjacent to the works or otherwise, any damage to roads, streets, footpaths, bridges as well as damage caused to the building and other structures and works forming the subject matter of this contract. The contractor shall also be reasonable for any damage caused to the buildings and other structures and works forming the subject matter of this contract due to rain, wind, frost or other inclemency of weather. The Contractor shall indemnify and keep indemnified the Employer and hold him harmless in respect of all and any loss and expenses arising

from any such injury or damage to persons or property as aforesaid and also against any claim made in respect of injury or damage, whether under any statute or otherwise and also in respect of any award or compensation or damage consequent upon such claims. The Contractor shall, at his own expense, effect and maintain till issue of the virtual completion certificate under this contract, with an insurance company approved by the Employer, an All Risks Policy for Insurance for the full amount of the contract including earth quake risk in the joint names of the Employer and the Contractor (the name of the former being placed first in the policy) against all risks as per the standard all risk policy for Contractors and deposit such policy or policies with the Employer before commencing the works.

The Contractor shall reinstate all damage of every sort mentioned in this clause so as to do delivery of the whole of the works complete and perfect in every respect and so as to make good or otherwise satisfy all claims for damage to property or third parties.

The Contractor shall also indemnify and keep indemnified the Employer against all claims which may be made against the Employer by any person in respect of anything which may arise in respect of the works or in consequence thereof and shall at his own expense, effect and maintain until the virtual completion of the contract, with an Insurance Company approved by the Employer a policy of Insurance in the joint names of the Employer and the Contractor (name of the former being placed first in the policy) against such risks and deposit such policy or policies before commencement of the works.

The minimum limit of the coverage under the policy shall be Rs.2 lakhs per person for any one accident or occurrence and Rs.5 lakhs in respect of damage to property for any one accident or occurrence. The Contractor shall also indemnify the Employer against all claims which may be made upon the Employer, whether under the Workmen's Compensation Act or any other statute in force, during the currency of this contract or at Common Law in respect of any employee of the Contractor or Sub-Contractor and shall be at his own expense effect and maintain until the Virtual Completion or the Contract with an Insurance Company approved by the Employer a policy of Insurance against such risks and deposit such policy or policies with the Employer from time to time during the currency of this contract.

In default of the Contractor insuring as provided above, the Employer may so insure and may deduct the premiums paid from any money due or which may become due to the Contractor.

The Contractor shall be responsible for any liability which may not be covered by the insurance policies referred to above and also for all other damages to any person, animal or defective carrying out of this contract, whatever, may be the reasons due to which the damage shall have been caused.

The Contractor shall also indemnify and keep indemnified the Employer against all and any costs, charges or expenses arising out of any claim or proceedings relating to the works and also in respect of any award of damage or compensation arising there from.

Without prejudice to the other rights of the Employer against Contractors in respect of such default, the Employer shall be entitled to deduct from any sums payable to the Contractor the amount of any damages, compensation costs, charges and other expenses paid by the Employer and which are payable by the Contractor under this clause.

The Contractor shall upon settlement by the insurer of any claim made against the insurer pursuant to a policy taken under this clause, proceed with due diligence to rebuild or repair the works destroyed or damaged. In this event all the money received from the insurer in respect of such damage shall be paid to the Contractor and the Contractor shall not be entitled to any further payment in respect of the expenditure

incurred for rebuilding or repairing of the materials or goods destroyed or damaged. The Contractor, in case of re-building or reinstatement after damage shall be entitled to such extension of time for completion as the Architect may deem fit, but shall, however, not be entitled to reimbursement by the Employer of any shortfall or deficiency in the amount finally paid by the insurer in settlement of any claim arising as set out herein. Without prejudice to his liability under this clause, the Contractor shall also cause all nominated sub-Contractors to effect, for their respective portions of the works similar policies of insurance in accordance with the provisions of this clause and shall produce or cause to produce to the Employer such policies. The Contractor shall not permit a nominated Sub-Contractor to commence work at the site unless said insurance policies are submitted. In the event of failure, of the Sub-Contractor to take out such policy or policies of insurance before commencing the works at the site, the Contractor shall be responsible for any claim or damage attributable to the said Sub-Contractor.

Date of commencement and completion

25. The Contractor shall be allowed admittance to the site on the "Date of Commencement" stated in the Appendix hereto, or such later date as may be specified by the Architect and he shall thereupon and forthwith begin the work and shall regularly proceed with and complete the same (except such painting or other decorative work as the Architect may desire to delay) on or before the "Date of Completion" stated in the Appendix subject nevertheless to the provision for extension of time hereinafter contained.

Damage for non-completion

26. If the Contractor fails to complete the works by the date stated in the Appendix or within any extended time under Clause 27 hereof and the Architect certifies in writing that in his opinion the same ought reasonably to have been completed the Contractor shall pay the Employer the sum named in the Appendix as "Liquidated Damages" for the period during which the said Works so remain incomplete and the Employer may deduct such damages from any money due to the Contractor.

Delay and Extension of Time

27. If in the opinion of the Architect, the works be delayed (a) by force majeure or (b) by reason of any exceptionally inclement weather or (c) by reason of proceedings taken or threatened by or dispute with adjoining or neighbouring owners or public authorities arising otherwise than through the Contractor's own fault or (d) by the works or delays of other Contractors or Tradesmen engaged or nominated by the Employer or the Architect and not referred to in the Schedule of Quantities and/or Specification or (e) by reason of Architect's instruction as per Clause 2 hereof or (f) by reason of civil commotion, local combination of workmen or strike or lockout affecting any of the building trades or (g) in consequence of the Contractor not having received in due time necessary instructions from the Architect for which he shall have specifically applied in writing or (h) from other causes which the Architect may certify as beyond the control of Contractor or (i) in the event, the value of the work exceed the value of the Priced Schedule of Quantities owing to variation, the Architect may with previous approval in writing of the Employer, make a fair and reasonable extension of time for completion of the contract works. In case of such strike or lock-out, the Contractor shall immediately give written notice thereof to the Architect but the Contractor shall nevertheless constantly use his endeavours to prevent delay and shall do all that may reasonably be

required to the satisfaction of the Architect to proceed with work.

If the Contractor needs an extension of time for the completion of the work or if the completion of work gets delayed for any reason beyond the due date of completion stipulated in the contract, the Contractor shall apply to the Employer for extension of time in writing at least 7 days before the expiry of the scheduled time and while applying for extension of time Contractor shall furnish the reasons in detail and his justification, if any, for delays. Only that period of extension of time as granted by the Employer (on receipt of the application from the Contractor or even in absence of any such application) will qualify for exemption of imposition of liquidated damages. For the balance period in excess of original stipulated period and authorized extension of time granted by the Employer, the provision of liquidated damages as stated under Clause 26 will become applicable.

Further the contract shall remain in force even for the period beyond the due date of completion irrespective whether the Contractor has applied or not, for the grant of extension of time for completion unless the Employer decides to terminate the contract. The delay for completion of work for any reason will not entail any right to the Contractor to claim any revision of rates or any extra compensation for any reason.

Failure by Contractor to comply with Architect's Instructions

28. If the Contractor after receipt of written notice from the Architect requiring compliance within ten days fails to comply with such further drawings and/or Architect's instructions, the Employer may employ and pay other persons to execute any such work whatsoever, that may be necessary to give effect thereto, and all costs incurred in connection therewith shall be recoverable from the Contractor by the Employer on the Certificate of the Architect as a debit or may be deducted by him from any money due to the Contractor.

Termination of Contract by the Employer

29. If the Contractor being an individual or a firm commits any "Act of insolvency", or shall be adjudged an Insolvent or being an Incorporated Company shall have an order for compulsory winding up made against it or pass an effective resolution for winding up voluntarily or subject to the supervision of the Court and the Official Assignee or the Liquidator in such acts of insolvency or winding up, as the case may be, shall be unable within seven days after notice to him requiring him to do so, to show to the reasonable satisfaction of the Architect that he is able to carry out and fulfill the contract and to give security therefore, if so required by the Architect.
- OR if the Contractor (when an individual, firm or Incorporated Company) shall suffer execution or other process of Court attaching property to be issued against the Contractor.
- OR shall suffer any payment under this Contract to be attached by or on behalf of any of the creditors or the Contractor.
- OR shall assign or sublet this Contract without the consent in writing of the Employer first hand and obtained.
- OR shall charge or encumber this Contract or any payments due or which may become due to the Contractor hereunder.
- OR if the Architect shall clarify in writing to the Employer that the Contractor.
- (i) Has abandoned the Contract for
 - (ii) Has failed to commence the works, or has without any lawful excuse under these Conditions suspended the progress of the works for fourteen days after

- receiving from the Architect notice to proceed for.
- (iii) Has failed to proceed with the works with such due diligence and failed to make such due progress as would enable the works to be completed within the time agreed upon or
 - (iv) Has failed to remove materials from the site or to pull down and replace work for seven days after receiving from the Architect written notice that the said Materials or work were condemned and rejected by the Architect under these conditions, or
 - (v) Has neglected or failed persistently to observe and perform all or any of the acts, matters of things by this contract to be observed and performed by the Contractor for seven days after written shall have been given to the Contractor requiring the Contractor to observe or perform the same.

Then and in any of the said cases the Employer may, notwithstanding any previous waiver, after giving seven day's notice in writing to the Contractor, determine the Contract, but without thereby affecting the powers of the Architect or the obligations and liabilities of the Contractor, the whole of which shall continue in force as fully as if the Contract had not been so determined, and as if the work subsequently executed had been executed by or on behalf of the Contractor. And further, the Employer by his agents or servants may enter upon and take possession of the works and all plants, tools, scaffoldings, sheds, machinery steam and other power utensils and materials lying upon the premises or the adjoining lands or roads, and use the same as his own property of may employ the same by means of his own servants and workmen in carrying on and completing the works or by employing any other Contractor or other person or persons to complete the works, and the Contractor shall not in any way interrupt or do any act, matter or thing to prevent or hinder such other Contractor or other person or persons employed for completing and finishing or using the materials and plant for the works. When the works shall be completed or as soon thereafter as convenient the Architect shall give a notice in writing to the Contractor to remove his surplus materials and plant, and should the Contractor fail to do so within a period of fourteen days after receipt of thereof by him, the Employer may sell the same by public auction, and give credit to the Contractor for the net amount realised. The Architect shall thereafter ascertain and certify in writing under his hand what (if anything) shall be due or payable to or by the Employer and expense or loss which the Employer shall have been put to in procuring the works to be completed and the amount, if any, owing to the Contractor and the amount which shall be so certified shall thereupon be paid by the Employer to the Contractor or by the Contractor to the Employer, as the case may be, and the Certificate of the Architect shall be final and conclusive between the parties.

Termination of Contracts by Contractor

- 30. If the payment of the amount payable by the Employer under Certificate of the Architect shall be in arrears and unpaid for thirty days after notice in writing requiring payment of the amount as aforesaid shall have been given by the Contractor to the Employer, or if the Employer interferes with or obstructs the issue of any such Certificate, or if the Employer shall repudiate the Contract, or if the works be stopped for three months under the order of the Architect or the Employer or by any injunction or other order of any court of Law, then and in any of the cases the Contractor shall be at liberty to determine the Contract by notice in writing to the Employer, through the Architect and he shall be entitled to recover from the Employer, payment for all works executed and for any loss he may sustain upon any plant or materials supplied or purchased or prepared for the purpose of the Contract.

In arriving at the amount of such payment the net rates contained in the Contractor's original tender shall be followed or where the same may not apply, valuation shall be made in accordance with Clause 17 hereof.

Certificate of payments

- 31a The Contractor shall be paid by the Employer from time to time by installments under Interim Certificates to be issued by the Architect to the Contractor on account of the works executed when in the opinion of the Architect, work to the approximate value named in the Appendix as "Value of Work for Interim Certificates" (or less at the reasonable discretion of the Architect) has been executed in accordance with this contract, subject, however, to a retention of the percentage of such value named in the Appendix hereto as "Retention percentage for Interim Certificates" until the total amount retained shall reach the sum named in the Appendix as "Total Retention Money" after which time Installments shall up to the full value of the work subsequently so executed and fixed in the building. The Architect may in his discretion include the Interim Certificate such amount as he may consider proper on account of materials delivered upon the site by the Contractor for use in the works. And when the works have been virtually completed and the Architect shall have certified in writing that they have been completed, the Contractor shall be paid by the Employer in accordance with the Certificate to be issued by the Architect the sum of money named in the Appendix as "Installment after Virtual Completion" being a part of the said Total Retention Money. The Contractor shall be entitled to the payment of the Final Balance in accordance with the final certificate to be issued in writing by the Architect at the expiry of the period referred to as "the Defects Liability Period" in the Appendix hereto from the date of Virtual Completion of as soon as after the expiration of such period as the works shall have been finally completed and all defects made good according to the true interest and meaning hereof whichever shall last happen, provided always that the issue by the Architect of any Certificate during the progress of the works or at or after their completion shall not relieve the Contractor from his liability under Clause 2 and 20 nor relieve the Contractor of his liability in case of fraud, dishonesty or fraudulent concealment relating to the works or materials or to any matter dealt with in the certificate, and in case of all defect and insufficiencies in the works or materials which a reasonable examination would not have disclosed. No certificate of the Architect shall of itself be conclusive evidence that any works or materials to which it relates are in accordance with the Contract neither will the Contractor have a claim for any amounts which the Architect might have certified in any interim bill and paid by the Employer and which might subsequently be discovered as not payable and in this respect the Employer's decision shall be final and binding.
- 31b The Contractors will be paid an advance of 75% of the cost of required building materials brought to the site for consumption in the works, except for cement and steel at the discretion of the Bank. The assessment of the cost of building materials shall be derived either from the actuals or from the tendered rate and the lesser of the two shall be considered for payment. The Contractor shall give an undertaking on stamp paper for this payment in the proforma given in Annexure II.
Advance as above may be paid in case of paints of all types whether ready-mix or dry. However, the material on which such advance is paid has to be used in the work within six months of the date of manufacture, failing which the whole advance so paid will be recovered in one lump sum from his next RA Bill after the expiry of six months from the date of manufacture.

- 31c The Contractor has to submit along with his RA Bills and final bill, a statement showing the detail as well as the quantities of cement, steel and other building materials received by him from the Bank upto the date of the bill for verification of the same before settlement of such bills by the Bank.
- 31d 75% of the amount payable to the Contractor on the RA bills will be released as ad-hoc payment within 7 working days from the date of certification by the Bank's Site Engineer, pending test checking of work and measurement checking of detailed arithmetical accuracy and certification by EE/SE, PMC of the Bank.
- 31e The Architect shall have power to withhold any certificate if the works or any parts thereof are not being carried out to his satisfaction.
- 31f The Architect may by any Certificate make any correction in any previous certificate which shall have been issued by him.
- 31g No payment shall be made to the Contractor if the Contractor fails to insure the works and keep them insured till the issue of the Virtual Completion Certificate.
- 31h Payments upon the Architect's Certificate shall be made within the periods named in the Appendix as "Period for honour of Certificates" after such certificates have been delivered to the Employer.
- 32. Any amounts payable by the Employer to the Contractor in pursuance of any certificates given by the Architect hereunder shall, if not paid, within the "Period of honouring certificates' named in the Appendix carry interest at the rate named in the Appendix as the "rate of interest for delayed payment" from the date upon which such sum ought to have been paid by the Employer until the payment.

Matter to be finally determined by Architect

- 33. The decision, opinion, direction, certificate of payment with respect of to all or any of the matters under Clause 2, 4, 6, 7, 12, 16, 17, 19, 20, 21, 27 (a,b,c,d,f), 28 hereof (which matters are herein referred to as excepted matters) shall be final and conclusive and binding on the parties hereto and shall be without appeal. Any other decision, opinion, direction. Certificate of valuation of the Architect or any refusal of the Architect to give any of the same, shall be subject to the right of Arbitration and review under Clause 34 hereof in the same way in all respect (including the provisions as to opening the reference) as if it were a decision of the Architect.

Settlement of disputes try arbitration

- 34. All disputes and differences of any kind whatever out of in connection with the contract or the carrying out of the works (whether during the progress of the works or within 12 months from the date of virtual completion of the work and whether before or within 12 months of determination abandonment or breach of the contract) shall be referred to giving inter-alia full details of the matter under dispute like quantities, rates, amount claimed and the reason thereto, and settled by the Architect, who shall state his decision in writing. Such decision may be in the form of a final certificate or otherwise. The decision of the Architect with respect to any of the excepted matters shall be final and without appeal as stated in Clause 33 hereof. But if either the Employer or the Contractor be dissatisfied with the decision of the Architect on a matter, question or dispute of any kind except any of the excepted matter or as to the withholding by the Architect of any certificate to which the Contractor may claim to be entitled, then and in any such case either party (the Employer or the Contractor) may within 28 days after receiving notice of such decision give a written notice to the other party through the Architect requiring that matter in dispute be arbitrated upon. Such written notice shall

specify the matters with full details and amounts which are in dispute or difference of which such written notice has been given and no other shall be and is hereby referred to the Arbitration and final decision of an arbitrator to be agreed upon and appointed by both the parties. The sole arbitrator shall be from the panel of arbitrators suggested by the Employer.

The arbitrator shall have power to open up, review and revise any certificate, opinion, decision, requisition or notice, save in regard to the excepted matters, referred to in the preceding clause and to determine all matters in dispute which shall be submitted to arbitration and of which notice shall have been given as aforesaid.

The arbitrator shall make his award within one year (or such further extended time as may be decided by him or them as the case may be with the consent of the parties) from the date of entering on the reference. In case during the arbitration proceedings the parties mutually settle, compromise or compound their dispute or difference, the reference to arbitration and the appointment of the arbitrator shall be deemed to have been revoked and the arbitration proceedings shall stand withdrawn or terminated, with effect from the date on which the parties file a joint memorandum of settlement thereof, with the arbitrator or the arbitrators as the case may be.

This submission shall be deemed to be a submission to arbitration within the meaning of the Indian Arbitration Act, 1940 or any statutory modification thereof.

It is agreed that the Contractor shall not delay the carrying out of the works by reason of any such matter, question or dispute being referred to arbitration, but shall proceed with the works with all due diligence and shall until the decision of the arbitrator or arbitrators as the case may be, is given abide by the decision of the Architect and no award of the arbitrator shall relieve the Contractor of his obligations to adhere strictly to the Architect's instructions with regard to the actual carrying out of the works. The Employer and the Contractor hereby also agree that arbitration under this Clause shall be a condition precedent to any right of action under the Contract.

Right of Technical Scrutiny of Final Bill

35. The Employer shall have a right to cause a technical examination of the works by any of the persons or organization as appointed by the Employer and the final bill of the Contractor including all supporting vouchers, abstracts etc. If as a result of this examination or otherwise any sum is found to have been overpaid or over-certified it shall be lawful for the Employer to recover the sum from any payment due to the Contractor for this work or any other work or works being carried out by Contractors elsewhere under the RESERVE BANK OF INDIA.

Employer entitled to recover compensations paid to workman

36. If, for any reason, the Employer is obliged by virtue of the provisions of the Workmen's Compensation Act, 1923, or any statutory modification or re-enactment thereof to pay compensation to a workman employed by the Contractor in execution of the works, the Employer shall be entitled to recover from the Contractor the amount of compensation so paid and without prejudice to the rights of the Employer under the said Act. The Employer shall be at liberty to recover such amount or any part thereof by deducting it from the security deposit or from any sum due by the Employer to the Contractor under this Contract or otherwise. The Employer shall not be bound to contest any claim made against it under the said Act, except on the written request of the contractor and upon his giving to the Employer full security to the satisfaction of the Employer for all costs for which the Employer might become liable in consequence of contesting such claim.

Abandonment of works

37. If at any time after the acceptance of the tender, the Employer shall for any reasons whatsoever not require the whole or any part of the work to be carried out, the Architect shall give notice in writing to the Contractor who shall have no claim to any payment of compensation or otherwise whatsoever on account of any profit or advantage which he might have derived from the execution of the whole works.

Return of surplus materials

38. Notwithstanding anything to the contrary contained in any or all the clause of this Contract, where any material for the execution of the Contract is procured with the assistance of the Employer by purchases made under orders or permits or licenses issued by Government, the Contractor shall hold the said Materials economically and solely for the purpose of the Contract and not dispose them without the prior written permission of the Employer and return it to the Employer, if required by the Employer, at the price to be determined by the Architect having due regard to the condition of the materials, the price to be determined by the Architect having due regard to the condition of the material, the price to be determined not to exceed the purchase price thereof inclusive of sales tax, octroi and other such levies paid by Contractor in respect thereof. In the event of breach of the aforesaid condition, the Contractor shall, in addition to being liable to action for contravention of the terms of licenses or permit and or criminal breach of trust, be liable to Employer for all moneys, advantages or profits resulting or which in the usual course would have resulted by reason of such breach.

Right of Employer to terminate contract in the event of death of contractor if individual

39. Without prejudice to any of the rights or remedies under this contract, if the Contractor, being an individual, dies, the Employer shall have the option of termination of the contract without incurring any liability for such termination.

Marginal Notes

40. The Marginal Notes and in the catch liens hereto and in the annexures hereto are meant only for convenience of reference and shall not in any way be taken into account in the interpretation of these presents and the annexures hereto. The Contractors will have to carry out and complete the said work in every respect in accordance with this contract.

Appendix Hereinbefore Referred To

Reference to clauses in Conditions Hereinbefore Referred To

8.	Defects Liability Period	12 Months
17.	Period of Final Measurement	3 months from the date of virtual completion
25.	Date of commencement	:
25.	Date of completion	:
26.	Rate of liquidated damages	Rs. 500 Per day
31.	Value of works for interim certificates	Rs. 5.00 lakhs
31.	Retention percentage	5%
31.	Security Deposit (EMD + Total retention money)	Rs. 70000/-
31.	Installment after virtual completion	50% of security deposit
31.	Period of honouring certificates of payment	1 month for running a/c bills and three months for final bills
32.	Interest for delayed payment	3% per annum

Reference to clauses in General Instruction to the Contractors and Special Conditions

22.	Basic Prices		
	(a) Grey cement	Rs. 4500/-	Per MT
	(b) Tor steel	Rs. 30000/-	Per MT
	(c) Structural steel section	Rs. 30000/-	Per MT

Employer

Contractor

SECTION G

SPECIAL CONDITIONS

1. The workmen will not be allowed to stay within the premises.
2. The water required for the work or workmen can be availed from the available source at site free of cost. The Contractor has to make his own arrangements to take the supply to the requisite position.
3. The electric power required for the work can also be similarly drawn from the supply available at site free of cost. The Contractor has to make his own arrangements to take the supply to the requisite position.
4. Permission, if any, required from the local bodies shall be obtained by the Contractor at his cost.
5. The intending tenderer can obtain any clarifications regarding the tender drawings, specifications etc. if any from the office of the Regional Director, Reserve Bank of India Project Management Cell (EZ) , Kolkata on any Bank's working day.
6. The tenderer may please note that the office area involved for this work is on the Ground floor & 1st floor of Office Building, at 8 C H street, Kolkata.
7. The entire materials for the work shall be brought to the working area through the freight lift only during specified time of working hours.
10. The debris/dust or any wastage generated out of the above work shall be cleaned as frequently as required and as instructed by the Bank's Engineer and make the entire office area clear before the commencement of office working hours.
11. The tenderer may please note that the work has to be carried out in the working office hours. The rates quoted for each item shall be quoted accordingly.
12. Provisions for cabling for computer, telephone, power etc. shall be made within the floor if required. However, the wires, switches, light fixtures etc. will be organised by the Bank through separate agency. The required cut outs etc. shall be made in the flooring by the tenderer to enable the Bank to fix the switches etc. without any extra charge.

13. The successful tenderer should prepare the layout of the floor and any other working drawings on a 1:4 scale showing the same should be got approved from the Bank's Engineer within 7 days.
14. Care shall be taken while executing the said job, If anything is damaged the same shall be rectified at no extra cost.
17. Wherever the basic rate for the material is specified, the contractor should furnish to the Bank for verification of all the paid bill. The purchase rate shall be got approved from the Bank before purchasing. The adjustment in price shall be made only on measured quantity with 5% wastage. No overhead and profit shall be considered on the cost difference. The basic prices are ex-godawn and are inclusive of excise duty, sales tax, octroi and all other duties levied by Local authority / Government. The rate quoted shall include transportation to site, storing and handling etc.
18. Bank reserves the right to insist on selection of material, workmanship, detailing and finishes, which they consider, are appropriate, and suitable for the intended use. The contractor is not eligible to claim extra on this account.
19. Bank will require the contractor to produce, samples of all the materials, accessories/finishes prior to procurement/manufacture. Failure to comply with these instructions can result in rejection of the work.
20. Samples of the materials for the work shall be got approved by the Bank's Engineer.
21. Any inconsistent deviation is found while on execution between the specification and drawings it is to be expressively noted that the specification prevail well and supercede the drawings.
22. The Tenderer should note that he should execute his part of work without causing any damage to any component of the building and also without disturbing the existing occupants during their office hours. Any damage so caused shall be made good at the cost & risk of the tender
23. The tenderer should note the tender drawings and other documents describing each item in the schedule are only indicative in nature and cannot be taken as complete in detail and finishes. Being tender for interior works which calls for workmanship and finish including use of good quality materials of high standard, it is expected that the tenderer should understand the intent of the tender drawings and specifications and provide for materials, workmanship, finishes and accessories appropriately so as to deliver the product of high

standards in keeping with the function for which the furniture is intended. No claim from the contractor at a later date will be entertained for his failure to understand this condition. The decision of the Bank in respect of the quality of material, type of work, workmanship, finish etc, shall be final and binding on the contractor. The contractor's claim for not providing in his tender for such materials, workmanship and finish cannot be entertained.

24. The successful contractor shall make sure that they protect their materials and hand them over in good shape to the Bank satisfactorily. At the time of handing over any damages, scratches, dents or such defects noticed shall be got rectified as directed without any extra charge by the Contractor to the satisfaction of the Bank.

25. The successful tenderers shall include, in the quoted price, all allied civil works such as chasing in wall, drilling holes etc to support the frames, partitions, make the surface good after grouting etc.

26. Neat house keeping at all times is the responsibility of the successful tenderer , who shall also ensure that the removal of debris, waste materials etc from the site at their own cost and the same shall be organized at regular basis.

27. The successful contractor shall also be responsible for the safety and security of all their materials and also for ensuring fire prevention steps at all times in the working premises including their part of the work.

28. The work has to be carried out in phases (if required as per the site conditions) without disturbing the working in the office. Necessary barricading of the area, if required from the rest of the area shall have to be arranged by the successful contractor at no extra cost. The work is to be organized and executed before/after office hours and on Sundays/holidays so as to have least disturbance .

29. The contractors also have to subject themselves to the security restrictions imposed by the Bank.

30. Removal of improper work

The Bank's Engineer shall, during the progress of works, have power to order in writing from time to time the removal from, the works within such reasonable time or times as may be specified in the order, of any materials which in the opinion of the Architect are not in accordance with the Specifications or instructions of the Architect, the substitution of proper materials, and the removal and proper re-execution of any work executed with materials and

workmanship not in accordance with the drawings and specifications or instructions, and the Contractor shall forthwith carry out such order, the Employer shall have the power to employ and pay other persons to carry out the same, and all expenses consequent thereon, or incidental thereto, as certified by the Architect shall be borne by the Contractor, or may be deducted by the Employer from any money due, or that may become due to the Contractor.

Signature of the Tenderer.

Place :

Date :

Specifications (General Building Work)

Section A – General

The scope of work covers execution and completion of the foundations and super-structure/ piling of the proposed office building/ staff colony/ officers quarters at _____ for the Reserve Bank of India in accordance with drawings and specifications prepared by and under the direction and to the satisfaction of M/s _____.

Contract

The form of contract shall be according to the printed form "Conditions of Contract". The following clauses shall be considered as an extension and not in limitations of obligation of the contractor.

Drawings

Two copies of all drawings, the schedule of quantities and specifications shall be furnished by the Architects to the Contractor for his own use until the completion of the contract, and shall be accessible at all reasonable time to the Architects or their representatives.

All important drawings are to be mounted on boards and placed in racks and indexed.

Dimensions

Figured dimensions are in all cases to be accepted in preference to scales sizes. Large scale details take precedence over small scale drawings. In case of discrepancy the Contractor is to ask for clarification before proceeding with the work.

Contractor to include in his rates

The contractor shall include in his rates for all the items listed in this section.

Contractor to Inspect Site

1. The contractor shall visit and examine the construction site and satisfy himself as to the nature of the existing roads or other means of communications, the character of the soil and the excavations, the extent and magnitude of the work and facilities for obtaining materials and shall obtain generally his own information on all matters affecting the execution of the work. No extra charge made in consequence of any misunderstanding or incorrect information on any of these points or on the ground of insufficient description will be allowed. All expenses incurred by the contractor in connection with obtaining information for submitting this tender including his visits to the site or efforts in compiling the tender shall be borne by the tenderer and no claims for reimbursement thereof shall be entertained.

Access to site

2. The contractor is to include in his rates for forming access to the site, with all temporary roads and gangways required for the works.

Setting Out

3. The contractor shall set out the building in accordance with the plans. All grid/ centre lines shall be pegged out to the satisfaction of the Architects. The contractor shall be responsible of the correctness of the lining out and any inaccuracies are to be rectified at his own expense. He will be responsible for taking ground levels of the site before setting out and recording them without any extra charge.

The contractor shall construct and maintain proper benches at the intersection of all main walls, columns etc. in order that the lines and levels may be accurately checked at all times.

Treasure Trove

4. Should any treasure, fossils, minerals or works of art of an quarial interest be found during excavation or while carrying out the works, the contractor shall give immediate notice to the Architects of any such discovery and shall make over such finds to the Employer.

Access for Inspection

5. The contractor is to provide at all times during the progress of the works and the maintenance period proper means of access, with ladders, gangways etc. and the necessary attendance to move and adapt as directed for the inspection of measurement of the works by the Architects of their representatives.

Attendance upon all trades

6. The general Contractors shall be required to attend on all the tradesman or sub-Contractors/ Contractors appointed by the Employer for water supply and sanitary, electrical installation, lifts, air conditioning, security equipment, hardware, telephone and other specialist Contractors. The rates quoted shall be inclusive of all attendance and also allow the other Contractors, appointed by the Employer, use of his scaffolding and retain until such time the relevant sub-contract works are completed.

Water supply

7. Water shall be arranged in accordance with Clause 26 (a) of Special Conditions of Contract.

The general contractor shall allow the use of water for other works on the site done by other Contractors appointed by the Employer and the cost shall be apportioned by the Architects.

Electric supply

8. Shall be arranged in accordance with Clause 25 (a) of General Instructions to Contractors and Special Conditions of the Contract. He shall also allow other Contractors to use the facilities when requested but compensation charges shall be apportioned by the Architects.

Gatekeeper and watchman

9. The contractor from the time of being placed in possession of the site must make arrangements for watching, lighting and protecting the work, all materials, workmen and the public by day and night on all days including Sundays and holidays at his

own cost.

Storage for materials

10. The Contractor shall provide for all necessary sheds of adequate dimension for storage and protection of materials like cement, lime, timber and such other materials including tools and equipment which are likely to deteriorate by the action of sun, wind, rain or other natural causes due to exposure in the open. For cement the contractor shall arrange for leak proof godown of sufficient size to store not less than 3 months' requirement of cement.

All such sheds shall be cleared away and the whole area left in good order on completion of the contract to the satisfaction of the Architects.

All materials which are stored on the site such as bricks, aggregates etc. shall be stacked in such a manner so as to facilitate rapid and easy checking of quantities of such materials.

Cost of Transportation

11. The Contractor shall allow in his cost for all transporting, unloading, stacking and storing of supplies of good and materials for this work on the site and in the places approved from time to time by the Architects. The Contractor shall allow in his price for transport of all materials controlled or otherwise to the site.

WC and Sanitary Accommodation & Office Accessories and Accommodation

12. The Contractor shall provide at his own cost and expense adequate closet and sanitary accommodation complying in every respect to the rules and regulations in force of the local authorities and other public bodies, for his workmen, for the workmen of the nominated sub-Contractors and other Contractors working in the building, the Assistant Engineer and other employer's agents connected with this building project and maintain the same in good working order.

The Contractor shall also provide at his own expense adequate office accommodation for the Assistant Engineer with approximately a minimum area of 300 sq.ft. along with necessary toilet facilities containing WC, urinal and wash basin for their use preferably contiguous to his office and shall maintain the same in satisfactory condition and shall provide light, fan and attendant etc. for the same and shall remove them after completion of the works. He shall arrange to provide a Dumpy Level/ Theodolite and at all times maintain in good working order at site, to enable the Assistant Engineer to check the lines and levels of the work. The Contractor shall also arrange to supply safe drinking water for use of Bank's staff attached to the project.

Materials, workmanship & samples

13. Materials shall be of approved quality and the best of their kind available and shall generally conform to IS specifications. The Contractor shall order all the materials required for the execution of work as early as necessary and ensure that such materials are on site well ahead of requirement for use in the work. The work involved calls for high standard of workmanship combined with speed and to the entire satisfaction of the Architects.

Rates for non-tender items

Rates of items not included in Schedule of Quantities shall be settled by the Architects as mentioned in the variation clause of the Contract Conditions.

Rate to include

The rates quoted shall be for all heights and depths and for finished work.

To ascertain from Contractors for the other trades

The contractor shall ascertain from other Contractors as directed by the Architects all particulars relating to their work with regard to the order of its execution and the position in which chases, holes and similar items will be required, before the work is taken in hand as no claims for extras will be allowed for cutting away work already executed in consequences of any neglect by the Contractors to ascertain these particulars beforehand.

Before ordering materials, the contractor shall get the samples approved from the architects well in time.

14. Testing of work and material

The contractor shall arrange to test all the materials to be used on work and works or portions of works at his cost in order to prove their soundness and efficiency. Before sending the samples of materials for testing the samples shall be sealed and signed jointly by the contractor and the representative from the Bank and each sample shall be given distinct identification mark. On receipt of the various test reports, proper record shall be maintained for all the tests carried out showing respective identification marks of the samples and results. If after any such tests, the work or portion of works is found to be defective or unsound in the opinion of the structural consultant/ Architects the Contractor shall pull down and redo such works at their own cost. The materials which are found not conforming to the relevant IS provisions after testing, shall be immediately removed from the site by the Contractor.

In case, the Contractor fails to get the work/portion of works/ materials tested at appropriate time, the employer will arrange for getting such testing done and all testing charges and other incidental expenditure incurred by the employer in connection with such tests shall be recovered from the Contractor.

15. Besides the provisions made in Clause No.4 of the conditions of Contract, the Contractor will be required to provide and maintain in working order the following power driven equipments during the construction work.

1. Concrete mixers of more than 200 litres capacity (7 cft)
2. Mechanically operated hoists to lift up materials to the highest level of the building of the capacity of 280 litres (10 cft per lift) powered by a suitable machinery capable of lifting the bucket with a speed of 15 metres per minute.
3. Immersion type vibrators for consolidation of concrete in RCC beams, columns and partition walls and surface type vibrators for consolidation of concrete in slabs. Vibrators shall be adequate in number. A set of stand by vibrators shall also be maintained on the site of work.
4. Lime-mortar mill
5. Pumps for bailing out water.
6. Any other machinery ordered by the Architects.

Foreman and Tradesman

16. All tradesman shall be experienced men properly equipped with suitable tools for carrying out all the work of carpentry and joinery and other specialist trades in a first class manner and where the Architects deem necessary, the Contractor shall provide any such tools, special or ordinary, which are considered necessary for carrying out of the work in a proper manner.

All such tradesman shall work under an experienced and properly trained Foreman, who shall be capable of reading and understanding all drawings, pertaining to this work and the contractor shall also comply with other conditions set out in Clause 9 of the Conditions of the Contract.

Work Programme/ Weekly Progress Report

17. The Contractor shall prepare and submit to architects for approval, a PERT/CPM chart showing the programme of construction of various items, fitted within the period stipulated for completion, within 30 days of the communication of the acceptance of the tender. The contractor shall also furnish necessary particulars to the Assistant Engineer/ Assistant Executive Engineer for compiling weekly progress reports in the form furnished by the architects. Approved programme shall be the basis for monitoring the progress of work. The Contractors also should up date and re-analyse the PERT/CPM chart as often as required as per direction of the Bank to assess and reassess the progress of work done and take corrective measures for making out any deficiency.

Clearing of site

18. The Contractor shall after completion of the work clear the site of all debris and left over materials at his own expense to the entire satisfaction of the Architects and Municipal or other public authorities.

Photographs

19. The Contractor shall at his own expense supply to the Architects with triplicate copies of large photographs not less than 25 cm x 20 cm (10" x 8") of the works taken from two approved portions of each building, at intervals of not more than three months during the progress of the work or at every important stage of construction.

Preparation of building for occupation and use on completion

20. The whole of the work shall be thoroughly inspected by the Contractors and all deficiencies and defects put right. On completion of such inspection, the Contractor shall inform the architects in writing, that he has finished the work and it is ready for the Architects' inspection.

On completion, the contractor shall clean all windows and doors and all glass panes including cleaning of all floors, staircase and every part of the building including oiling of al hardware. He will leave the entire building neat and clean and ready for immediate occupation and to the satisfaction of the Architect.

Contractor to provide etc.

21. The Contractor shall provide a notice board on proper supports 3m x 2m (10' x 6') in a position approved by the architects. He shall allow for painting and lettering stating name of work, name of Architects, structural consultants, general contractor and sub-

Contractors, all letters except that of the name of the work shall be in letter not exceeding 5 cm in height and all to the approval of the Architects.

Vouchers

22. The Contractor shall furnish the Architects with vouchers on request, to prove that the materials are as specified and to indicate the rates at which the materials are purchased in order to work out the rate analysis of the non-tender items which he may be called upon to carry out thereafter.

Protection

23. The contractor shall properly cover up and protect all work throughout the duration of work until completion, particularly masonry/finish, mouldings, steps terrazzo or special floor finishes, staircases and balustrades, doors and windows frames, plaster angles, lighting and sanitary fittings, glass, paint work and all finishing.

Section (B) - Materials

1. Materials shall be of the best approved quality obtainable and they shall comply with the respective latest IS specification.
2. Samples of all materials shall be got approved before placing an order and the approved sample shall be deposited with the Architect.
3. In case of non-availability of materials in metric sizes, the nearest size in FPS units shall be provided with the prior approval of the Architects for which neither extra will be paid nor any rebate shall be recovered.
4. All the materials shall be tested in any testing laboratory approved by the Assistant Engineer/ Assistant Executive Engineer, as per the testing guidelines issued by the Employer, which can be perused by the Contractor from the office of the _____ at _____. Results of such tests in original issued by the laboratory shall be submitted to the Architects with copy to Assistant Engineer/ Assistant Executive Engineer. The entire charges connected with such testing including for repeated tests if ordered by the Architect shall be borne by the Contractor.
5. It shall be obligatory for the Contractor to furnish certificate, if demanded by the Architects, from manufacturer or the material supplier, that the work has been carried out by using their materials and as per their recommendations.
6. All materials supplied by the Employer/ any other specialist firm shall be properly stored and the Contractor shall be responsible for its safe custody until they are required on the works and till the completion of work.
7. Unless otherwise shown on the drawings or mentioned in the Schedule of Quantities or Special Conditions, the quality of materials, workmanship dimensions etc. shall be as specified hereinunder.
8. All equipments and facilities for carrying out field test on materials shall be provided by the Contractors without any extra cost.

(a) Cement

Cement shall comply in every respect with the requirements of the latest publication of IS 269 and unless otherwise specified ordinary Portland cement shall be used.

The weight of ordinary Portland cement shall be taken as 1440 kg per cem (90 lbs per cft). Cement shall be measured by weight and in whole bags, and each undisturbed and sealed 50 kg bag being considered equivalent to 34.72 litres (1.2 cft) in volume. Care should be taken to see that each bag contains full quantity of

cement. When part bag is required, cement shall be taken by weight or measured in measuring boxes.

No other make of cement but that approved by the Architect will be allowed on works and the source of supply shall not be changed without approval of the Architect in writing. Test certificates to show that cement is fully complying with the specifications shall be submitted to the Architect and notwithstanding this, the Architects may at their discretion, order that the cement brought on site and which they may consider damaged or of doubtful quality for any reason whatsoever, shall be retested in an approved testing laboratory and fresh certificates of its soundness shall be produced. Cement ordered for retesting shall not be used for any work pending results of retests.

Cement shall be stored in weather proof shed with raised wooden plank, flooring to prevent deterioration by dampness or intrusion of foreign matter. It shall be stored in such a way as to allow the removal and use of cement in chronological order of receipt i.e. first received being first used. Cement deteriorated and/or clodded shall not be used on work but shall be removed at once from the site. However, allowing use of warehouse set cement shall be determined by the Architect.

Daily record of cement received and consumed shall be maintained by the Contractor in an approved form and submitted to the Architects.

(b) Lime

Lime shall comply in every respect with the requirements of IS 712 and shall be made from approved lime stone or kankar and properly burnt, it shall be free from excess of unburnt kankar or lime stone ashes or other extraneous materials and shall be stored in weather proof sheds. Lime which has been damaged by rain, moisture or air slaking shall not be used but shall be removed from the site of work forthwith. Lime shall be slaked with fresh water and screened through appropriate screens and stored and used within 14 days provided it is protected from drying out.

Field tests according to IS 383 shall be carried out from time to time to determine the quality of lime.

(c) Fine Aggregate

Sand shall conform to IS 383 and relevant portion of IS 515. It shall pass through a IS sieve 4.75 mm (3/16 BS) test sieve leaving a residue not more than 5%. It shall be from natural source crushed stone screenings, if allowed, chemically inert, clean, sharp, hard, durable, well graded and free from dust, clay, shale large pebbles, salt, organic matter, loam mica or other deleterious matter. The sum of percentages of all deleterious materials in sand shall not exceed 5% by weight. It shall be washed if directed to reduce the percentage of deleterious substance to acceptable limits. Sand shall not contain any trace of salt and it shall be tested and sand containing any trace of salt shall be rejected.

The fine aggregate for concrete shall be graded within limits as specified in IS 383 and the Fineness Modulus may range between 2.60 to 3.20.

The fine aggregate shall be stacked carefully on a clean hard dry surface so that it will not get mixed up with deleterious foreign materials, if such a surface is not available a platform of planks of corrugated iron sheets or brick floor or a thin layer of lean concrete shall be prepared.

(d) Coarse Aggregate

Shall consist of crushed or broken stone 95% of which shall be retained on 4.75 mm IS test sieve. It shall be obtained from crushing Granite, Quartzite, Trap, Basalt or similar approved stones from approved quarry and shall conform to IS 383 and IS 515. Coarse aggregate shall be chemically inert when mixed with cement and shall be cubical in shape and free from soft, friable, thin porous, laminated or flaky pieces. It shall be free from dust and any other foreign matter.

Gravil/ Shingle of desired grading may be permitted as a substitute in part or full in plain cement concrete if the Architect is other wise satisfied about the quality of aggregate. For all RCC works the size of coarse aggregate shall be 20 mm and down gauge.

(e) Reinforcement

Reinforcement shall be of mild steel tested quality conforming IS 432-1966 and any other ISS applicable or deformed bar conforming to IS 1786 and IS 1139 or hard drawn steel wire fabric conforming to IS 1566-1967.

All finished bars shall be free from cracks, surface flaws, laminations, jagged and imperfect edges.

(f) Bricks

Bricks shall generally comply with IS 1077 except in size which shall be conforming to the sizes locally available. Depending upon the quality of bricks they shall be classified as 1st and 2nd class.

Bricks shall be the best quality locally available table moulded well burnt but not over-burnt, have pane rectangular faces with parallel side and sharp right angled edges, have a fine compact and uniform texture. The bricks shall be free from cracks, chips, flaws, stones or lumps of any kind and shall not show efflorescence either dry or subsequent to soaking in water. It shall emit a clear ringing sound on being struck and shall not absorb water more than 20% by weight. Common building bricks shall have a minimum compressive strength of 50 Kg per sq.cm. when used as panel in frame structure and 100 Kg per sq.cm. for load bearing wall construction, unless otherwise specifically stated in the schedule of quantities.

(g) Neeru

Shall be made of Class C lime (i.e. pure flat lime) as mentioned in IS 712. It shall be slaked with fresh water and then sifted and reduced to a thick paste by grinding in amill. Neeru thus prepared shall eb kept moist until used and no more than that can be consumed in 15 days shall be prepared at a time.

(h) Surkhi

Shall be made by grinding well burnt bricks, brick bats, burnt clay balls etc. The brick etc. to be used shall be prepared from selected clay. The quality shall conform to IS 314.

Brick bats etc. shall be ground in a mechanical disintegrator to a fine powder passing through IS sieve No.9 (2.36 mm) with a residue not exceeding 10% by weight.

Surkhi for lime Surkhi plaster shall be ground to a fine powder in a mortar mill to pass through IS sieve 150 micron (No.100).

Surkhi shall be stored in weather proof shed on a brick paved platform.

(i) Water

Water for mixing cement/ lime/ surkhi mortar or concrete shall not be salty or brakish and shall be clean, reasonably clear and free from objectionable quantities of silt and traces of oil, acid and injurious alkali, salts, organic matter and other deleterious materials which will either weaken the mortar or concrete or cause efflorescence or attach the steel in reinforced cement concrete. Water shall be obtained from sources approved by the Architect. Potable water is generally considered satisfactory for mixing and curing concrete, mortar, masonry etc. Where water other than main source is used this shall be tested in an approved testing laboratory to establish its suitability. All charges connected therewith shall be borne by the Contractors.

(j) Timber

Timber shall be well seasoned and of the best quality heart wood of specified species viz.

Timber shall be considered as well as seasoned, if its moisture content does not exceed the following limits.

(i) Timber for frames 14%

(ii) Timber for planking shutters etc. 12%

The moisture content of timber shall be determined according to method described in paragraph 4 of IS 287 for maximum permissible moisture content of timber used for different purposes in different climatic zones.

In measuring cross sectional dimensions of the frame pieces tolerance upto 1.5 mm shall be allowed for each planned surface.

(k) 1st class Indian teak wood

1st class Indian teak wood means CP and Bulsar teak of good quality and well seasoned. It shall have uniform colour, reasonably straight grains and shall be free from large, loose, dead knots, cracks, shakes, warp, twists, bends, sap wood or defects of any kind. No individual hard and sound knot shall be more than 2.5 cm in diameter and aggregate area of all knots shall not exceed 1% of the area of the piece. There shall not be less than 5 growth rings per 2.5 cm width.

(l) 2nd class Indian teak wood

Shall be similar to 1st class Indian teack wood except that knot upto 4 cm diameter and aggregate area of all knots upto 1.5% of the area of the piece shall be allowed. There shall not be less than 4 growth rings per 2.5 cm width.

(m) Hardwood

The timber selected shall comply with the requirements of IS 1003. The timber shall be chemically treated under vacuum and high pressure as per IS 401 and kilm

seasoned as per IS 1141. The moisture content shall be within 8% to 14%.

(n) Flush Doors

All flush doors shall be solid core exterior grade unless otherwise specified and it shall generally conform to IS 2202 and shall be fabricated as described under specification.

(o) Steel windows and doors

Steel windows and doors shall be fabricated out of steel sections conforming to IS 226. They shall conform to IS 1038. Unless otherwise specified the details of construction etc. shall be as described under Specifications.

(p) Floor tiles

Plain cement tiles, chequered tiles, mosaic tiles, shall conform to IS 1237. For neutral shade tiles grey cement shall be used. Tiles shall be compacted by mechanical vibration and hydraulically pressed. It shall be of choice shade and shall have desired pattern of chip distribution. The sizes of chips and proportion of chips to cement in Terrazzo or mosaic floor shall be as specified in IS 1237. The size and thickness of tiles shall be as approved by the Architect.

(q) Glazed tiles

White or coloured glazed tiles shall comply with IS 777. It shall be from an approved manufacturer and shall be flat and true to shape. They shall be free from cracks, crazing, spots, chipped edges and corners. The glazing and colour shall be of uniform shade and unless otherwise the tile shall have an average thickness of 5.50 mm.

(r) Marble

Marble slabs for flooring, dado, veneering etc. shall be of the kind specified in the item such as white or pink, makrana, chittor, black, bhanslana black, Jaisalmer yellow, Baroda Green, Patiala (Pepsu) grey etc.

Marble from which the slabs are made, shall be selected quality, hard, sound, dense and homogeneous in texture, free from cracks, decay, weathering and flaws. Before starting the work the contractor shall get the sample of marble slabs approved by the Architect.

The slabs shall be machine cut whenever specified and machine polished.

Shall be of selected quality, hard, sound, dense and homogeneous texture, free from cracks, decay, weathering the flaws. Stone slabs shall be of uniform colour and as approved by the Architect. They shall be machine cut and machine polished where specified and shall conform to the required sizes. Thickness shall be as specified in the respective items.

(t) Glass

Glass used for glazing shall be sheet glass of best approved quality, free from flaws, specks, bubble and shall be 2.9 mm thick upto 0.60 x 0.60 m size and for larger size it shall be 4 mm thick unless otherwise specified in the Schedule of Quantities.

The following types of glasses shall be used.

(u) Asbestos roofing & rain water pipes

All asbestos pipes and fittings shall comply with IS 459 and shall be free from cracks, chipped edges or corners and other damages.

(v) CGI Sheets

CGI sheets shall be of the gauge specified in the description of the item and shall conform to IS 277. The sheets shall be free from cracks, split edges, twists, surface flaws etc. They shall be clean, bright and smooth. Galvanising shall be uninjured and in perfect condition. The sheets shall show no signs of rust or white powdery deposits on the surface. The corrugation, shall be uniform in depth and pitch and parallel.

(w) Paints

Lime for lime wash, dry distemper, oil bound distemper, cement, primer, oil paint, enamel paint, flat oil paint, plastic emulsion pain, anti-corrosive primer, red lead, water proof cement paint shall be from an approved manufacturer and shall conform to the latest Indian Standards for various paints. Ready mixed paints as received from the manufacturer without any admixture shall be used, except for addition of thinner, if recommended by the manufacturer.

(x) Mortars

Lime Surkhi Mortar

Lime and Surkhi Mortar conform to the specifications, It shall be composed of Portland cement and sand. The ingredients shall be accurately gauged by measure and shall be well and evenly mixed together in a mechanical pan mixture, care being taken not to add more water than required. No mortar that has begun to set shall be used. River sand shall be used unless otherwise specified.

If hand mixing is allowed, then it shall be done on pucca water-proof platform. The gauged materials shall be put on the platform and mixed dry. Water sill then be added and the whole mixed again until it is homogeneous and of uniform colour. Not more than one bag of cement shall be mixed at one time and which can be consumed within half an hour of its mixing.

Composite lime, cement and mortar

The mortar shall be of proportions specified for each type of work in the schedule of quantities. It shall comprise of Portland cement, lime and sand. Lime shall be measured in gauge boxed similar to one used for measuring cement and sand to the proportions specified and sufficient water then be added to it to form a thick slurry. The slurry thus obtained shall then be added to dry cement and sand mixture and thoroughly mixed to make a workable homogeneous mortar of uniform colour by adding more water if necessary. Mechanical mixers shall generally be used for

mixing such mortars. If hand mixing is allowed it shall be done on pucca platform.

List of Materials of Approved Brand And/Or Manufacture

1.	Tiles (Terrazzo, Mosaic, Chequered, Plain)	Bharat, Nimmco, NITCO
2.	White Glazed Tiles	H & R Johnson, Somani Pilkington, Cera, Decora
3.	Flush doors	Sitaboard, Mysoboard, Kutty
4.	Plywood products (Particle boards)	IPM, Novopan
5.	Steel doors, windows and ventilators	Sen Harvik, Agew
6.	Rolling shutters and grills	Standard, Swastik, Diana, Hercules
7.	Aluminium doors, windows, partitions	Godrej, Ajit India, Alumilite
8.	Water proofing compounds	CICO, Imperno, Accoproof
9.	Hardners	Ironite, Ferrok, Hardonate
10.	Paints & distempers	Jenson & Nicholson, Asian Paints, Shalimar, Alkali & Chemical Corporation of India Limited, Goodlass Nerolac, Garware, Berger.
11.	Red oxide (for IPS flooring)	Shalimar, Blundel Eomite
12.	Water proof cement paints	Super Snowcem or any other brand cement paints with ISI mark
13.	Glass	Hindustan Pilkington, Triveni, Shree Vallabh
14.	Pressed steel door	Shirke Polynorm, TI Frames, Madras, Chandan Metal Products, Baroda Agew, Ahmedabad.
15.	Ceramic tiles	Spartek, Bell, Naveen, H & R Johnson.

Note – Contractors' attention is drawn to clause 23 of the General Instructions to the Contractor and Special Conditions (Page 15) in this connection. In addition to the above listed materials, materials having BIS marks will also be construed as the approved materials.

Section (C) – Mode of Measurement

The method of measurement for various items in the tender shall be generally in accordance with the IS:1200 subject to the following.

1. Excavation

- (a) Footings Area of Excavation for footing shall be measured equal to the area of the lowest concrete course as shown on the drawing. Depth shall be measured vertically from ground level to bottom of concrete course or dry rubble packing as the case may be.
- (b) Plinth beams – Depth of excavation for plinth beam shall be measured from ground level upto bottom of beam and width equal to width of beam. If a leveling course is ordered, it shall be measured upto the bottom of leveling course,
- (c) Where excavation is made in trenches, measurements for cutting shall be taken by means of tape and staff and the width of concrete or rubble packing as shown on the drawing shall be considered as width of excavation.
- (d) Where excavation is made for leveling the site, levels shall be taken before start and after completion of work and total quantity of excavation computed from these levels in manner approved by the Architect.
- (e) Where soil including soft rock and hard rock are mixed, hard rock after excavation shall be stacked separately. Measurement of the entire excavation shall be taken as indicated above. Excavation of hard rock shall be measured from stacks of excavated hard rock and reduced by 50% for bulkage and voids. The quantity so arrived at shall be paid for under hard rock. The difference between the quantity of entire excavation and quantity payable under hard rock shall be paid as soil including soft rock.

2. Earth Filling

In open space – Filling shall be measured from cross sections of embankments, levels of which are recorded by means of levels before start of work and after completion of work. When it is not possible to measure filling from cross sections, it may be measured from loose stacks or lorry measurements with previous written permission from the Architect and 20% deduction shall be made from the measured quantity to arrive at the net quantity payable.

3. Cement Concrete (Plain & Reinforced)

Cement concrete in PCC & RCC items shall be measured exclusive of reinforcement and plaster thickness but shall include necessary costs of shuttering, centering, hire charges of all equipment, curing, hacking and fair finish. Reinforcement and plaster shall be measured and paid separately.

Items like RCC precast jalli, RCC pipes and other such items which are normally manufactured in factories as well as those items which have been specifically mentioned in schedule of quantities shall be measured inclusive of reinforcement.

No deductions will be made for openings upto 0.1 sq.m. and no extra labour for forming such opening or voids shall be paid.

Columns shall be measured from the top of the footing and shall be measured through, including flare of column in case of the column in case of flat slab

construction.

Beams shall be measured from face to face of column /beams and shall include haunches, if any. The depth of the beams (other than raft foundation beams) shall be measured from the top of the slab to bottom of the beam. In case of inverted beams and semi-inverted beams the depth shall be overall depth of beam.

In case of combined footings and raft foundation, the exposed portion of beam rib shall be measured as beam and the remaining portion measured in footing/raft slab.

Slabs (other than in raft foundation) shall be measured in bays (clear of beams) with deduction for column portion.

Chajjas only projected portion shall be measured in sq.mt.

Staircase – Measurements shall be in Cu.Mt. Staircase comprising of step, soffit slab, landing slab shall be measured and paid under this item. Side parapet walls, railings, finishing of risers and trades and that the reinforcement and plastering etc. shall be paid separately under respective items.

4. Reinforcement

Shall be measured in lengths of bars as actually placed in position on standard weight basis, no allowance being made in the weight for rolling margin. Wastage and binding wire shall not be measured. Authorised overlaps and spacers shall only be measured.

5. Brick Work

Except walls of half brick thickness or less, all brick work shall be measured in cubic meters.

Walls of half brick thickness or less shall each be measured separately and given in square meters starting the thickness.

Thickness of wall

Brick walls upto and including three bricks in thickness shall be measured in multiples of half brick which shall be deemed to be inclusive of the mortar joints. Where fractions of half brick occur to architectural or other reasons, the measurement shall be taken as full half brick.

For walling, which is more than three bricks in thickness the actual thickness of wall shall be measured to the nearest centimeter.

Honeycombed brick walling shall be given in square meter starting the thickness of wall and the pattern of honeycombing. Honeycomb openings shall not be deducted.

Deductions

No deductions or additions shall be made on any account for :

- (i) ends of dissimilar materials (i.e. joints, beams, lintels, lofts, girders, rafter, purlins, trusses, corbels, steps etc.) upto 500 square centimeter in section.
- (ii) Opening upto 0.1 sq.mt. in section.
- (iii) Wall plates, bed plates and bearing of slabs, chajjas and the like where the

thickness does not exceed 10 cm and the bearing does not extent over the full width of the wall.

6. Stone Masonry

Except where otherwise described, stone work and stone walling generally shall be given in cubic meters and facia work in square meters.

When measuring walls, the thickness shall be measured to the nearest one centimeter.

Deductions shall be made as described under brick work.

7. Wood Work

All work shall be measured net as fixed. No extra measurement will be given for shape, joints, splayed, meeting sites of doors and windows and shall be measured in unit of square meter.

Area over one face inclusive of exposed frame thickness (excluding width of cover mould) shall be measured in case of doors, windows and ventilators when frames are included in the item. Portions embedded in masonry or flooring shall not be measured. Where frames are measured separately mode of measurements shall be as per CPWD practice.

Reduction in quoted rates will not be made for the material used of specified sizes including permissible tolerances as per IS code. Likewise no increase will be admissible for using material sizes beyond the size specified in the agreement/ drawing.

8. Steel doors, windows, ventilators, louvers

Clear area between side jambs and clear height between floor and bottom of lintel/ beam shall be measured. Hood shall not be measured separately. The rate should be inclusive of the cost of hood.

10. Flooring, skirting, dado

Flooring shall be measured from skirting to skirting and where the wall surfaces are plastered or provided with dado it shall be measured from plaster to plaster or dado to dado.

The skirting and dado shall be measured clear from the floor to the top of tile and the length shall be between finished tile faces measured along the floor.

11. Plastering & Painting

All plastering and painting work shall be measured in square meters unless otherwise described.

Net area of surface plastered shall be measured. No deductions will be made for ends of joints, beams, posts etc. and openings not exceeding 0.5 sq.mt. each and no addition shall be made for reveals, jambs, soffits, sills etc. of these openings nor for finishing the plaster around openings, end of joints, beams and posts etc.

12. Painting, white washing, colour washing and distempering

All painting work shall be measured. No deductions will be made for unpainted surfaces of end of joints, beams, posts etc. and openings not exceeding 0.5 sq.mt. and no addition shall be made for reveals, jambs, sills etc. of these openings.

The following multiplying factors for obtaining equivalent areas shall be adopted.

Sr. No.	Description of work	How measured Factor	Multiplying No.
	1	2	3
1	Panelled or framed and braced or ledged and battened or ledged battened and braced joinery.	Measured flat (not girthed) including CHOWKAT or frame edges, chocks, cleats etc. shall be deemed to be included in the item.	1.30 (for each side)
2	Flush joinery	Measured flat (not girthed) including CHOWKAT or frame edges, chocks, cleats, etc. shall be deemed to be included in the item.	1.20 (for each side)
3	Fully glazed or gauzed joinery	Measured flat (not girthed) including CHOWKAT or frame edges, chocks, cleats, etc. shall be deemed to be included in the item.	0.80 (for each side)
4	Partly paneled and partly glazed or gauzed joinery	Measured flat (not girthed) including CHOWKAT or frame edges, chocks, cleats, etc. shall be deemed to be included in the item.	1.00 (for each side)
5	Fully venetioned or louvered	Measured flat (not girthed) including CHOWKAT or frame edges, chocks, cleats, etc. shall be deemed to be included in the item.	1.80 (for each side)
6	Weather boarding joinery	Measured flat (not girthed) supporting framework shall not be measured separately.	1.20 (for each side)
7	Wood shingle roofing	Measured flat (not girthed)	1.10 (for each side)
8	Boarding with cover fillets and match boarding	Measured flat (not girthed)	1.05 (for each side)
9	Tile and slate battening	Measured flat overall, no deduction shall be made for open spaces.	0.80 (for painting all over)
10	Trellis (or JAFFRI work on way or two way)	Measured flat overall, no deduction shall be made for open spaces, supporting members shall not be measured separately.	2.00 (for painting all over)
11	Guard bars, balustrades, gates, gratings, grills, expanded metal and railings	Measured flat overall, no deduction shall be made for open spaces, supporting	1.00 (for painting all over)

		members shall not be measured separately.	
12	Gates and open palisade fencing, including standards, braces, rails, stays etc.	-do-	1.00 (for painting all over)
13	Carved or enriched work	Measured flat	2.00 (for each side)
14	Steel roller shutters	Measured flat (size of opening) overall, jumb guides, bottom rails and locking arrangement etc. shall be included in the item (top cover shall be measured separately)	1.10 (for each side)
15	Plain sheet steel doors and windows	Measured flat (not girthed) including frame, edges etc.	1.10 (for each side)
16	Fully glazed or gauzed steel doors and windows	Measured flat (not girthed) including frame, edges etc.	0.50 (for each side)
17	Partly paneled and party glazed or gauzed steel door	Measured flat (not girthed) including frame, edges etc.	0.80 (for each side)
18	Collapsible gate	Measured flat (size of opening)	1.50 (for painting all over)
19	All types of plaster and all other areas and works not included above	Measured flat	1.00 (one only) for each surface measured flat

Section (D) – Workmanship

Plain & Reinforced Cement Concrete

General

Except where they are varied by the requirements of this specification due provision of Indian Standard Specification IS-456-1964 for plain and reinforced concrete and IS-432 Part I & II for Mild & medium tensile steel bars and hard drawn steel wire for concrete reinforcement and any other relevant ISS applicable together with the latest amendments shall be held to be incorporated in this specification. It shall be intent of these specifications to ensure that all concrete placed at various locations of the job should be durable, strong enough to carry the design loads, it should wear well and practically be impervious to water. It should be free from such defects as shrinkage, cracking and honeycombing.

Proportioning the Mix

In ordinary concrete, excluding controlled concrete, proportions of cement to fine and coarse aggregate shall be as specified in the respective items and shall be accurately measured as in Table A below. These proportions are based on assumption that the aggregate are dry. If aggregates are moist, allowance shall be made for bulking in accordance with IS:2386. Allowance shall also be made for surface water present in aggregate when computing water content. Surface water present shall be determined by one of the field methods described in IS:2386 (Part III). In the absence of exact data, the amount of surface water may be estimated from the values given in Table B below.

Mixing

Concrete of 1:2:4 or richer mix shall be mixed in an approved mechanical mixer. The mixer and the mixing platform shall be suitably protected from wind and rain. Aggregate shall be accurately measured out in boxes and mixed dry along with cement, water shall then be added in measured quantity and mixing shall be continued until there is an uniform distribution of the materials and the mass is uniform in colour and consistency but in no case shall be mixing be done for less than 2 minutes.

When hand mixing is permitted with the approval of the Architect, it shall be carried out on a water tight mixing platform and care shall be taken to ensure that mixing is continued until the mass is uniform in colour and consistency.

Consistency

Quantity of water for making reinforced concrete shall be sufficient, so as to ensure that concrete shall surround and properly grip all the reinforcement. The best consistency shall be that, which will flow sluggishly without flattening out and without separation of coarse aggregates from the mortar. The degree of plasticity shall depend on the nature of work and atmospheric temperature and whether the concrete is vibrated or hand compacted. The slumps shown in Table C on page No.70 obtained by the standard slump test carried out in accordance with the procedure laid down in IS 1199-1959 shall be adopted for different types of work.

Admixtures

The use of admixtures may be allowed only if approved by the structural consultant and his

decision in this regard shall be final.

Transporting

Concrete shall be conveyed from the place of mixing to the place of final deposit as rapidly as practicable by methods which will prevent segregation or loss of any of the ingredients. If segregation does occur during transport, the concrete shall be re-mixed before being placed. In no case, more than 30 minutes shall elapse between mixing and consolidation in its position.

Placing & Compacting

Concrete shall be placed in layers of suitable thickness or in strips and compacted before initial setting commences and should not be subsequently disturbed. Method of placing shall be such as to preclude segregation and as far practicable, the placing shall be continuous. Special care shall be taken in accordance with IS:456 while laying concrete under extreme weather.

Concrete shall be thoroughly compacted during the operation of placing and thoroughly worked around the reinforcement, embedded fixtures and spaded against corners of the form work and by punning, rodding, mechanically vibrating or by any other approved means. In addition, form work shall be tapped tightly by using wooden mallet at the pouring head. The number and type of vibrator to be used shall be subject to the approval of Architects and in general immersion type vibrators shall be used. External vibrators shall also be used whenever directed.

The intensity and duration of vibration shall be sufficient to cause complete settlement and compaction without any stratification of successive layers or separation of ingredient or formation of laitance. Vibrator shall be inserted vertically in the concrete at points not more than 45 cm apart and withdrawn very slowly when air bubbles no longer come on the surface. Over vibration or vibration of very wet mixes is harmful and should be avoided. Care shall be taken to utilize the vibrator only to compact the concrete and not to spread it. Sufficient number of reserve vibrators in good working condition shall be kept on hand at all times, so as to ensure that there is no slackening or interruption in compacting.

Construction Joints

Concreting shall be carried out end to end continuously as far as possible and when construction joints are totally unavoidable, it shall be located in a predetermined position approved by the Architect. The joints shall be kept at places, where the shear force is the minimum and these shall be straight and at right angles to the direction of main reinforcement. When the work has to be resumed on a surface which has hardened, such surface shall be roughened, it shall be swept clean, thoroughly wetted and covered with a 13 mm thick layer of mortar composed of cement and sand in the same ratio as the cement and sand in the concrete mix. This 13 mm layer of mortar shall be freshly mixed and placed immediately before the placing of concrete.

Where the concrete has not fully hardened, all laitance shall be removed by scrubbing the wet surface with wire or bristle brushes, care being taken to avoid dislodgement of particles of aggregate. The surface shall be thoroughly wetted and free water removed. The surface shall then be coated with neat cement grout. In horizontal joints the first layer of concrete to be placed on this surface shall not, exceed 15 cm thickness and shall be well rammed against old work, particular attention being paid to corners.

Expansion Joints

Expansion joints shall be provided where required as shown on the drawing or as directed by the Architect/Consultant. The joints shall be filled with approved quality filler.

Curing

Concrete shall be carefully protected during first stage or hardening from harmful effects of excessive heat, drying winds, rain or running water. It shall be covered with a layer of sacking sand, canvas, hesin or similar absorbent materials and kept constantly wet for ten days from the date of placing of concrete. Alternatively, the concrete being thoroughly wetted and covered by layer of approved waterproof material which should be kept in contact with it for seven days.

Form Work

The form work shall conform to the shape, lines and dimensions as shown on the plans and be so constructed as to remain sufficiently rigid during the placing and compacting of the concrete and shall be sufficiently water tight to prevent loss of cement slurry from the concrete. For work or centering shall be constructed of steel or timber and adequately designed to support the full weight of wet concrete without deflection and retain its form during laying, ramming and setting of concrete. Timber used shall be properly seasoned so as to prevent deformation when wetted.

All props shall be straight and of full height and no joints shall be allowed. Props shall be braced with thin bamboos or wooden battens and where additional staging is necessary, extra care shall be taken to use bigger diameter props with bracing at 4 to 5 levels. All props shall be supported on sole plates and double wedges. At the time of removing props these wedges shall be gently ceased and not knocked out.

All rubbish, chippings, shavings and saw dust shall be removed from the interior of the forms before the concrete is placed and the form work in contact with the concrete shall be cleaned and thoroughly wetted or treated with non-stain mineral oil or any other approved material. Care shall be taken that oil or such approved material is kept out of contact with the reinforcement.

All form work shall be removed without shock or vibration and shall be ceased off carefully in order to allow the structure to take up gradually. Forms shall not be disturbed until concrete has adequately hardened to take up superimposed load coming on it and in no circumstances shall forms be struck until the concrete reaches a strength of at least twice the stress to which the concrete may be subjected at the time of striking.

In the normal circumstances (generally where temperatures are above 21 deg.C) and where ordinary cement is used, forms may be struck after expiry of following periods.

(a)	Walls, columns and vertical sides of beams	48 hours or as may be directed by Architects.
(b)	Bottom of slab upto 4.5m span	7 days
(c)	Bottom of slab above 4.5m span , bottom of beam and arch rib upto 6m span	14 days
(d)	Bottom of beams and arch rib over 6m span	21 days

However, this period may be increased or decreased at the discretion of Architects. Special

care shall be taken while striking the centering of cantilevered slab canopies, portal frames folded plate construction and period of striking centering shall be as determined by the Architect.

If directed, forms shall be given an upward camber to ensure that the beams do not have any sag.

Surface that becomes exposed on removal of forms shall be carefully examined and any fins, burns, projections etc. that are detected shall be removed. Any honeycombing of minor nature shall be finished nearly with cement mortar 1:2.

Any work showing signs of damage through premature or careless removal of centering or shuttering, shall be reconstructed by the contractor at his own cost.

Strength

Concrete mixed in the proportion desired shall have compressive strength after placing, not less than the following.

Sr. No.	Concrete mix	Minimum compressive strength (7 days)	Minimum compressive strength (28 days)
1	1:1:2	160 Kg/sq.cm (2250 lbs/sq.in)	250 Kg/sq.cm (3500 lbs/sq.in)
2	1:1.5:3	132 Kg/sq.cm (1875 lbs/sq.in)	200 Kg/sq.cm (2850 lbs/sq.in)
3	1:2:4	106 Kg/sq.cm (1500 lbs/sq.in)	150 Kg/sq.cm (2250 lbs/sq.in)

Tests

Tests on concrete shall be carried out in accordance with IS 456 and any other ISS applicable. The frequency of works test shall be at such intervals as ordered by the Architect and subject to that every 150 cu.m. concrete placed or part thereof and for a day's concrete exceeding 20 cu.m. a batch of 6 cubes shall be made for every sample and 3 of them tested after 7 days and the remaining 3 cubes shall be tested after 28 days. The criteria for acceptance of a concrete as conforming to the specified proportion/ grade of concrete shall be in accordance with IS 456 and the contractor shall entirely re-do the rejected work at his own cost. Strength of 28 days shall alone be considered for acceptance.

The contractor shall arrange to carry out the tests in accordance with the relevant Indian Standard Specifications in an approved laboratory and the test reports in original submitted to Architect. The entire cost of testing shall be borne by the contractor.

Steel reinforcement

Reinforcement shall be accurately fabricated, placed and adequately, maintained in position as shown on drawings or as directed by the Architects. All finished bars shall be free from cracks, surface flows, laminations, jagged and imperfect edges. Cement mortar blocks shall be used to give requisite cover as shown on the drawing or as directed and all

intersections of bars shall be firmly ties with binding wire of 16 to 18 gauge. Reinforcement shall be bent in accordance with the procedure stipulated in IS 2502 of 1963 and will not be straightened in a manner which will injure the material.

All reinforcement shall immediately before placing in concrete, be thoroughly cleaned of loose mill scale, loose rust, oil and grease or other deleterious matter that would destroy or reduce bond.

Reinforcement in reinforced concrete members shall not be connected by welding or coupling except in accordance with relevant ISS and with the previous approval of the Architect. Overlaps and joints shall be staggered and located at points, along the span where neither shear nor bending moment is maximum.

Cover

Reinforcement shall have cover as shown on the RCC drawings and where not specified the thickness of cover shall be as follows. Cement mortar blocks in CM 1:1 shall be used for making cover blocks.

- (a) At each end of reinforcing bar not less than 25 mm nor less than twice the diameter of such rod or bar.
- (b) For a longitudinal reinforcing bar in a column not less than 40 mm nor less than the diameter of such rod or bar. In the case of columns of minimum dimensions of 20 cm or under whose reinforcing bars do not exceed 13 mm, the cover of 25 mm may be used.
- (c) For longitudinal reinforcing bar in a beam not less than 25 mm, nor less than the diameter of such rod or bar.
- (d) For tensile, compressive, shear or other reinforcement in a slab not less than 13 mm, nor less than the diameter of such reinforcement and
- (e) For any other reinforcement not less than 13 mm nor less than the diameter of such reinforcement.

Table A

Sr. No.	Nominal mix	Quantity of aggregate required for 50 Kg of cement		Quantity of water required for 50 Kg of cement	
		Fine Cu.M.	Coarse Cu.M.	Vibrated	Un-vibrated
				(For dry aggregates)	
1	1:1:2	0.035 (1.2 Cu.Ft.)	0.070 (2.4 Cu.Ft.)	22 Litres (4.8 Gallons)	27 Litres (6 Gallons)
2	1:1.5:3	0.052 (1.8 Cu.Ft.)	0.106 (3.6 Cu.Ft.)	23 Litres (5 Gallons)	30 Litres (6 Gallons)
3	1:2:4	0.070 (2.4 Cu.Ft.)	0.138 (4.8 Cu.Ft.)	27 Litres (6 Gallons)	32 Litres (7 Gallons)
4	1:3:6	0.105 (3.6 Cu.Ft.)	0.210 (7.2 Cu.Ft.)	28 Litres (6.25 Gallons)	34 Litres (7.5 Gallons)
5	1:4:8	0.150 (4.8 Cu.Ft.)	0.280 (9.6 Cu.Ft.)	--	45 Litres 910 Gallons)

Table B

Sr. No.	Aggregate	Approximate quantity of surface water in Litres/ Cu.Mt.
1	Very wet sand	120
2	Moderately wet sand	80
3	Moist sand	40
4	Moist gravel or crushed rock	20 to 40
	Coarser the aggregate, lesser the water it will carry	

Table C

Sr. No.	Type of work	Slumps	
		When vibrated	When not vibrated
1	Mass concrete in RCC foundation footings retaining walls and road slabs	2.5 cms (1")	5 cms (2")
2	Beams, slabs, columns with simple reinforcement	2.5 cms to 5 cms (1" to 2")	5 cms to 10 cms (2" to 4")
3	Thin sections with congested reinforcement	5 cms to 10 cms (2" to 4")	10 cms to 15 cms (4" to 6")

Note – Should conditions governing slump and workability change pointing to advisability of an increased slump, this shall only be done by decreasing the amount of aggregate and not by increasing the amount of water.

Specification for Controlled Concrete

The following specifications shall form part of the contract and these shall be deemed to be supplemental to the specifications in the printed tender and not in derogation thereof except to the extent specifically provided therein.

1.0 General

1.1 All concrete shall comply with the requirements of IS 458. Wherever a reference is made to any Indian Standard Code of practice it shall mean the latest version of the relevant standard in use.

1.2 Concrete work shall be supervised by a competent concrete technologist approved by the Architect – Structural Consultant whose duty will be to supervise all stages of designing the mix, preparation and placing of concrete. All cubes shall be made and site tests carried out under his direct supervision in the presence of Architect/ Structural Consultant or his authorised representatives. In order to exercise the required degree of constant control over the concrete materials and their preparations, the contractor shall set up and maintain at his own expense, a testing laboratory at site. He shall provide all apparatus required for sensitive testing of concrete and concrete materials and in particular he must have the following equipment in the Site Laboratory.

- (i) Compression testing machine of minimum capacity of 150 T.
- (ii) A set of standard sieves.
- (iii) Sieve vibrator.
- (iv) Measuring cylinders.
- (v) Slump cones.
- (vi) Adequate number of standard moulds & vibrating table.
- (vii) Weighing balance.
- (viii) Oven or other apparatus to dry aggregates.
- (ix) Curing tank for cubes.

Any other apparatus deemed necessary by the Architects/ Structural Consultant for proper control shall be provided by the contractor at his own expense.

The laboratory shall be staffed by full time qualified technicians.

1.3 Before the commencement of construction work, the contractor shall supply to the Architects/ Structural Consultant for his approval, drawings showing the general detailed arrangement for concreting plant.

1.4 All materials which have been damaged, contaminated or have deteriorated or do not comply in any way with the requirements of this specifications shall be rejected and shall be removed from the site at the contractor's expense.

1.5 Materials viz. cement, fine aggregates, coarse aggregate, water etc. shall be tested, if directed, in an approved testing laboratory and test reports in original, shall be forwarded to Architect and all costs of tests shall be borne by the contractor.

If directed, tests shall be repeated and cost of such tests shall be borne by the contractor.

- 1.6 The concrete mix shall be designed by any of the recognized methods. The proportions chosen should be such that the concrete is of adequate workability for the conditions prevailing on the work in question and can be properly compacted.
- 1.7 The maximum total quantity of aggregate by weight shall not exceed what is shown in the table given below in paragraph 3.3 except where otherwise specifically permitted by the Architect/ Consultant.
- 1.8 Except where it can be shown to the satisfaction of the Architect/ Consultant that supply of properly graded aggregate of uniform quality can be maintained over the period of work, the grading of aggregate should be controlled by obtaining the coarse aggregate in different sizes and blending them in the right proportions for various mix designs, the different sizes being stocked in separate stock piles. The materials should be stock piled preferably a day before use. The grading of coarse and fine aggregate should be checked as frequently as possible, the frequency for a given job being determined by the Architect/ Consultant to ensure that the suppliers are maintaining the uniform grading with that of the samples used in the preliminary tests.
- 1.9 In proportioning concrete, the quantity of both cement and aggregate should be determined by weight. Water should be either measured by volume in calibrated tanks or weighed. All measuring equipment shall be maintained in a clean serviceable condition and their accuracy periodically checked.
- 2.0 Materials
 - 2.0.1 Cement – Shall comply in every respect with the requirements of the IS 269 for Portland cement and shall be obtained from approved sources.
 - 2.0.2 Cement shall be stored in suitable weatherproof structures in raised wooden platform and in stacks which are not higher than 10 bags. Sufficient space shall be provided for circulation and rotation of bags in order to minimize the length of storage of any of the bags. Provisions for storage shall be ample and the consignment of cement as received shall be separately stored in such a manner as to provide easy access for the identification and inspection of each consignment. Cost of providing these structures shall be borne by the Contractor.
 - 2.0.3 Stored cement shall meet the test requirements at any time after storage when a retest by the Architect/ Consultant. Cement concerning which there is doubt shall not be used pending testing and satisfactory results. All cement not conforming to specifications and rejected by the Architect/ Consultant shall be removed immediately from the site of work.
 - 2.0.4 Cement shall be used in the sequence in which it arrives. In order that no cement shall be unnecessarily stored for a long period. If cement becomes lumpy due to partial hydration it shall be removed from the site immediately.
 - 2.0.1 Admixtures – Shall be allowed to improve workability only if there is proven evidence that neither the strength nor the other requisite qualities of concrete and/or steel, accessories, grout are impaired by their use. The use of admixtures containing Calcium Chloride, fluoride, Nitrates and Sulphates is prohibited. The Architect's decision on all matters relating to the use of admixtures shall be final.
 - 2.0.2 Admixtures shall be stored in a suitable weatherproof shed/ building. Any material

which has deteriorated or which has been contaminated or damaged whether during transit or at site, shall be immediately removed from the site and replaced at contractor's own expense.

2.3.1 Fine Aggregate – Shall conform with the requirements of IS 383 and relevant portion of IS 515. It shall be chemically inert, strong, hard, durable, of limited porosity, free from adherent coatings, clay lumps, coal and coal residues, and shall not contain any organic matter of other admixtures that may cause corrosion of reinforcement or impair the strength of durability of the concrete. The maximum quantity of the deleterious materials shall not exceed the limits specified in the relevant Indian Standard Specifications.

2.3.2 The natural sand shall have grading conforming to one of the four grading limits given in the following table.

IS sieve designation	Percentage passing			
	Grading Zone I	Grading Zone II	Grading Zone III	Grading Zone IV
10 mm	100	100	100	100
4.75 mm	90-100	90-100	90-100	95-100
2.36 mm	60-95	75-100	85-100	95-100
1.18 mm	30-70	55-90	75-100	90-100
600 micron	15-34	35-59	60-79	80-100
300 micron	5-20	8-30	12-40	15-50
150 micron	0-10	0-10	0-10	0-15

(When grading falls outside the limits of any particular grading zone of sieves, other than 600 micron sieve, by a total amount not exceeding 5% it shall be regarded as falling within the grading zone).

2.4.1 Coarse Aggregate – Shall conform with the requirements of IS 383 and relevant portions of IS 515. It shall consist of hard, dense, durable, uncoated crushed rock. Use of gravel shall be allowed only if specified in the schedule of quantities. Aggregates shall be free from soft, friable, thin or flaky pieces. It shall be free from injurious amounts of alkali and organic matter other than deleterious materials. The maximum quantity of deleterious materials shall not exceed the limits specified in the relevant Indian Standard Specifications.

2.4.2 Coarse aggregates shall be obtained in single sizes conforming to the grading given in the following table in respect of each nominal size. Single sized aggregates shall be blended in suitable proportions to obtain a desired grading of coarse aggregates. At the discretion of the Architect/ Consultant, use of graded aggregates shall be allowed provided the grading conforms to the limits specified in the following table under Column B.

IS Sieve Designation	A					B				
	% passing for single sized aggregate of nominal size					% passing of graded aggregate of nominal size				
	63	40	20	16	12.5	10	40	20	16	12.5
mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm

80	100	--	--	--	--	--	100	--	--	--
63	85-100	100	--	--	--	--	--	--	--	--
40	0-30	85-100	100	--	--	--	95-100	--	--	100
20	0-5	0-20	85-100	100	--	--	30-70	95-100	100	100
16	--	--	--	85-100	100	--	--	--	90-100	--
12.5	--	--	--	--	85-100	100	--	--	--	90-100
10	--	0-5	0-20	0-30	0-30	85-100	10-35	25-55	30-70	40-85
4.75	--	--	0-5	0-5	0-5	0-20	0-5	0-10	0-10	0-10
2.36	--	--	--	--	--	0-5	--	--	--	--

- (a) For heavily reinforced concrete members as in the case of ribs of main beams, the nominal maximum size of the aggregate shall usually be restricted to 5 mm less than the minimum clear distance between the main bars or 5 mm less than the minimum cover to the reinforcement whichever is smaller.
- (b) Where reinforcement is widely spaced as in solid slabs, nominal maximum size of the aggregate shall be 20 mm.
- (c) For reinforced concrete work, aggregate having a maximum size of 20 mm shall be used.

2.4.4 In selecting coarse as well as fine aggregates, the contractor shall satisfy himself that the source is suitable and adequate for regular supply and a watch shall be maintained that the particle shape and grading remain reasonably uniform throughout the progress of work. If directed by Architect/ Consultant, the aggregates shall be washed at contractor's expense.

2.4.5 For both fine and coarse aggregates, preliminary tests shall be carried out for physical characteristics limits of deleterious substances, soundness etc. prior to commencement of work and also when the source of supply is changed.

2.5.1 Water - Water used for both mixing and curing shall be free from injurious amounts of deleterious materials. Potable water is generally considered satisfactory for mixing and curing concrete. Water containing any sugar or an excess of acid, alkali or salt, shall not be permitted for use. Water which fails to satisfy the following requirements shall not be used.

- (a) To neutralize x 200 ml sample it should not require more than 2 ml of 0.1 normal NaOH.
- (b) To neutralize 200 ml sample it should not require more than 10 ml of 0.1 normal HCL.
- (c) Percentage of solids should not exceed the following.
Organic 0.02 percent
Inorganic 0.30 percent
Sulphates 0.05 percent
Alkali chlorides 0.10 percent

2.5.2 In case of doubt the Architect/ Consultant may require that concrete mixed with water proposed to be used should not have a compressive strength, lower than 90% of the strength of concrete mixed with distilled water.

2.6.1 Reinforcement - All reinforcement shall conform with the requirements of relevant IS

specifications for mild steel, deformed steel etc. All reinforcement when placed in position, shall be clean and free from loose mild scales, dust, loose rust and coats of paints, oil or other coatings which may destroy or reduce bond.

- 2.6.2 Welded joints may be allowed only when tests shall be made to prove that the joints are of the full strength of the bars connected. Welding of reinforcement shall be done in accordance with the recommendations of relevant Indian Standards for welding of mild steel bars used in reinforced cement concrete.
- 3.1 Concrete Mix Design – Concrete mix for various specified design strength shall be worked out by the contractor by any of the recognized method of mix design. There shall be one or two or more mix designs for same grade of concrete for different workability as required for different structural members such as slabs, beams, columns etc.
- 3.2 The selected mix proportion shall ensure that workability of the fresh concrete is suitable for conditions of handling and placing, so that after compaction it surrounds all reinforcement ducts etc. and completely fills the form work. When the concrete is hardened, its quality shall be such as to comply with the strength, durability and other requirements, taking into account the conditions to which it will be exposed.
- 3.3 The preliminary mix design shall assume only fair control, unless the contractor can prove from his past experience that he is capable of achieving a high degree of control. Before arriving at average strength values, the contractor shall give due regard to the criteria of acceptance for preliminary test as stipulated in IS 456 (please see Table I) 5 companion cubes shall constitute a test and the average strength of 5 companion cubes tested shall not be less than the stipulated strength for preliminary tests. The design mix and control shall be accepted if only one out of five cubes may give a value less than the specified strength (Ref. Cl 5.2.2.1 and 5.4.2 of IS 456-1964). The contractor shall prepare well in advance all calculations, tabulations, graphs pertaining to concrete mix design and preliminary test results and submit the copies to Architect/ Consultant for their instructions (Please see Table II). Only that mix which is approved in writing by the Architect/ Consultant shall be allowed on the works. However, it shall be clearly understood that such approval shall not absolve the contractor of his responsibility for compliance of works test results.
- 3.4 The minimum cement content for various mixes as well as the maximum aggregate cement ratio shall be as under.

Maximum aggregate/ Cement ratio by weight	Mix	Cement content Concrete
9.0	M 150	280 Kg/Cu.Mt. (800 Kg/100 CFT)
7.0	M 200	320 Kg/Cu.Mt. (900 Kg/100 CFT)
6.0	M 250	350 Kg/Cu.Mt. (1000 Kg/100 CFT)
5.0	M 300	390 Kg/Cu.Mt. (1100 Kg/100 CFT)
4.5	M 350	425 Kg/Cu.Mt. (1200 Kg/100 CFT)
4.0	M 400	460 Kg/Cu.Mt. (1300 Kg/100 CFT)

4. Mixing & Placing of Concrete
- 4.1 Measurement of materials – Cement – In proportioning concrete, the quantity of both cement and aggregates shall be determined by weight. Where the weight of

cement is determined by accepting the maker's weight per bag, a number of bags as directed by the Architect/ Consultant shall be weighed separately to check the net weight. Where cement weighed on the site and not in bags, it shall be weighed separately from the aggregates.

- 4.2 Aggregate – Aggregate shall be batched by weight in a mechanical weigh-batcher or batching plant unless otherwise specified in the schedule of quantities. Where volumetric proportions are allowed, with the consent of the Architect/ Consultant, the conversion from weight to that of volume shall be on the basis of dry bulk densities of the aggregates.
- 4.3 Water – Water shall be measured either by volume in calibrated tanks or weighed. Water shall not be measured using ordinary buckets. Measurement of water to control and maintain water cement ratio is of utmost importance and adequate attention shall be given by the contractor to the satisfaction of the Architect/ Consultant.
- 4.4 All measuring equipment shall be of approved type and maintained in serviceable condition and their accuracy periodically checked.
- 4.5 Mixing – Concrete shall be mixed in a mechanical mixer. Thorough mixing of concrete is essential and mixer shall always be operated at the speed recommended by the makers. The mixing time from the time of adding water shall be in accordance with IS 1791, but in no case mixing shall be done for less than two minutes to ensure that the materials are uniformly distributed and the mass is uniform in colour and consistency. When the mixing is over, the entire contents of the drum shall be discharged in one operation into a hopper or a container to avoid segregation of mortar from coarse aggregate. If the concrete is allowed to be unloaded on a platform, it shall be watertight. After day's work the mixer shall be thoroughly washed and blades cleaned otherwise mixing drum will soon become callous with hardened concrete which will impair the efficiency of the mixer. Inside of the drum shall be inspected regularly, any blades which are worn out or broken should be replaced.
- 4.6 Transporting – Concrete shall be handled from the place of mixing to the place of final deposit as rapidly as practicable by methods which will prevent the segregation or loss of any of the ingredients. If segregation occurs during transport the concrete shall be remixed before being placed.
- 4.7.1 Placing – Concrete shall be placed in position and compacted before initial setting commences and when once compacted, it shall not be subsequently disturbed. Method of placing shall be such as to preclude segregation.
- 4.7.2 During hot or cold weather, concrete shall be transported in deep containers to reduce loss of water by evaporation during hot weather and loss of heat during cold weather. Deep containers are specified on account of their lower ratio of surface area to mass.
- 4.7.3 Concrete shall not be dropped into position from a height greater than 2.0 metres.
- 4.7.4 Before the concrete is actually placed in position, the inside of the forms should be inspected to ensure that the shuttering is watertight and the surface treated with approved composition. All debris, sand dust etc. shall be removed from shuttering before concrete is placed in position.

- 4.7.5 Concrete shall be in suitable layers depending upon the nature of work and in no case shall be more than 30 cm thick, placing shall be confinery as far as practicable.
- 4.7.6 When concrete is required to be placed under adverse condition viz. extreme weather conditions, under water, in alkali soils and in alkaline water, the requirements as stipulated in IS 456 shall be complied.
- 4.8.1 Compaction – Concrete shall be thoroughly compacted during the operation of placing and thoroughly worked around the reinforcement around embedded fixtures and into corners of the form work. Means of compaction shall be by rodding, punning and by light tapping the form work on the external face at the actual pouring head and this shall be followed by mechanical vibration by using approved type vibrator.
- 4.8.2 Beams and columns shall be vibrated using immersion vibrators as per IS 2505 and IS 3558, thin sections like water tank walls shall be vibrated using clamp on vibrators and shall be vibrated using surface vibrators. The contractor shall at all times have in reserve sufficient vibrators of each type to guard against shutdown of the work occasioned by the failure of the equipment. No concreting shall be permitted in the event of power failure.
- 4.8.3 The intensity and duration of vibration shall be sufficient to ensure complete settlement and compaction without any stratification of successive layers or separation of ingredients or formation of laitance. Immersion vibrators shall be inserted vertically and not at an angle at regular intervals not more than 45 cm. apart withdrawn very slowly when air bubbles no longer come on the surface. It is better to vibrate at smaller intervals for shorter periods of time, rather than at wider intervals for longer periods of time.
- To avoid trapping of air the thickness of layer of concrete to be vibrated shall not be less than 15 cm and maximum advisable shall be 45 cm. The vibrator shall be used only to aid compaction and shall never be used to push concrete laterally in the forms and it shall never be used nearer than 10 cm to the form surface in order to obtained a uniform appeance.
- 4.8.4 Curing – Concrete shall be carefully protected during first stage of hardening from harmful effects of excessive heat, drying winds, running down of surface water and shocks. Concrete shall be prevented from drying out at least for a period 14 days and thereafter the surface kept moist for another 7 days. The method of curing shall be that horizontal surfaces shall be kept covered with ponded water for a continuous period of 14 days and vertical surfaces like columns, fins etc. shall be covered with straw, Hessian etc. and kept constantly wet by water spray. Mere sprinkling of water on vertical surfaces shall not be allowed.
- 5.1 Testing and acceptance of concrete – Method of sampling and testing shall be carried out as per IS 1199 and IS 516 and evaluation of test results shall be as per IS 456 in general and clause 5.4 hereafter in particular.
- 5.2 Tests shall be conducted on compaction cubes of specimen. Companion specimens shall be cast from a single batch of concrete and shall be of the same age at the time of testing. The average strength of three companion specimens shall constitute the result of that test. From each sample of concrete 6 companion cubes shall be taken. Three of these shall be tested at 7 days and the remaining 3 at 28 days.
- 5.3 A minimum of two such samples giving 12 cubes shall be obtained per mix per day

for every 30 Cu.Mt. or fraction thereof for each grade, whichever gives more number of cubes. The Architect/ Consultant may at his absolute discretion increase or decrease the frequency of tests.

- 5.4 The criteria for acceptance of a concrete shall be in accordance with the latest version of IS 456 and the consequences of rejection shall be at the expense of Contractors. Strength of 28 days shall alone be considered for acceptance.

Table I

Strength requirements of concrete (All values in Kg/Cm)

Compressive strength of 15 cm cubes at 28 days after mixing, conducted in accordance with IS 516		
Grade of concrete	Preliminary test Min.	Work test Min.
M 100	135	100
M 150	200	150
M 175	230	175
M 200	260	200
M 250	320	250
M 300	380	300
M 350	440	350

Table II

Acceptance Criteria For Concrete
(For all grades of concrete) Clause 5.2.2.1 and 5.4.2 of IS 456 latest

Preliminary test				Work test				
Minimum no. of specimens from each batch (Cubes)		Minimum frequency	Criteria acceptance	Minimum no. of specimens taken from the same day's work (Cubes)		Minimum	Frequency	Criteria for acceptance
7 days compressive strength test as an optional test, if desired	5	28 days compressive strength test		7 days compressive strength test as on optional test, if desired.	3	28 days compressive strength test.	In terms of quantity of concrete	In terms of period
		For each batch with a minimum of three batches	Accept its average strength of the specimens tested is not less than compressive strength specified in Table I subject to the conditions that only one out of five consecutive tests may give a value less			For every 30 Cu.Mt. of concrete or part thereof as indicated in Para 5.3	At such intervals as Architect's / Consultant may decide. However, in the case of controlled concrete sample shall be drawn each day for the first 4 days of concreting and	Accept if average strength of the specimens tested is not less than strength specified in Table I subject to the conditions that only one out of three

			than the specified strength.				thereafter at least once in 7 days.	consecutive tests may give a value less than specified strength but this shall not be less than 90% of the specified strength.
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Table III

Concrete mix design for M _____ (Grade of mix) proposed to be used in _____ (designation & level of structural members).

Weight in Kgs of _____

Cement	Coarse aggregates	Fine aggregates	Aggregate/ Cement ratio	Water/ Cement ratio
1	2	3	4	5

Compacting factors for IS 1199	Results of preliminary tests cube strength at 7 days/ 28 days	Gradation of		Fineness moulds for	
		Coarse aggregate (CA)	Fine aggregate (FA)	Coarse aggregate (CA)	Fine aggregate (FA)
6	7	8	9	10	11

Specific gravity of		Cement	Absolute volume	Density of cone by water displacement method
Coarse	Fine			
12	13	14	15	16

Signature of the testing laboratory in charge

Signature of the contractor

Brick and Stone Masonry

General

All brick work should be carried out as shown on the drawings with set backs, projections, cuttings, toothings etc. Wherever the proportion of cement mortar has not been specifically mentioned, cement mortar in the proportion of 1:6 shall be used. Flat bricks arches shall be provided wherever required, without any extra cost. Brick work shall be kept wet while in progress, till mortar has properly set. On holidays or when work is stopped, top of all unfinished masonry shall be kept wet. Should the mortar become dry, white or powdery, for want of curing, work shall be pulled down and rebuilt at the contractor's expense.

Brick work 1st class

Bricks shall be thoroughly cleaned, well wetted and soaked for at least twelve hours in fresh water before being used on the work. Bricks shall be of locally available best quality.

English bond shall be used throughout in walling. A good bond shall be maintained throughout the work, both laterally and transversely. In walling, the courses shall be kept perfectly horizontal and in plumb with the frogs facing upwards. Vertical joints shall not exceed 10 mm thickness and shall be full of mortar. No broken bricks shall be used except as closers. After day's work all joints shall be raked to 12 mm depth to provide for proper key to plastering.

Mortar used shall be as specified in respective items and every third course of brickwork shall be flushed with mortar grout.

Whole of the masonry work shall be brought up at one uniform level throughout the structure, but where breaks are unavoidable, joints shall be made in good long steps. All junctions of walls and cross walls shall be carefully bonded into the main walls. The rate of laying masonry may be upto a height of 60 cm per day if cement mortar is used and 45 cm per day if lime mortar is used. Greater heights may be built only if permitted by the Architect.

During rains, the work shall be carefully covered to prevent mortar from being washed away. Should any mortar or cement be washed away, the work shall be removed and rebuilt at the contractor's expense.

Brick work 2nd class

Shall be similar to 1st class brick work except that 2nd class bricks shall be used and joints shall be 10 mm to 12 mm thick.

Half brick masonry

Shall be set in cement mortar as specified. Hoop iron bands of 2.5 cm x 0.16 cm (1" x 1/6") shall be embedded in every fourth course with thick mortar band or 2 Nos. 6 mm (1/4") dia. Bars shall be used in every sixth course.

Structural Steel Work

All steel work shall conform to IS 800-1962 and shall be free from defects impairing strength, durability or appearance and shall be of the best quality for the purposes specified and possessing structural properties to withstand safety stresses to which these shall be normally subjected. The contractor shall bear the cost of all tests.

All structural steel members brought by or handed over to the contractor shall be handled with care, stacked on edge and supported evenly.

The structural steel and rivet bars shall conform to IS 226. Before any fabrication work is commenced, all plates shall be flattened and all bars and sections be straightened or otherwise trued and made free from twist or other distortion. Method adopted for the purpose shall be such as not to injure the material.

Cutting shall be effected by shearing, cropping or sawing and shall be clean, reasonably square and free from distortion. If directed, the edges shall be ground. Gas cutting by mechanically controlled torch shall be permitted for mild steel only, with the approval of the Architect.

It shall be the responsibility of the contractor to submit shop drawings to the Architect/Consultant. All shop drawings shall be prepared in advance of the actual fabrication. These shall show full size sections and all joints and connection, thickness of material used and details of welds, bolts, rivets etc. Shop drawings shall clearly distinguish between shop and field rivets, bolts and welds. Drawings shall be made in conformity with the IS code for shop drawings and with due regard to speed and economy in fabrication and erection. A marking diagram allotting distinct identification marks to each separate piece of steel shall be prepared. The diagram shall be sufficient to ensure convenient assembly and erection at site. All shop drawings shall show temporary bracing and connections required during fabrication and erection.

Rivetting

All holes in plates or sections over 12 mm thick must be drilled and not punched and accurately gauged. All holes (except in purlins, runners, packing plates, lacing bars) shall be drilled to required size. All matching holes for rivets or black bolts shall be such that a gauge 0.8 mm less in diameter than the hole can pass freely through members assemble for riveting and bolting.

All holes are turned and fitted, bolts shall be drilled and reamed, if necessary, to a tolerance of only plus 0.13 mm when the number of thickness to be rivetted exceeds three or the total thickness is 90 mm or more, the holes shall be drilled or reamed in position after assembly, except when the steel bushed jigs are used. Parts shall be firmly held together during such block drilling and taken apart for removal of burrs, after drilling.

All parts assembled for riveting shall be in close contact and all bearings stiffeners shall bear tightly at both top and bottom without being drawn or caulked. All parts of riveted members shall be temporarily pinned or bolted while riveting. Drilling of holes shall not be permitted except to draw the parts together and no drift used shall be larger in any part than the nominal diameter of rivet or bolt. Drifting done during assembling shall not distort metal or enlarge holes. Rivets when cold shall be of size shown on drawing and shall preferably fill the hold and form the head of standard dimension unless otherwise stated. All riveting

wherever practicable shall be done by the hydraulic or pneumatic process. All loose, burnt or badly formed rivets with eccentric or deficient heads shall be cut and replaced by sound rivets. Countersunk heads shall be provided wherever required. Caulking and re-cupping shall not be permitted.

Bolting

All turned and fitted bolts shall be parallel throughout the barrel within the tolerance of only minus 0.13 mm and faces of heads and nuts bearing on steel work shall be machines. All such bolts shall be provided with washers of standard size so that the nut when turned shall not bear on the unthreaded body of the bolt. Heads and nuts shall be hexagonal with worth screws and shall be well formed. Where the full bearing area of the rivet is to be developed, the threaded portion of the bolt shall not be within the thickness of the parts bolted together. Threaded portion of each bolt shall project beyond the nut at least by one thread. Tapered washers shall be provided for all heads and nuts bearing on leveled surfaces.

Welding

Welding wherever indicated on the drawing shall conform to IS 814-1963 unless otherwise specified. Welding shall be carried out by experienced welders only, who if necessary, shall produce testimonials about their work or if required by Architect/ Consultant shall have to undergo qualifying tests as prescribed in IS 1181. welding work shall be carried out as per IS 816.

Welding shall be done in flat position wherever possible and adequate steps shall be taken to maintain the correct length, rate of travel, current and polarity for the type of electrode and nature of work.

Steel shall not be pained or oiled and any areas where welding is to be performed shall be well cleaned to remove any paint, scale or rust immediately before welding for a distance of at least 2 cm (3/4") on either side.

The work shall be securely held in position by means of tack welds, service bolts, clamps or jigs before commencing the welding so as to prevent any relative movement due to distortion, wind or other causes. When welding is liable to cause distortion, the work shall be securely held in approved frames or jigs.

Parts to be filled welded shall be brought in as close contact as practicable and in no event shall be separated more than 4.75 mm (3/16"). If the separation is 1.6 mm (1/16") or greater, the size of the fillet welds shall be increased by the amount of the separation.

The separation between facing surfaces of lap joints shall not exceed 1.6 mm (1/16"). The fit of joints at contact surfaces which are not completely sealed by welds, shall be close enough to exclude water after painting.

Abutting parts to be butt welded shall be carefully aligned. Misalignment greater than 3 mm (1/8") shall be corrected and in making the correction, the parts shall not be drawn into a sharper slope than 2 degrees (11 mm in 30 cm or 7/16" in 12").

The sequence of welding shall be such that when possible, the members which offer the greatest resistant to compression are welded first.

Welded joints showing slag inclusion or lack of proper penetration shall be cut and re-welded overlap of the toe of the weld and under-cutting of the parent metal should be avoided and where present to a serious extent shall be rectified.

All slag shall be removed from each run before another run is superimposed. When cold, the final run shall be protected with clean boiled linseed oil and shall not be painted until approved by the Architect/ Consultant or his representative.

Grinding of finished weld is permitted provided the weld is not reduced below the prescribed section. All exposed welds shall be ground smooth. Welds which have not been ground, shall be scrubbed with a 10% solution of Hydrochloric acid which shall be washed off with water before paint if applied and alkali resisting paint is used.

Fabrication and Erection

In order to facilitate handling, transportation and execution the contractor may fabricate the structural members in suitable sections. The details of site connections and their location shall be approved by the Architect/ Consultant.

Frame or lattice sections intended for use as parts of composite construction which are likely to deflect considerably during handling shall be suitable stiffened by means of steel angles.

Roof and other structures shall be supported at close intervals during the welding/ bolting of site connections.

The frame of steel skeleton building shall be carried up true and plumb and temporary bracings shall be introduced wherever necessary to take care of all loads to which structures may be subjected including erection equipment and operation of the same. Such bracings shall be kept in position as long as required for safety or as deemed necessary by the Architect/ Consultant.

As erection progresses, the work shall be securely bolted to take care of all dead load, wind load and erection stresses. No riveting or welding shall be done until the structure has been properly aligned. Rivets driven in field shall be heated and driven with the same care as those driven in the shop.

In the setting or erection of steel work the individual pieces shall be considered plumb or level when error does not exceed 1 to 500. For exterior columns the error shall not exceed 1 to 1000.

Slight bends in the members of fabricated structures shall not be straightened unless strictly necessary on account of danger of overstraining connection and rivets, welds or bolts. Connection plates, if slightly bent or twisted shall be straightened cold, if bend so sharply as to require heating the whole piece thus heated shall subsequently annealed. No straightening whatsoever shall be carried out without the previous sanction of the Architect/ Consultant.

Expansion Gaps

Particular care must be taken to ensure free expansion and contraction, wherever provided for, in drawings or special specifications.

Painting

Painting of steel structures shall be carried out as per detailed specifications under painting.

Painting Joints

The surface of all joints must be thoroughly scrapped, cleaned and given the first coat of red lead paint before joining up which should be done while the paint is still wet. This procedure shall not apply to welded joints. All rivets, bolts, washers etc. shall be thoroughly cleaned and dipped in boiled linseed oil. All machines surfaces shall be well coated with a mixture of white lead and tallow.

Measurements

All fabricated trusses, frames, gantry, crane rails, fish plates, clamps, square or round bars etc. stanchions, built-up girders and purling shall be calculated on the basis of standard net weight according to ISI Code. Net weight of cleats, brackets, packing pieces, rivets, bolts, distance pieces, separators, gussets, holding down bolts, fish plates etc. shall be added to the respective items. No deduction shall be made for holes, bolts or rivets and waste involved in cutting or notching ends of sections or intermediate points for making connections.

No payment shall be made for butt welds. In the case of fillet welded joints weight of filled welds shall be as under.

Fillet Weld	Weight in Kg/Cm
5 mm	0.11
6 mm	0.20
7 mm	0.28
10 mm	0.40
12 mm	0.70
16 mm	1.07

Flooring, Dado and Stone Veneering

All flooring, skirting, dado, stone veneering etc. shall be executed strictly as per relevant IS specifications and in workmanlike manner.

Indian Patent Stone

Selection of materials, method of mixing placing and compacting shall be generally conform to the specifications under plain and reinforced cement concrete described earlier. A stiff mix consistent with workability shall be used.

Preparation of Surface

Before the operation for laying topping is started, the surface of base concrete shall be thoroughly cleaned of all dirt, loose particles, coked mortar droppings and laitance if any, by scrubbing with coir or steel wire brush. Where the concrete has hardened so much that roughening of surface by wire brush is not possible, the surface shall be roughened by chipping or hacking at close intervals. The surface shall then be cleaned with water and kept wet for 12 hours and surplus water shall be removed by mopping before the topping is laid.

Laying

The screed strips shall be fixed over the base concrete dividing it into suitable panels. Before placing the concrete for topping, neat cement slurry shall be thoroughly brushed into the prepared surface of the base concrete just ahead of the finish. Concrete of specified proportion and thickness shall be laid in alternate panels to required level and shape and thoroughly tamped.

Finishing the surface

After the concrete has been fully compacted it shall be finished by trowelling or floating with neat cement rendering. Finishing operations shall start shortly after the compaction of concrete and the surface shall be trowelled three times at intervals so as to produce a uniform and hard surface. The satisfactory resistance of floor to wear depends largely upon the care with trowelling is carried out. The time interval allowed between successive trowelling is very important. Immediately after placing cement rendering, only just sufficient trowelling shall be done to give a level surface. Excessive trowelling in the earlier stages shall be avoided as this tends to bring a layer rich in cement to the surface. Sometimes, after the first trowelling, the duration depending upon the temperature, atmospheric conditions and the rate of set of cement used, the surface shall be re-trowelled to close any pores in the surface and to bring to surface and to scrap off any excess water in concrete or laitance. No dry cement shall be used directly on the surface to absorb moisture or to stiffen the mix. The final trowelling shall be done well before the concrete has become too hard but at such a time that considerable pressure is required to make any impression on the surface.

If directed by the Architect, approved mineral pigment shall be added to the rendering to give desired colour and shade to the flooring at no extra cost.

When instead of 1:2:3 or 1:2.5:3.5 mix, 1:2:4 mix is specified the topping shall be rendered with 1:1 cement mortar with a suitable mineral pigment, if directed, instead of cement only. If specified in the Schedule of Quantities, the flooring shall be machine polished as per Architect's instructions.

Wherever the patent stone flooring is used as finished on roof the joints shall be filled with an approved bituminous filler in workmanlike manner.

Ironite topping

Instead of finishing the top with rendering coat of 1:1 cement mortar, the top shall be finished with 12 mm thick ironite topping. Unless otherwise specified, one part of ironite and four parts of ordinary cement by weight shall be mixed dry thoroughly. This dry mixture shall be mixed with stone grit 6 mm (1/4") and down size or as otherwise directed in the ratio of 1:2 by volume and well turned over. Just enough water shall be added to this dry mix and mixed thoroughly well and laid to uniform thickness of 12 mm and compacted. After initial set has started the surface shall be finished as directed.

Plain and colour cement tiles, marble mosaic and terrazzo tiles flooring

The tiles shall conform to IS 1237 having the colour approved by the Architect and the rate shall include provision of border tiles and tiles of different colours in pattern if directed. The mosaic topping of lighter shade tiles shall be made of white cement with an approved shade pigment and neutral shade tiles shall be of grey cement with an approved shade pigment. The type of tiles shall be as specified in respective items.

The sub-grade shall be thoroughly wetted after cleaning of all dirt, laitance and loose material. A bed of lime mortar consisting of one part of lime and two parts of sand shall be laid and properly leveled to an average thickness of 25 mm and the surface shall be kept slightly rough to form a satisfactory key for tiles. Neat cement paste of honey like consistency shall be spread over mortar bed, over such area at a time as would accommodate about 20 tiles. Tiles shall be soaked in water for 15 minutes and allowed to dry for the same duration. Tiles shall then be fixed with a thin coat of cement paste on back of each tile and then each tile being gently tapped with a wooden mallet till it is properly bedded and in level with adjoining tiles, joints shall be fine and as imperceptible as possible.

After tiles have been laid in a room or a day's fixing work is completed, surplus cement grout that may have come out of the joints may be wiped off gently and joints cleaned. A thin slurry of coloured cement matching to the colour of tiles shall be spread over it and rubbed so as to seal even a thinnest joint between the tiles and make it impervious and the flooring cured for 7 days. The tiles shall be polished and finished according to IS 1443.

Dado, skirting and risers

Tiles shall conform to IS 1237 and shall be of approved design. The tiles shall be fixed with neat cement grout on a blacking coat consisting of 1:4 cement sand plaster of 15 mm to 20 mm thick. The top and bottom junctions of tiles shall be rounded off neatly as directed. The joints shall be filled with matching shade coloured cement slurry. The surface shall be kept wet for 7 days and then polished with carborundum stone to obtain smooth surface and fine polish.

Shahabad/ Tandur/ Kotah/ Cuddappah Stone Flooring

The flooring shall be either with rough stone or machine cut and machine polished as specified in respective items and shall be of specified thickness and of approved quality and size, free from cracks and flakes and shall be uniform in colour with straight edges. The sides of machine cut and machine polished stones shall have perfect angles and surface smooth.

The stone slabs shall be laid and finished as described under plain cement or colour cement tiles on a bedding of 1:2 lime mortar 25 mm (average) thickness. The finished stone surface thus laid shall then be polished to the required degree as approved by the Architect.

In dado, skirting, risers etc.

Stone slabs shall be laid on a backing plaster of cement mortar 1:4 of 15 mm to 20 mm thick and finished as described under plain and coloured cement file dado.

The terrazzo/ mosaic finish shall be laid on an under layer of thickness as specified in the respective items. In addition to the under layer, unless otherwise specified, a cushioning layer of lime mortar or lime concrete with brick bat aggregate of specified proportion shall also be provided to the specified thickness. The topping shall consist of a layer of marble chips of selected sizes, colour and design approved by Architect, mixed with cement with desired shade of pigment.

For lighter shade mosaic/ terrazzo white cement shall be used for neutral shade, grey cement shall be used. The proportion of terrazzo mix shall be three parts of cement and one part of marble powder by weight. For every part of cement marble powder mix, the proportion of marble aggregate by volume shall be 1:5 parts unless otherwise specified.

The topping shall be mixed and laid in panels as described in IS 2114 and as per decorative designs prepared by Architects. The dividing strips of panels shall be Aluminium or as specified in the schedule of quantities. It shall be polished as specified in IS 2114.

Broken Mosaic Flooring

Broken mosaic flooring shall be laid on an under layer of thickness as specified in the item.

Pieces of mosaic tiles shall be obtained from broken marble mosaic tiles of approved shade conforming to IS 1257. The sizes of pieces shall be suitable to obtain the desired pattern of flooring as shown on the drawings or as approved by Architect.

Broken pieces shall be thoroughly wetted before fixing them. Ordinary or colour cement grout shall be spread on the bedding. Mosaic tile pieces shall be fixed piece by piece to the desired pattern. The flooring shall be laid to correct level and slopes and compacted by straight screed tamper. The grout shall cream upto the surface. The junctions of the flooring and the wall shall be rounded and the flooring shall be extended along the wall to about 15 cm (6"). After the day's work, the surplus cement grout that may have come out of the joints shall be cleaned off. The flooring shall be cured for seven days and then polished with a machine as stipulated in IS 1443.

Broken China Mosaic

Broken China mosaic flooring shall be exactly as per broken mosaic tile flooring except that the broken pieces shall be of china of approved colour and manufacturer and the floor shall not be polished.

Marble flooring

Marble slabs shall be of the best Indian marble of white or other approved colour as specified in the item. They shall be hard, dense, uniform and homogeneous in texture. They shall have even crystalline grain and free from defects and cracks. The surface shall

be machine polished to an even and perfectly plane surface and edges machine cut true to square. The rear face shall be rough enough to provide a key for the mortar.

No slab shall be thinner than the specified thickness at its thinnest part. The sizes of the slabs shall be as specified in the respective items.

The slabs shall be laid as described under mosaic tile flooring in every respect.

White glazed tiles in flooring and dado

White glazed tiles from an approved manufacturer conforming to IS 777 shall be used. They shall be of specified size and thickness. All specials viz. covers, internal and external angles, corners, beads etc. shall be used wherever directed. Under layer of specified thickness and mortar of stipulated proportion shall be laid as described in marble mosaic flooring. Tiles shall be washed clean and set in cement grout and each tile being gently tapped with a wooden mallet till it is properly bedded and in level with the adjoining tiles. The joints shall be kept as thin as possible and in straight lines or to suit the required pattern. After the tiles have been laid, surplus cement grout shall be cleaned off.

The joints shall be cleaned off the grey cement grout with a wire brush or trowel to a depth of 5 mm (3/16") and all dust and loose mortar removed. Joints shall then be flush pointed with white cement. The floor shall then be kept wet for seven days. After curing, the surface shall be washed with mild hydrochloric acid and clean water. The finished floor shall not sound hollow when tapped with a wooden mallet.

Marble in facia or dado

Marble slabs of approved shade, variety, size and thickness as specified in the item shall be used. They shall be of selected quality, dense, uniform and homogeneous in texture and free from cracks or other structural defects. The exposed face shall have no veins or unsightly stains and defects. They shall have uniform milky white or coloured shade or patterns of colours approved by Architect samples shall be got approved by the Architect before ordering the slabs. The surface shall be fine polished and sides machine cut, true to square.

When a single course of marble slab is to be fixed as in dado etc. the slab shall be fixed as described below.

Mortar pads of CM 1:2 of uniform width shall be struck on to the wall at close intervals and the marble slabs shall be pressed on to them firmly. The remaining cavities if any, shall then be filled with thin grout of cement mortar of the same proportion. The sound coming on gently tapping of the slab will indicate if there are hollows. When the hollow cannot be filled with grout and the finished slab continues to give a hollow sound on tapping, the slab shall be removed and reset.

For facia work, where more than one course is required, the marble slabs shall be fixed in the same way as described above except that at horizontal joints of the slabs, adjacent slabs shall be held together by a wrought iron/ copper pin passing through a hole drilled into the slabs. In addition, wrought iron/ copper holdfasts/ dowels shall be provided to anchor the slabs to the wall. The holdfasts shall be countersunk into the joints of the slab and it shall be located about a metre apart subject to a minimum of one for each slab for each horizontal.

The facing shall be fixed truly in plumb and in perfect line or curves as shown on the plans. The courses and joints shall be as directed by Architect. The surface shall be protected

from sun and rain and cured for ten days and shall be finally polished.

The rate shall include erecting and removing double scaffolding equipment etc.

Polished or tool finished Granite/ Malad/ Sand Stone

The facia stone/ slab shall conform to the specifications under "Materials" and it shall be erected as shown on the drawing or as directed by Architect.

The stone or stone slab shall be of size as shown on the drawing or as directed by the Architect. The exposed faces, full beds and joints shall be dressed/ finished as directed. The joints shall be cut square to the face and shall be at right angles to each other or as directed. The facing shall be fixed in cement mortar truly in plumb and in perfect plane straight or curved as shown on the drawing, the bed being fully flushed with mortar. The joints shall be exactly vertical and horizontal. The joints shall not exceed 1 mm to 1.5 mm for machine polished/ fine tooled/ closed punched and chisel dressed work. The stones shall break joints for about half the height of the course. Courses shall be shown on the drawing or as directed. The gap between the facing stone and the wall shall be filled with either 1:2:4 concrete or 1:2 cement mortar. Gun metal, wrought iron/ copper pins and hold fasts shall be used as and wherever directed. Lead caulking shall be used for fixing hold fasts. The surface shall be protected from sun and rain and cured for ten days.

The face shall be finished as specified or directed after filling the joints with matching shade cement/ cement mortar of 1:1 proportion mixed with approved water proofing material.

The rate shall include double scaffolding.

Vitrum tiles

Tiles of colours and design as shown on the drawing or as directed by the Architect shall be used. They shall be fixed and finished strictly as per manufacturer's specifications and as directed. The rate shall be inclusive of double scaffolding, equipment etc.

Oxy-Chloride flooring

Oxy-chloride flooring shall be laid strictly in accordance with IS 658.

Materials for flooring shall be obtained in two parts viz. dry mix and magnesium chloride. The proportions of the dry mix to the gauging solution and the strength of the later shall be furnished by the manufacturer of the dry mix.

All materials used in the manufacture of dry mix and magnesium chloride shall comply with the requirements of IS 657.

The slab floor shall be roughened to a suitable degree by chiseling, picking or by any other suitable process before oxy-chloride composition is laid. It shall be cleaned thoroughly, freed from dust, dirt, grease etc. The surface shall be damped with the solution of magnesium chloride of specific gravity 1.08 to 1.10. The wet mix prepared as per manufacturer's instructions shall be laid, in two layers and in panels defined by screed patterns and the surface finished as directed.

When marble mosaic finish is specified the surface shall be machine polished.

Stillen tiles or other heavy duty tiles

Heavy duty flooring tiles shall be laid strictly according to manufacturer's specifications and machine polished as directed.

Cast iron tile flooring

The tiles shall be manufactured from cast iron conforming to IS 210. The tiles shall be of the design as shown in the drawings and of standard dimensions 20 cm x 20 cm or 30 cm x 30 cm as specified in the description of item. Variation in weight to the extent of 5% on either side shall be permissible. The ribs of tiles shall be tapering down with the thicker end at top so that cementing material filling the hollows between them is held fast and prevented from getting loose on the top. The top surface of the tiles shall be ground smooth while the sides of the hollows shall be left rough.

Laying

The sub-grade concrete of RCC slab on which the grid tiles are to be laid shall be cleaned, wetted and mopped. The bedding for the grid tiles shall consist of one part of cement and two parts of stone grit 6 mm and down grade laid to 25 mm thickness tamped and corrected to proper levels. The bedding concrete shall be laid each time over such an area as would accommodate 8 to 10 tiles. The grid tiles shall be laid one by one, pressed into the bedding and tapped with a wooden mallet, so that the mortar works up into the hollows of the grid tiles about 5 mm and the top face of the tile is at the correct finishing level and plane. The flooring is cured for ten days and after thoroughly drying the surface, the joints and the hollows in the tiles shall be filled with mastic asphalt to obtain a smooth and uniform surface.

Plastering

Scaffolding

Scaffolding for carrying over plastering work shall be double scaffolding having two sets of vertical supports so that scaffolding is independent of the walls.

Preparation of surface

All putlog holes in brickwork and junction between concrete and brickwork shall be properly filled in advance. Joints in brickwork shall be raked about 10 mm and concrete surface hacked to provide the grip to the plaster. Projecting burns of mortar formed due to gaps at joints in shuttering shall be removed.

The surface shall be scrubbed clean with wire brush/ coir brush to remove dirt, dust etc. and the surface thoroughly washed with clean water to remove efflorescence, grease and oil etc. and shall be kept wet for a minimum of six hours before application of plaster.

Bank's Building Projects – Maintenance of Records

(A) Registers at the site office of the Bank's Engineer

1. Measurement Books
2. Cement register (daily record)
3. Steel register
4. Steel consumption register – bill wise
5. Drawing register
6. Materials at site register
7. Hindrance register
8. Concrete tube test register
9. File and register for extra/ variation items
10. Materials tests register and file
11. Site order book (in triplicate)
12. Lead caulking register
13. Labour reports and progress reports register
14. Attendance register for RBI staff
15. Site visit & instructions register
16. Certified true copies of the contracts

(B) Registers at RBI Accounts Office

1. Project register – trade wise
2. Subsidiary project register showing the recoveries
3. Cement register
4. Steel register
5. Variation order register
6. EMD register
7. Security deposit register
8. Sundry deposits register
9. Printed tender book register
10. Quotation register
11. Sanction registers
12. Limit registers
13. Order book for purchase and repairs
14. Bill register
15. IT deduction register
16. Certified true copies of the contracts

**Statement showing quantities of theoretical consumption of cement
for major items of work (as per CPWD norms)**

Sr. No.	Description of work	Unit	Qty. of cement per unit quantity of work in Quintals
1	2	3	4
1	Plain cement concrete work		
(a)	Cement concrete 1:2:4	Cu.M	3.20
(b)	Cement concrete 1:3:6	Cu.M	2.20
(c)	Cement concrete 1:4:8	Cu.M	1.70
(d)	Cement concrete 1:5:10	Cu.M	1.30
2	Damp proof course		
(a)	25 mm thick in CC 1:2:4	100 sq.m.	8.00
(b)	38 mm thick in CC 1:2:4	100 sq.m.	12.16
(c)	50 mm thick in CC 1:2:4	100 sq.m.	16.00
3	Reinforced cement concrete work		
(a)	RCC work in CC 1:2:4	Cu.M	3.20
(b)	RCC work in CC 1:1:1/2:3	Cu.M	4.00
(c)	RCC work in CC 1:1:2	Cu.M	6.10
(d)	Providing and fixing pre-cast RCC 1:2:4 set in position in cement mortar 1:2 including finishing with cement plaster 1:3 of thickness not exceeding 6 mm		
	(i) Kerb, step and the like	Cu.M	3.68
	(ii) Coping bed plates anchor blocks, window sills and the like	Cu.M	3.86
	(iii) Small lintels not exceeding 1.5 m clear, coping shelves and the like	Cu.M	3.90
4 (a)	Brick work (all classes) in CM 1:3		
	(i) With modular brick	Cu.M	1.12
	(ii) With FPS brick	Cu.M	1.28
(b)	Brick work (all classes) in CM 1:4		
	(i) With modular brick	Cu.M	0.84
	(ii) With FPS brick	Cu.M	0.95
(c)	Brick work (all classes) in CM 1:5		
	(i) With modular brick	Cu.M	0.68
	(ii) With FPS brick	Cu.M	0.78
(d)	Brick work (all classes) in CM 1:6		
	(i) With modular brick	Cu.M	0.55
	(ii) With FPS brick	Cu.M	0.62
(e)	Half brick (all classes) in CM 1:3		
	(i) With modular brick	100 sq.m.	12.75
	(ii) With FPS brick	100 sq.m.	14.28
(f)	Half brick (all classes) in CM 1:4		
	(i) With modular brick	100 sq.m.	9.50
	(ii) With FPS brick	100 sq.m.	10.64
(g)	Brick work 3" in CM 1:3 with FPS brick	100 sq.m.	9.23
(h)	Honey comb brick work half brick thick in CM 1:4		
	(i) With modular brick	100 sq.m.	5.54
	(ii) With FPS brick	100 sq.m.	6.56
(i)	Brick drip course at junction of roofs and walls in CM 1:4		
	(i) 10 cm thick with modular brick	100 m	0.84

Sr. No.	Description of work	Unit	Qty. of cement per unit quantity of work in Quintals
1	2	3	4
	(ii) 7.6 cm thick with FPS brick	100 m	0.83
(j)	Brick drip course at junctions of roofs and walls in CM 1:6		
	(i) 10 cm thick with modular brick	100 m	0.55
	(ii) 7.6 cm thick with FPS brick	100 m	0.54
(k)	Providing brick band 5 cm projected from wall face in CM 1:4		
	(i) 10 cm thick 5 cm projected with modular brick	100 m	0.42
	(ii) 7.6 cm thick 5.7 cm projected with FPS brick	100 m	0.41
5	Stone work		
(a)	Random rubble masonry within foundations or super structure in CM 1:6 including leveling up with cement concrete 1:6:12 at plinth or sill or ceiling level.	Cu.M	0.85
(b)	Coursed rubble masonry in foundation and superstructure in CM 1:6	Cu.M	0.75
(c)	Stone work plain ashlar cyclopean, sunk or moulded and ashlar punched in CM 1:6 including pointing with CM 1:2 with an admixture of pigment matching the stone shade.	Cu.M	0.54
(d)	Stone work in plain ashlar cyclopean sunk or moulded arch, dome or circular moulded and curve columns in CM 1:3 including pointing with CM 1:2 with an admixture of pigment matching the stone shade.	Cu.M	1.07
(e)	Stone work plain in coping cornies, string courses and plinth coarses in CM 1:6	Cu.M	0.54
(f)	Stone work for wall lining etc. average thickness 40 mm to 70 mm in CM 1:3 including pointing with CM 1:2 with an admixture of pigment matching the stone shade.	100 sq.m.	8.75
(g)	30 mm thick sand stone shelves, fixed in walls in CM 1:3 including finishing complete.	100 sq.m.	1.64
6.	Flooring		
(a)	Brick flooring in CM 1:4	100 sq.m.	11.02
(b)	Brick flooring in CM 1:6	100 sq.m.	7.25
(c)	25 mm 1:2:4 finished with a floating coat of neat cement	100 sq.m.	10.20
(d)	40 mm thick cement concrete flooring 1:2:4 finished with a floating coat of neat cement	100 sq.m.	15.00
(e)	50 mm thick cement concrete flooring 1:2:4 finished with a floating coat of neat cement	100 sq.m.	18.20
(f)	75 mm thick cement concrete flooring 1:2:4 finished with a floating coat of neat cement	100 sq.m.	26.20
(g)	Cement concrete pavement (25 mm to 50	Cu.M	3.20

Sr. No.	Description of work	Unit	Qty. of cement per unit quantity of work in Quintals
1	2	3	4
	mm thick) with 1:2:\$ including finished complete		
(h)	50 mm thick cement concrete flooring with metallic concrete hardener topping, under layer of 40 mm thick cement concrete 1:2:\$ and top layer 10 mm thick metallic cement hardener consisting of mix 1:2 by volume with metallic hardening compound of approved quality is mixed in the ratio of 4:1	100 sq.m.	21.10
(i)	40 mm thick cast in situ flooring (28 mm thick under layer and 12 mm thick top layer)		
	(i) Neutral shade with cement with Grey cement	100 sq.m.	1.95
	(ii) Light shade with white cement (Grey cement)	100 sq.m.	4.05 10.90
	(iii) Medium shades 50% Grey Cement (White Cement)	100 sq.m.	12.92 2.02
(j)	Pre-cast terrazzo tiles 20 mm thick with marble chips of sizes up to 6 mm laid in 25 mm thick bed of lime mortar jointed with neat cement slurry mixed with pigment.		
	(i) Light shade using white cement (Grey Cement)	100 sq.m.	4.40
	(ii) Medium shade using 50% white cement and 50 % grey cement White cement Grey cement	100 sq.m.	2.20 6.60
	(iii) Neutral shades (with grey cement)	100 sq.m.	8.80
(k)	Pre-cast terrazzo tiles 20 mm thick with marble chips of sizes upto 6 mm in skirting or on walls, laid on 12 mm thick cement plaster 1:3 jointed with neat cement slurry.		
	(i) Light shade using white cement Grey cement	100 sq.m.	2.20 11.74
	(ii) Medium shade using 50% white cement and 50% grey cement White cement Grey cement	100 sq.m.	1.10 12.84
	(iii) Neutral shades (with grey cement)	100 sq.m.	13.94
(l)	Chequered terrazzo tiles 22 mm thick with marble chips of sizes upto 6 mm on 25 mm thick bed of lime mortar jointed with neat cement slurry.		
	(i) Light shade using white cement Grey cement	100 sq.m.	4.40 4.40
	(ii) Medium shade using 50% white cement and 50% grey cement White cement Grey cement	100 sq.m.	2.20 6.60
	(iii) Neutral shades (with grey cement)	100 sq.m.	8.80
(m)	White glazed tiles 5.5 mm thick in flooring	100 sq.m.	

Sr. No.	Description of work	Unit	Qty. of cement per unit quantity of work in Quintals
1	2	3	4
	treads and risers of steps skirting and dado on 12 mm thick cement plaster 1:3 in base and jointed with white cement slurry etc. White cement Grey cement		2.50 10.44
(n)	Marble stone slab flooring over 20 mm thick base lime mortar and jointed with grey cement slurry etc.		
	(i) 25 mm thick	100 sq.m.	5.00
	(ii) 30 mm thick	100 sq.m.	5.12
	(iii) 40 mm thick	100 sq.m.	5.36
(o)	Marble stone slab flooring over 20 mm thick base of cement mortar 1:4 and jointed with grey cement slurry.		
	(i) 25 mm thick	100 sq.m.	13.51
	(ii) 30 mm thick	100 sq.m.	5.12
	(iii) 40 mm thick	100 sq.m.	5.36
(p)	Extra if white cement slurry used instead of grey cement slurry in joints of stone flooring. White cement	100 sq.m.	0.76
(q)	Marble tiles 25 mm thick in risers of steps, skirting and pillars, laid on 12 mm thick cement mortar 1:3 and jointed with grey cement slurry etc.	100 sq.m.	12.34
(r)	Kotah stone slab flooring over 20 mm thick base of lime mortar and jointed with cement slurry etc.		
	(i) 25 mm thick	100 sq.m.	6.40
	(ii) 30 mm thick	100 sq.m.	6.80
	(iii) 40 mm thick	100 sq.m.	7.60
(s)	Kotah stone slab flooring over 20 mm thick base of cement mortar 1:4 and jointed with neat cement slurry etc.		
	(i) 25 mm thick	100 sq.m.	14.91
	(ii) 30 mm thick	100 sq.m.	15.31
	(iii) 40 mm thick	100 sq.m.	16.11
(t)	Kotah stones slab 25 mm thick in riser of steps skirting dado and pillars laid on 12 mm thick cement mortar 1:3 and jointed with neat cement slurry etc.	100 sq.m.	13.74
(u)	40 mm sand thick sand stone flooring over 20 mm thick base of cement mortar 1:5 with joints finished flush.	100 sq.m.	7.75
(v)	40 mm thick sand stone flooring over 20 mm thick base of cement mortar 1:5 including pointing with cement mortar 1:2 (1 cement and 2 stone dado)	100 sq.m.	9.31
(w)	400 mm thick sand stone flooring over 20 mm thick lime mortar including pointing with cement mortar 1:2.	100 sq.m.	1.56
(x)	40 mm thick fine dressed and rubbed stone flooring over 20 mm thick base of cement mortar 1:5 (1 cement and 5 sand)	100 sq.m.	8.28

Sr. No.	Description of work	Unit	Qty. of cement per unit quantity of work in Quintals
1	2	3	4
	with joints 5 mm thick finished flush.		
(y)	40 mm thick fine dressed and rubbed stone, flooring over 20 mm thick base of cement mortar 1:5 with joints 5 mm thick including pointing with cement mortar 1:2 (1 cement and 2 stone dust)	100 sq.m.	9.84
(7)	Finishing		
(a)	12 mm cement plaster 1:3	100 sq.m.	7.34
(b)	12 mm cement plaster 1:4	100 sq.m.	5.47
(c)	12 mm cement plaster 1:5	100 sq.m.	4.46
(d)	12 mm cement plaster 1:6	100 sq.m.	3.60
(e)	15 mm cement plaster 1:3	100 sq.m.	8.77
(f)	15 mm cement plaster 1:4	100 sq.m.	6.54
(g)	15 mm cement plaster 1:5	100 sq.m.	5.33
(h)	15 mm cement plaster 1:6	100 sq.m.	4.30
(i)	20 mm cement plaster 1:3	100 sq.m.	11.42
(j)	20 mm cement plaster 1:4	100 sq.m.	8.51
(k)	6 mm cement plaster to ceiling 1:3	100 sq.m.	3.67
(l)	6 mm cement plaster to ceiling 1:4	100 sq.m.	2.74
(m)	Neat cement punning	100 sq.m.	2.20
(n)	18 mm cement plaster in two coats under layer 12 mm cement plaster 1:5 finished with a top layer 6 mm thick with cement plaster 1:6.	100 sq.m.	6.26
(o)	18 mm thick cement plaster in two coats under layer 12 mm thick cement plaster 1:5 and top layer 6 mm thick with cement plaster 1:3.	100 sq.m.	6.26
(p)	12 mm cement plaster 1:2 (1 cement and 2 stone dust)	100 sq.m.	6.26
(q)	18 mm thick or artificial red stone plaster of 12 mm thick under layer of cement plaster 1:4 with 6 mm thick finishing coat of cement mortar 1:1:3 mixed with red oxide. (1 cement, 1 marble dust and 3 stone dust)	100 sq.m.	9.47
(8)	Pointing		
(a)	Flush or ruled or cut or weather pointing on brick work with cement mortar 1:3.	100 sq.m.	1.53
(b)	Raised and cut pointing on brick work with cement mortar 1:3	100 sq.m.	2.35
(c)	Flush or ruled pointing on stone work with cement mortar 1:3	100 sq.m.	1.17
(d)	Raised and cut pointing on stone work with cement mortar 1:3	100 sq.m.	1.94
(9)	Mortar		
	Cement Mortar 1:1	Cu.M.	10.20
	Cement Mortar 1:2	Cu.M.	6.80
	Cement Mortar 1:3	Cu.M.	5.10
	Cement Mortar 1:4	Cu.M.	3.80
	Cement Mortar 1:5	Cu.M.	3.10
	Cement Mortar 1:6	Cu.M.	2.50
(10)	Miscellaneous		
(a)	Lime concrete terracing average 10 cm thick with 25 mm brick ballast and 50%	100 sq.m.	6.63

Sr. No.	Description of work	Unit	Qty. of cement per unit quantity of work in Quintals
1	2	3	4
	lime concrete 1:2 (1 lime putty and 2 surkhu) rammed and finished with gur and belgri treatment and covered with flat brick tiles grouted with cement mortar 1:3 over 12 mm layer of cement mortar 1:3		
(b)	Providing and laying average 10 cm thick cement based water proofing treatment with brick bat coba as per manufacturers' specifications.	100 sq.m.	*
(c)	Providing and filling with water proof brick bat cement concrete.	Cu.M.	*
(d)	Rough cast or pebble dash plaster in two layers under layer 12 mm cement plaster 1:4 and top layer 10 mm cement plaster 1:3.	100 sq.m.	10.58
(e)	Plinth protection 50 mm thick in cement concrete 1:3:6 over 75 mm bed of dry brick ballast.	100 sq.m.	11.00
(f)	Brick edging 10 cm wide 10 cm deep to plinth protection including grouting with cement mortar 1:3	100 m	1.14
(g)	Fixing of pre-cast cement concrete jail 1:2:4 in cement mortar 1:3	100 sq.m.	1.64
	(i) 50 mm thick		
	(ii) 40 mm thick		
	(iii) 25 mm thick		
* As specified by the specialist firm at the time of tendering for the job.			
Note – For any other item of work, Site Engineer shall refer to the CPWD specifications and norms. In case no coefficient is available for a specific item, the decision of Superintending Engineer, RBI shall be final and binding on the Contractor.			