

मुरगांव पत्तन न्यास
सिविल इंजनीयरी विभाग



MORMUGAO PORT TRUST
CIVIL ENGINEERING DEPARTMENT

MORMUGAO PORT TRUST

'INSTRUCTIONS TO TENDERERS'

1. The Tenderer shall examine carefully. the conditions of contract, specifications and drawings etc. supplied herewith. He shall inspect the site and on his own responsibility thoroughly acquaint himself with all local conditions at site etc., for the purpose of making a tender. All costs, charges and expenses that may be incurred by tenderers in connection with such examination and for the submission of tender shall be borne by him and the Board accepts no liability whatsoever thereof concerning materials. labour. nature of soil. working condition.
2. The rates quoted by the tenderer shall hold good and be firm at least for six months from the date of . opening of the tender. The rates quoted must be filled in ink only, both in figures and words in the bill of quantities attached herewith and shall be inclusive of sales tax, octroi or any other State or Corporation tax or duty or levy or any other imposition of like nature.

Any corrections to rates shall be supported by the tenderer's Signature there against. In case the rate quoted in figures and words are not identical, the lower of the two rates entered in figures or words shall be deemed as the rate quoted for the item in question.

Corrections to quoted rates shall not be allowed after opening of the tender.

3. Should there be any doubt or obscurity as to the meaning or any of the tender documents or if any further information is required, the tenderer must address is enquiry not later than 3 weeks before the date fixed for submission of tender to the Chief Engineer.

In case all drawings are not issued with the tender, the Contractor is expected to inspect the same at the office of the Chief Engineer, and get necessary clarification for purpose of quoting. The tenderer shall be deemed to have full knowledge of all relevant drawings and to have understood the method and sequence of operations. whether he inspects them or not.

4. It must be clearly understood that the rates quoted in the tender are to include for everything required to be done as detailed in the instructions to the tenderers, conditions of contract, specifications and drawings, referred to therein and also for such work as is necessary for the proper completion of the contract although specific mention thereof may have been omitted in the specification or drawings. The rates are for works in situ and should be inclusive of incidentals necessary for carrying out the works.
5. The tender shall be based on the conditions and specifications drawings etc, stipulated in the tender documents. Any tender which includes any deviation with works specified ill the tender documents or which contains any other conditions of any sort shall be liable for rejection.
6. The tenderer shall alongwith the tender furnish general but clear particulars of his scheme for execution of the works inclusive of the plant and temporary works which he intends to use, supply or construct as the case may be.
7. The tenderer shall produce satisfactory evidence with his tender to support his experience and ability for carrying out work of this class and magnitude by way of giving details of works carried out by him in the past, their cost and time and completion, their banker's reference, and their Sales Tax Registration No. under the Central Sales Tax Act, 1959. In case the tenderer is not registered under the Central Sales Tax Act, Purchase Tax, if any. payable by the Board will be recovered from his bill.
8. The tenderer should submit alongwith his tender the latest Income Tax Clearance Certificate from the Income Tax Authorities concerned alongwith his permanent income tax account No. given for assessing the Income Tax.
9. The successful tenderer shall enter into an Agreement, the form of which will be set out in the form of Agreement, appended to the Conditions of Contract. The cost of stamping the Agreement shall be borne by the successful tenderer.
10. The amount of earnest money should be made in the form of cash or Demand Draft on a Scheduled Bank in Vasco-da-Gama/Mormugao in the name of the Chairman, Mormugao Port Trust, and forwarded separately and not in the same envelope as Tender and an official receipt obtained for the same. EMD's will not be accepted in the form of Bank Guarantees. The Earnest money will be returned to the unsuccessful tenderers after the disposal of the Tenders and

to the successful tenderers after the execution of a formal agreement and on payment of Security Deposit or will be retained by the Port Trust as part of Initial Security Deposit. The Earnest Money will be returned by a crossed cheque drawn on the State Bank of India, Vasco-da-Gama Mormugao and the Board will not be responsible for reimbursing to the tenderers the Bank's commission for encasbing the same or for the Bank's commission chargeable for the issue of the demand draft if this method of remittance is preferred by any of the tenderer .

11. In the event of a person whose tender has been received and opened on behalf of the Board, withdrawing his tender before the receipt of the final decision or in the event of a person whose tender has been accepted failing to execute the agreement in such form as aforesaid within 30 days after such acceptance shall be made to him, the Earnest Money deposited by such person shall be forfeited and in the latter case the tender also shall be cancelled.
12. The tenderer shall submit an organisation chart as set out 'Schedule-A' listing the names of the key personnel whom he would employ to direct the work, together with a brief resume of their experience. Tenderer shall also state in the said schedule, the estimated average and peak labour force that will be employed on the contract.
13. Tenderer shall submit in their tender a list and description of the main plant and equipment which they propose to use on the work indicating which equipment is owned by the Tenderers. This information will be used in the analysis of tenders received only and the Board expresses no opinion as to the adequacy or not of the plant and equipment so listed for performing the work ill the time prescribed in the Contract. Tenderers shall agree that the Board reserves the right prior to awarding the contract, to have the plant inspected and the acceptance of the Tender shall be dependent upon his ability to replace any equipment reported upon adversely with equivalent equipment in good condition forth with. Tenderers shall make available to the Board on operator, fuel and other facilities requited to make a proper inspection.
14. (a) Materials mentioned in the Schedule 'B' will be supplied to the contractor if he so desires in the quantities and at the rate specified in the List of materials to be supplied attached to the tender. Adequate and proper place for storing cement and other materials shall be arranged to the satisfaction of the Chief Engineer or his representative by the Contractor at his own cost. The Contractor should clearly stipulate in his tender, whether he will draw materials from the Department. In regard to supply of materials by the Department, no claim/compensation for delay for such supply will be entertained. Necessary extension of time will however be considered.

(b) Any other materials not specified in 'List of Material to be supplied' may be supplied to the Contractor for bonafide use on the works if available with the Department and if decided by the Chief Engineer. The issue rate for such materials will be stores procurement rate plus overheads or market rate whichever rate is higher or as fixed by the Chief Engineer.
15. Tenders will be opened in public at th~ Office of the Chief Engineer, Mormugao Port Trust immediately after closing time mentioned in the advertisement in the presence of the tenderers or their authorised representatives who are present at the time.
16. Tender may be withdrawn on writing or telegraphic request dispatched by the Tenderer in time for delivery in the normal course of business prior to closing time for the receipt of tenders. provided that written confirmation of any telegraphic withdrawal over the signature of the Tenderer is placed in the mail and post marked prior to the closing time for the receipt of Tenders. Negligence on the part of the Tenderer in preparing his tender confers no right to withdrawal or modification of this tender after such Tender has been opened.
17. Telegraphic offers will be treated as defective, invalid and are likely to be rejected. Only detailed complete offers received prior to the closing time and date of the Tenders will be taken as valid.
18. The language in which the contract documents shall be drawn up is English Language.
19. The Tenderer shall submit alongwith his Tender a Bar Chart showing completion time of various sections of his proposed work including supply and delivery of all important items for this Contract.
20. The Contractor is deemed to have ascertained and provided for payment of Income-Tax, super tax and all other Taxes, Rates, Duties, Port Dues Wharfage, etc as are chargeable under the laws for the time being in force in respect of the contract and the contract price shall be deemed to be inclusive of all such payments.

- 1.
- 21 The Board does not bind itself to recommend for acceptance of the lowest or any tender or assign any reason for non-acceptance of any tender and reserve to itself the right to divide the contract between two or more tenderers.
- 22 Until such time the Contract agreement is prepared and executed, the conditions of contract, specifications, schedule including Schedule of Rates, Drawings and tender together with acceptance thereof with such modifications as have been mutually agreed upon in writing shall govern the rights and obligations of the Contractor and the Board.
- 23 Every tender should be signed on all the papers of the tender and any tender not so signed is liable to be treated as defective.
- 24 In the event of the tender being submitted by a Firm it must be signed separately by each constituent thereof or in the event of the absence of any partner it must be signed on his behalf by a person holding a power of Attorney from him, authorising him to do so.
25. If the tenderer approaches a Trustee or any Officer of the Port directly or indirectly with a view to exercising influence on him for securing the contract his tender is liable to be rejected summarily without assigning any reasons and the Tenderer may even be forbidden from future tendering with Mormugao Port Trust through appropriate action.
26. The tenderer shall submit alongwith the tender a financial stability certificate from Nationalised Bank in India to the effect that he can undertake the work of the magnitude as contemplated in the Tender.
27. The rates quoted by the Contractor shall include all leads and lifts in carrying out the works under the contract in different floors (ground floor and upper floors) and carriage of construction materials to different floors etc. No claim will be entertained for extra lift etc. due to the tall height of structures.
28. The electrical work if included in the B.O.Q. will be part of this contract. However the Contractor shall not do the finishing works such as painting, colour washing etc. before the electrical work is completed though he has finished the other works. No compensation will be payable to the contractor for any delay on this account.
29. For the items of work which are partly completed, and are in progress, payments at Part Rates as decided by the Chief Engineer may be made. The decision, to make such payments is left entirely to the discretion of the Chief Engineer whose decision is final and binding on the contractor.
30. Tenders should be submitted in a sealed cover and on top of the cover the name of the work for which the tender is called and submitted should be superscribed.
31. Name and address of the tenderers should be written on the left hand corner of the sealed cover containing the tender.
32. The tenderer shall quote rates for provisional items included in the tender.
33. Electrical works are included in the scope of this contract, if included in the B.O.Q.
34. The period of maintenance, guarantee period, etc. mentioned in the tender documents are applicable to the general items of the work and not for item of work like water-proofing treatment etc. for which different Guarantee Periods are stipulated. The contractor has to enter an appropriate agreement that during the Guarantee Period of the Waterproofing treatment, he will rectify/make good any defects observed in the water-proofing treatment at his cost. Further, as guarantee for satisfactory performance of the water-proofing treatment provided. an amount of 5% of the cost of waterproofing will be retained initially for a period of two years. .
35. Statutory Regulations (Ref Clause No. 24(2) of General Conditions of Contract): As per the Income Tax Act, 1961 the contractors while submitting their bills for settlement to Civil Department through Sub-Sections they should necessarily indicate their PERMANENT ACCOUNT NUMBER on every bill. Also No Dues Certificate as to compliance with the EPF and ESIC mandatory requirement from the authority concerned have to be produced for preferring claims with the MPT. They should also produce depositive proof of their contribution to the office of the Regional Provident Fund Commissioner, and the ESIC Authority. Those contractors who have not been allotted separate code nos. should also submit their contributions to P.E Commissioner under code No. *GoA/* 11 0286 while submitting their bills, challans/receipt for the above payment should accompany alongwith the bill. otherwise their bill will not be passed for payment.

CHIEF ENGINEER
MORMUGAO PORT TRUST

MORMUGAO PORT TRUST
SPECIAL INSTRUCTIONS

Clause No.1:

The terms of payment for running account bills as stipulated in para one of Clause No. 54 (4) of General Conditions have been modified to read as below:

"90% of the amount of the bills submitted shall be within a period 10 days from the date of receipt of the bill in the Office of the Chief Engineer and balance 10 % within a period of 15 days there from provided the bill is prepared on the basis of joint measurements and is undisputed."

These terms of payments will not be applicable to the final bill.

Clause No.2:

The likely liability arising as a result of the application of the Contract Labour (R & A) Act, 1970 and the Rules framed thereunder will be borne by the Board if it is finally held by the Court that Rule 25(2) of the Contract Labour (R & A) Central Rules 1971 is applicable to the Contractor in which case the same shall be reimbursed to the Contractor by the Board. However, for the Board to accept the liability as stated above, the Contractor shall maintain appropriate day to day records of the labour engaged by him on the works and further the disbursement of wages made by the Contractor to his labour should be made in presence of an authorised representative of the Chief Engineer.

Further, any reimbursement on account of the above if it is made, will be restricted to the difference between the wages paid by the Port Trust to their labour of respective categories and the wages actually paid by the Contractor to his labour or to the difference between the wages paid by the Port Trust to their labour of respective categories and the wages as per minimum wages fixed by the Government of Goa, whichever difference is less. This amount will not be subject to any other escalation etc., and it will be adjusted against the labour escalation paid to the contractor as per Clause No. 70 of General Conditions of Contract.

Clauses No.3:

The attention of the tenderer is specially invited to Clause NO.5 of Instructions to Tenderers. However, if inspite of the above, the tenderer stipulated conditions which are contrary to the conditions in the tender documents, he should indicated the increase or reduction over the tendered amount which would be allowed by him in case the same are withdrawn. The break up of the amount relating to each of the aforesaid conditions should be given. However in case the tenderer fails to indicate the increase/reduction over the tendered amount as above, the Port Trust reserves rights to take their own evaluation of such conditions and add or subtract the same from the tendered amount as the case may be.

Clause No.4:

Electrical works if included in the Bill of Quantities form part of this contract (this clause supersedes the Clause No. 28 and 33 of "Instructions to Tenderers" contained in Volume I). The Contractor will engage Licenced Electrical Staff/ Agency for carrying out the Electrical works. It shall be the responsibility of the Contractor to furnish necessary test certificates to the Electrical Department whenever necessary and arrange to give power supply connections to the building after observing all the formalities under different Electrical Regulations! Acts etc. Costs towards these services are deemed to have been included in the tendered rates.

Clause No.5:

- (a) Tenders must be sent, with Bill of Quantities duly filled in with rates and in sealed covers as per clauses 6 (b) and 6 (c) hereof, addressed to the Chief Engineer, Mormuga Port Trust Headland Sada Goa, 403804, so as to reach him not later than 15.00 hours on the date mentioned in the tender notice. Tenderers shall submit their tenders in two covers as described below:
- (b) If the tenderer stipulates conditions which are in deviation to the conditions in the tender documents, he shall indicate the increase or decrease over the tendered amount which would be allowed by him in case the same are withdrawn. The break up of the amount relating to each of the aforesaid conditions shall be given

In addition to the deviations,if any, all the following accompaniments to the tender viz;

(i) Covering letter from the tenderer giving full details of alterations, conditions/counter conditions etc.

if any, on which he has based his tender:

(ii) Volume- I of Tender Documents.

(iii) Financial stability Certificate.

(iv) Income-Tax Certificate.

(v) Plant and Machinery Statement.

(vi) A copy of the latest audited Balance Sheet of the Firm of the tenderer.

Shall be put in the first cover which shall be sealed and superscribed "TENDER FOR CONSTRUCTION OFDeviation and accompaniments cover NO.1" and bear on the bottom left corner of the cover the name of the Tenderer

(c) The Schedule of Quantities and Rates duly filled in with rates and tender amounts based on the Port Trust Design., should be put in the second cover which shall be sealed and supercribed "TENDER FOR THE CONSTRUCTION OF Cover NO.2 and bear on the bottom left corner of the cover the name of the tenderer.

(d) The first cover shall be opened on the scheduled opening date and the second cover will be opened at a later date which will be intimated to the tenderers.

Clause NO.6:

Permission for working beyond the normal working hours of the Port or on Sundays and Public Holidays as stipulated under Cl. No. 42 of General Conditions of Contract will be given to the contractor subject to his agreeing to bear the cost of overtime, if any, which may have to be paid to the Port's supervisory staff.

Clause No.7:

The contractor and his workers/agents shall be required to obtain from MPT and display a Photo Identity Card during entry stay and exit from the Port Security areas guarded by CISF personnel.

Clause No.8:

All applications for issuance of photo Identity Cards shall be routed through the Chief Engineer, who shall forward the same to the Port's Traffic Department, whose pass section will issue the photo Identity Card to the Contractor or his agents on payment of necessary fees as prescribed from time to time and the same shall be valid for the duration of the contract or a period of one year, whichever is less. It is the responsibility of the contractor to ensure that all photo Identity cards issued by the port to his workers/agents /Labourers are returned immediately on completion of the work.

Clause NO.9:

Subject to the availability, land for construction of temporary sheds/stores/labour hutments etc., will be given to the contractor in Port areas at Headland/Vasco. The contractor shall clear away all the temporary structures built within a period of fourteen days after completion of the work and leave the whole of the site clean to the satisfaction of the Chief Engineer.

Clause No 10:

Lease rent shall be charged to the contractors for the area allotted for construction of their temporary sheds for site office/store/labour hutments required in the contract works. The licence fee shall be as per Port's Scale of Rates vide item (i) and (ii) of Part- II (section-C) . Refer Schedule-Co The revised licence fee fixed by the TAMP as applicable from time to time shall be liable to be paid by the contractor.

Clause No. 11:

No temporary structures/sheds which are constructed to house the contractor's office/store/labour hutments shall be permitted to be retained during the period of maintenance.

Clause No 12:

All materials to be used in the structure shall be conforming to the relevant I.S.I specification or as specified in the Tender Schedule. Contractor shall carry out laboratory test as specified in the relevant I.S.I at the discretion of Chief Engineer and only approved materials/ approved brand of material shall be used.

Clause No. 1'3:

Without limiting his obligation and responsibilities under clause 21 of G.C.c. (Vol. I) the Contractor shall insure, at his cost, in the joint names of the Board and the Contractor against all losses or damage from whatever cause arising (other than the Exempted risks) for which he is responsible under the terms of the contract in such manner that the Board and Contractor are covered during the period of construction of the works and are also covered during the period of Maintenance for losses or damage arising from a causes occuring prior to the commencement of the period of maintenance and for any loss or damage occasioned by the contractor in the course of any operations carried out by him for the purpose of complying with his obligations under Clause 45 of G.C.C. (Vol. 1):-

- a) The works and the temporary works to the full value of such works executed from time to time. The materials, Constructional Plant and other things brought on to the site by the Contractor to the full value of such materials, Constructional Plant and other things.
- b) Such insurance shall be effected with an insurer and in terms approved by the Board and the Contractor shall whenever required produce to the Chief Engineer or the Chief Engineer's representative the policy or policies of insurance and the receipts for the payment of the current premia provided always without limiting his obligations and responsibilities as aforesaid nothing in the clauses contained shall render the contractor liable to insure against the necessity for repair or reconstruction of any work constructed with material or workmanship not in accordance with the requirements of the Contract.

Clause No. 14:

- (a) Before commencing the execution of the works, the Contractor (but without limiting his obligations and responsibilities under Clause 22 of G.C.C. (VoU) shall insure against any damage, loss or injury which may occur to any property (including any employee of the Board) by or arising out of the execution of the works or Temporary works or in the carrying out of the contract otherwise than due to the matters referred to in the proviso to Clause 22 (1) of G.C.C. (Vol. I)
- (b) Such insurance shall be effected with an insurer and in terms approved by the Board and for at least the amount stated in the Tender and the Contractor shall whenever required produce to the Chief Engineer or the Chief Engineer's Representative the policy or policies of insurance and the receipts for payment of the current premia.

Clause No. 15:

The Contractor shall insure against accident, injury etc. to workmen with an insurer approved by the Board and shall continue such insurance during the period of contract shall when required produce to the Chief Engineer or the Chief Engineer's representative such policy of insurance and the receipt for payment of the current premia, provided always that in respect of any persons employed by any sub-contractor, the contractor's obligation to insure as aforesaid shall be satisfied if the sub-contractor shall have insured against the liability in respect of such persons in such manner that the Board is indemnified under the policy but the Contractor shall require such sub-contractor to produce to the Chief Engineer or the Chief Engineer's representative when required such policy of insurance and the receipt for payment of the current premia.

Clause No. 16:

If the contractor shall fail to effect and keep in force the insurance referred to in the above mentioned clauses hereof or any other insurance which he may be required to effect under the terms of the contract then and in any such case the Board may effect and keep in force any such insurance and pay such premium or premia as may be necessary for that purpose and from time to time deduct the amount so paid by the Board with interest as stated in Vol. I as aforesaid from any moneys due or which may be due to the contractor or recover the same as a debt due from the contractor.

Clause No. 17:

The contractor shall not disturb the normal functioning of the port by dumping his materials on the roads. Prior permission from the Chief Engineer shall be obtained for storage of materials near the site.

MORMUGAO PORT TRUST

INDEX TO

GENERAL CONDITIONS

CLAUSE	PAGE NO.
DEFINITIONS AND INTERPRETATIONS	
1.	1. Definitions
	2. Singular and Plural
	3. Marginal headings or note
ENGINEER'S REPRESENTATIVE	
2.	Duties and powers of Engineers's representative
ASSIGNMENT AND SUB – LETTING	
3.	Structure of firm
4.	Assignment
5.	Sub – letting
EXTENT OF CONTRACT	
6.	Extent of contract
CONTRACT DOCUMENTS	
7	1. Documents and mutually explanatory 2&3 Specific drawing
8.	1. Custody of Drawings
	2. One copy of drawing to be kept on site
9.	Further drawings and instructions
GENERAL OBLIGATIONS	
10.	Contract Agreement
11.	1. Security deposit
	2. Refund of security deposit
	3. Forfeiture of security deposit
12.	Inspection of site
13.	1. Sufficiency of tender
	2. Adverse physical conditions and artificial obstructions

14. Work to be to satisfaction of Chief Engineer
15. Programme to be furnished
16. Contractor's Superintendence
17.
 1. Contractor's Employees
 2. Removal of Employees
18. Setting out
19. Bore Holes and Exploratory Excavation
20. Watching and Lighting
21.
 1. Care of works
 2. Expected Risks
22.
 1. Damage to persons and property
 2. Indemnity by Employer
23. Accident or injury to workman
24.
 1. Giving of notices and payment of fees
 2. Compliance with statutes, regulation etc.
25. Fossils etc.
26. Patents rights and Royalties
27. Interference with Traffic Adjoining properties
28. Extra Ordinary Traffic
29.
 1. Opportunities for other contractors
 2. Co-ordination with others
30. Supply of Plant, Materials and Labour
31. Clearance of site on completion
32. Return of labours etc.

MATERIALS AND WORKMANSHIP

33.
 1. Quality of Materials and Workmanship Tests
 2. Costs of Samples
 3. Costs of Tests
 4. Cost of Tests not provided for etc.
34. Access to site
35.
 1. Examination of work before covering up
 2. Uncovering and making openings
36.
 1. Removal of improper work and materials

37.
 1. Suspension of work
 2. Suspension lasting more than 90 days.

COMMENCEMENT TIME AND DELAY

38. Commencement of work
39.
 1. Possession of Site
 - 2 & 3 Way leaves etc.
 4. Port Railways
40. Time for completion
41. Extension of time for completion
42.
 1. Night work and work on holidays 2
 - & 3 Rate of Progress
43. Liquidated damages for delays
44.
 1. Certificate of completion of work
 2. Risk pending completion

MAINTENANCE AND DEFECTS

45.
 1. Definition of 'period of Maintenance' .
 2. Execution of work or Repair etc.
 3. Cost of Execution of work or Repair etc.
 4. Remedy on Contractor's failure to carry out work required
46. Contractor to search

ALTERATIONS, ADDITIONS AND OMISSIONS

47.
 1. Variation
 2. Order for variations to be in writing
48.
 1. Valuation of variation
49.
 1. Plant etc., exclusive use for the work
 2. Removal of plant etc.
 3. Board not liable for damage to plant etc.
 4. Conditions of hire of certain plant
 5. Hire purchase payments by the Board
 6. Cost for purposes of clause 63
 7. Contractor's certificate as to hiring provision
50. Approval of materials etc. not implied

MEASUREMENT

51. Quantity

52. Works to be measured
53. Method of measurement
54.
 1. Monthly payment
 2. Payment of Retention Money
 3. Payment of Security Deposit
 4. Time of payment
 5. Correction and with-holding of certificate
 6. Indian Currency
55. Approval only by Maintenance Certificate
56.
 1. Maintenance Certificate
 2. Cessation of Liabilities
 3. Unfulfilled obligations

REMEDIES AND POWER

57.
 1. Forfeiture
 2. Valuation of date of forfeiture
 3. Payment after forfeiture
 4. Assignment of benefit of Agreement
58. Urgent Repairs

SPECIAL RISKS

59.
 1. No liability for war etc. risks
 2. Damage to works etc. by special risks
 3. Projectile, Missile, etc
 4. Outbreak of war
 5. Removal of Plant on termination
 6. Payment if contract terminated

FRUSTRATION

60. Payment in event of frustration

NOTICES

61.
 1. Service of notices on Contractor
 2. Service of notices on Board

VARIATION OF PRICE

62. Contract price not subjected to variation.
63. Major economic dislocation
64. Port Rules and Regulations

SECURITY RISK

65. Security Risk

ARBITRATION CLAUSE

66. Settlement of Disputes

LABOUR

67. 1 & 2 Engagement of Labour
68. Trade Union Membership
69. Copy of Clause to be displayed
70. Supply of water
71. Alcoholic liquor or drugs
72. Arms and Ammunition
73. Disorderly conduct etc.
74. Epidemics
10. Festivals and Religious Customs
11. Compliance with regulations, etc
12. Observance by Sub-Contractor
13. Wage Record
14. Accidents
15. Notices
- 16, 17 & 18 Inspection of wage record
19. Representation of Parties
20. Safety Provision
21. Maternity benefits for female workers
22. Dock Labour Regulations 23. Provision of Protective Measures

MATERIALS SUPPLIED BY THE DEPARTMENT

68. I & 2 Return of the surplus materials
3. Account of Material used

MOBILISATION ADVANCE

69. Mobilisation Advance

VARIATION IN PRICE

70. Variation in price of Labour and Materials

MORMUGAO PORT TRUST

SPECIAL CONDITIONS

INDEX

CLAUSE

1. Duties and Dues etc.
2. Taxation
3. Drawings
4. Other Contractors
5. Returns and Reports
6. Obstructions
7. Security and Safety
8. Tidal Working
9. Miscellaneous
10. Law Covering Contract

MORMUGAO PORT TRUST
GENERAL SPECIFICATIONS

CHAPTER	CHAPTER TITLE
1. CHAPTER - I	General Particulars etc.
2. CHAPTER - II	Earthwork Excavation etc.
3. CHAPTER - III	Masonry, Laterite, Bricks and Concrete.
4. CHAPTER - IV	Cement Concrete and Reinforced Concrete.
5. CHAPTER - V	Wood work, Wrought & put up Doors, Windows, etc.
6. CHAPTER - VI	Structural Steel works.
7. CHAPTER - VII	Roofing.
8. CHAPTER - VIII	Flooring.
9. CHAPTER - IX	Plastering.
10 . CHAPTER - X	Painting concrete, Masonry and Plaster surfaces.
11 . CHAPTER - XI	Painting wood work and Iron work.
12 . CHAPTER - XII	Water supply and drainage.
13 CHAPTER - XIII	Road work.

MORMUGAO PORT TRUST
GENERAL CONTDITIONS
DEFINITIONS AND INTERPRETATIONS

1. (1) In the contract (as hereinafter defined) the following words expressions shall have the meaning hereby assigned to them except where the context otherwise requires:

DEFINITIONS:

- (a) 'Board' means the Board of Trustee of the Port of Mormugao, a body corporate under the Major Port Trust Act of 1963. For the purpose of the Contract the term 'Board' also includes the Chairman and Chief Engineer as defined hereunder.
- (b) "Chairman" means the Chairman of the Board of Trustees of Mormugao Port Trust.
- (c) "Chief Engineer" means Chief Engineer of the Mormugao Port Trust.
- (d) "Contractor" means the person or persons, firm or company whose tender has been accepted by the Board and includes the Contractor's personal representatives, successors and permitted assignees.
- (e) "Chief Engineer's Representative Engineer in Charge" means an Engineer of Port Trust posted at the site of work for supervision or/ and the Engineer directed by the Chief Engineer to inspect the construction works.
- (f) "Department" means Civil Engineering Department of the Mormugao Port Trust.
- (g) "Works" Means the works to be executed in accordance with the Contract.
- (h) "Contract" means the general conditions, special conditions, special Instructions, Technical Specifications, Drawings and priced Schedule of Quantities and Rates and Prices (if any) of Tender and Contract Agreement.
- (i) "Contract Price" means the sum named in the Tender subject to such additions thereto or deductions there from as may be made under the provisions thereafter contained.
- (J) "Constructional Plant" means all appliances or things of whatsoever nature required in or about the execution, completions or maintenance of the works or Temporary works (as hereinafter defined) but does not include materials or other things intended to form or forming part of the permanent work.
 - (k) "Temporary Works" means all temporary works of every kind required in or about the execution, completion or maintenance of the works.
- (l) "Drawings" means the drawings referred to in the Specification and any modification of such drawings approved in writing by the Chief Engineer and such other drawings as may be from time to time be furnished or approved in writing by the Chief Engineer.
- (m) "Site" means the lands places on under in or through which the works are to be executed or carried out and any other land on places provided by the Board for the purposes of the Contract together with such other places as may be specifically designed in the contract as forming part of the site.
- (n) "Approved" means approved in writing including subsequent written confirmation of previous verbal approval and "Approval" means approval in writing including as a aforesaid.

- (o) "Month" means month according to Gregorian Calendar.
- (p) "Schedule Bank" means a Bank included in the second Schedule to the Reserve Bank of India Act, 1934.
- (q) "Sub Contractor" means any person, firm or corporation having a contract for the execution of a part or parts of the work included in the contract and a person, firm or corporation furnishing materials called for in the Contract and worked to a special design according to the Specifications.
- (r) "Others" means any person or firm or corporation employed by or having a contract directly or indirectly with the Board otherwise than through the Contractor.

4. Words imparting the singular only also include the plural and vice versa where the context required.
2. The marginal heading or notes in these General Conditions shall not be deemed to be part thereof or be taken into consideration in the interpretation or construction thereof or of the Contract.

Singular and plural
Marginal Headings or Notes

ENGINEERS REPRESENTATIVE

- 2 The duties of the Chief Engineer's Representative are to watch and supervise the works and to test and examine any materials to be used or workmanship employed in connection with the works. He shall have no authority to relieve the Contractor any of his duties or obligations under the Contract.

Duties & Powers of Chief Engineer's Representative

Any written instructions or approval given by the Chief Engineer's Representative to the Contractor within the terms of the above shall bind the Contractor as though it had been given by the Chief Engineer provided always as follows:

- (a) Failure of the Chief Engineer's Representative to disapprove any work or materials shall not prejudice the power of the Chief Engineer there after to disapprove such works or materials and to order the pulling down, removal or breaking up thereof.
- (b) If the Contractor shall be dissatisfied by reason of any decision of the Chief Engineer's Representative he shall be entitled to refer the matter to the Chief Engineer who shall thereupon confirm, reverse or vary such decision.

ASSIGNMENT & SUB-LETTING

3. The Contractor shall when required by the Chief Engineer produce documents such as memorandum and articles of association in case of a company or in case of a partnership the deed of partnership and so on for the inspection of the chief Engineer and any further change after such production either in the form of alteration of the structure or partnership or relationship shall be made only with the prior approval of the Chief Engineer.
4. The Contractor shall not assign the contract or any part thereof or any benefit or interest therein or thereunder (otherwise than by a charge in favour of the Contractor's Bankers of any monies due or to become due under this contract) without the prior written consent of the chief Engineer.
5. (1) The Contractor shall not sublet whole of the works. Except where otherwise provided by the contract, the contractor shall not sub-let any part of the works without the prior written consent of the chief Engineer (which shall not be unreasonably withheld) and such consent if given shall not relieve the contractor from any liability or obligations under the Contract and he shall be responsible for the acts defaults and neglects of any sub-contractor, his agents, servants or workman, as fully as if they were the acts, default or neglects of the Contractor, his agents, servants or workmen provided always that the provision of labour on piece-work basis shall not be deemed to be a sub-letting under this clause.

Structure of Firm

Assignment

Sub-Letting

- (2) The Contractor shall, at the time of signing the contract, notify the Chief Engineer in writing of the names of sub-contractors proposed for the principal parts of the works and for such others as the Chief Engineer may direct and shall not employ any to whom the Chief Engineer may reasonably object.
- (3) In view of his responsibility for the acts and omissions of his sub-contractor, the contractor shall not be obliged to employ as a sub-contractor any person or firm to whom the Chief Engineer reasonably objects.
- (4) Nothing contained in the contract documents shall create any contractual relation between any sub-contractor and the Board.

EXTENT OF CONTRACT

6. The contract comprises the construction, completion and maintenance (if prescribed) of the works and except in so far as the Contract otherwise provides the provision of all labour, material, constructional Plants Temporary works and everything whether of a Temporary or Permanent nature required in and for such construction, completion and maintenance, so far as the necessity for providing the same is specified in or reasonable to be inferred from the contract.

Extent of Contract

CONTRACT DOCUMENTS

7. (J) Except if and to the extent otherwise provided by the Contract the provisions of the General conditions and Special Conditions shall prevail over those of any other document forming part of the Contract, subject to the foregoing, the several documents forming the Contract are to be taken as mutually explanatory of one another but in case of ambiguities or discrepancies the same shall be explained and adjusted by the Chief Engineer who shall thereupon issue to the Contractor instructions directing in what manner the works are to be carried out.

Documents Mutually Explanatory

- (2) The dimensions written on the drawings are to be taken and not those obtained from seating the drawing. In case of any discrepancy between the drawing and specifications the latter shall prevail.

Specifications and Drawings

- (3) The Specifications and Drawings are to be considered as explanatory of each other and should anything appear in the one that is not described in the other, no advantage shall be taken of any such omission, should any discrepancies however appear or should any misunderstanding arise as to the meaning and import of the specifications of drawings or as to the dimensions or the quality of the materials or the due and proper execution of the works or as to measurement or quality and evaluation of the works executed under this contract or as extras thereupon, the same shall be explained by the chief Engineer and his explanation shall be binding upon the Contractor and the contractor shall execute the work according to such explanation and without extra charge or deduction to or from the price specified in the Schedule of Quantities and Rates and shall also do all such works and things as may be necessary for the proper completion of the work as implied by the Specifications and Drawings even though such works and things are not specially shown and described in the Specifications and Drawings.

8. (1) The Drawings shall remain in the sole custody of the chief Engineer but two copies thereof shall be furnished to the Contractor by the Board free of cost. The contractor shall provide and make at his own expense any further copies required by him. At the completion of the Contract the Contractor shall return to the Board all drawings provided under the Contract. The contractor shall give adequate notice in writing to the Chief Engineer or the Chief Engineer's representative of any further drawings or specifications that may be required for the execution of the work or otherwise under the contract.

Custody of Drawings

(2) One copy of the Drawing furnished to the Contractor as aforesaid shall be kept by the Contractor on the site and the same shall at all reasonable time be available for inspection and use by the Chief Engineer and the Chief Engineer's Representative and by any other person authorised by the Chief Engineer in writing.

One copy of drawings to be kept on site

9. The Chief Engineer shall have full power and Authority to supply to the Contractor from time to time during the progress of the works such further drawings and instructions as shall be necessary for the purpose of the proper and adequate execution and maintenance of the works and the Contractor shall carry out and be bound by the same.

Further drawings and instructions

GENERAL OBLIGATIONS:

10. (1) The Contractor shall when called upon so to do enter into and execute a contract agreement in the form annexed with such modifications as may be necessary. The cost of stamping the agreement shall be borne by the Contractor.

Contract Agreement

(2) Until such time the contract agreement is executed the conditions of contract, specifications, schedules and rates drawings and tender together with the acceptance thereof with such modifications as have been mutually agreed upon in writing shall govern the rights and obligations of the Contractor and the Board.

11. (1) The successful tenderer will be required to deposit as security for the due fulfillment of the contract amounts as under.

Security Deposit

5% of the Contract value at the time of the acceptance of the Tender.

Unless the said security deposit is made within twenty eight days of the receipt of the order to commence work, or such extension of that period as granted by the Chief Engineer in Writing, the earnest money will be liable to forfeiture and the contract to cancellation. The said deposit of a sum equal to 5% of the estimated value of the contract may be made either in cash or by Demand Draft payable in Vasco da Gama. or Government Promissory (G.P) Notes or securities of Public Bodies and encashable at Vasco da Gama, or by Bank Deposits, Bank Deposit receipt must be made out in the name of the Chairman, Mormugao Port Trust and securities must be endorsed in the favour of the Board of Trustees of the Port of Mormugao or order if required accompanied by transfers in favour of the Chairman. No interest will be allowed on cash deposits, but Bank Deposits receipt when returned will be endorsed to the Contractor together with any bank interest that may have accrued thereon. Bank deposit receipt must be on any schedule bank and concurred by the Reserve Bank of India in writing. For calculating the amount of stamp duty payable, the tenderers should specifically state in the form of Tender as to how they propose to lodge the above mentioned deposit. In the case of G.P. Notes or Securities of Public Bodies, the endorsement in favour of the Board should be 'pay to the Chairman of the Port of Mormugao or order' and further in the case of G.P. Notes the endorsement in favour of the Board should bear the "Examiner" stamp of the Public Debt Office, Reserve Bank of India, only securities enfaced for payment of interest in Vasco da Gama will be accepted. The value of the G.P. Notes and securities to be deposited will be taken at 10% below the market rate ruling on the date the same are tendered or the face value thereof whichever is lower. On payment of this deposit and on the completion of the contract Agreement, Earnest Money Deposited with tender will be refunded or will be retained as a part of initial security deposit. Bank Guarantee issued by the State Bank of India or by a scheduled Bank will also be accepted.

If the Contractor furnishes a Bank Guarantee in the form annexed. the said Guarantee shall extend from the date of issue of the letter or intent for a period as detailed in the Appendix-I and the Contractor shall further agree to extend the validity of the said Bank Guarantee from time to time for such period of periods as Chief Engineer / Chairman may require.

(2) The Security of 5% paid by the Contractor shall be held in deposit as security for satisfactory maintenance of the work as hereinafter provided. **Refund of Security Deposit**

(3) The Board may at its option forthwith forfeit the above Security Deposit in whole or part if in the opinion of the Board the Contractor has failed to fulfill any or all the conditions of this contract without prejudice to any and all rights of the Board to recover from the Contractor any amounts falling due to the Board through non-observance by the Contractor of any of the Clause hereof. **Forfeiture of Security Deposit**

12. (1) The tender shall be deemed to have been based on such data regarding Hydrological, climatic and physical conditions as shall have been submitted by the Board in the documents furnished to the Contractor by the Board for the purpose of tendering but the Contractor shall nevertheless also inspect and examine the site and its surroundings and shall satisfy himself before submitting his Tender as to the Form and Nature of the Site, the quantities and nature of the work and materials necessary for the completion of the works and means of access to the Site the accommodation he may require and in general shall himself obtain all necessary information (subject as above mentioned) as to risks contingencies and other circumstances which may influence or affect his tender. The Tenderer shall not thereafter be entitled to claim extra sums and contend that the data furnishes by the Board, was inadequate or faulty in content or context. **Inspection of Site**

(2) Only such vehicles as are licenced by the Board will be permitted to enter into the Harbour premises. Tenderer should obtain permits from the Port Security Office of the Mormugao Port Trust for gaining entry of vehicles.

13. (1) 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 rates and prices stated in the priced Schedule of Quantities and the Schedule of Rates and Prices (if any) which rates and prices shall except in so far as it is otherwise provided in the contract cover all his obligations under the contract and all matters and things necessary for the proper completion and maintenance of the works. **Sufficiency of Tender**

(2) If however during execution of the works the Contractor shall encounter physical conditions or artificial obstructions which conditions or obstructions could not have reasonably foreseen by an experienced contractor, the contractor shall forth with given written notice thereof to the Chief Engineer and if in the opinion of the Chief Engineer such conditions or artificial obstructions could not have been reasonably foreseen by an experienced contractor then Board shall pay the additional expenses to which the contractor shall have been put by reason of such conditions including the proper and reasonable expenses. **Adverse physical condition and Artificial obstructions**

(a) of complying with any instructions which the Chief Engineer may issue to the Contractor in connection therewith and,

(b) of any proper reasonable measures approved by the Chief Engineer which the Contractor may take in the absence of specific instructions from the Chief Engineer, as a result of such conditions or obstructions being encountered.

14. Save in so far as it is legally or physically impossible, the Contractor shall execute, complete and maintain the works in strict accordance with the Contract to the satisfaction of the Chief Engineer and shall comply with and adhere strictly to the Chief Engineer's instructions and directions on any matter (Whether mentioned in the Contract or not) Touching or concerning the works. **Work to be to the satisfaction of the Chief Engineer**

15. Within six weeks from the date of the order to commence work after the acceptance of his Tender the contractor shall submit to the chief Engineer for his approval a programme showing the order of procedure and method in which he proposed to carry out the works, and shall whenever required by the Chief Engineer or Chief Engineer's representative furnish for his information particulars in writing of the contractor's arrangement for the carrying out of the works and of the Constructional Plant and Temporary works which the contractor **Programme to be furnished**

intends to supply, use or construct as the case may be. The submission to and approval by the Chief Engineer or Chief Engineer's Representative of such programme or the furnishing of such particulars shall not relieve the Contractor of any of his duties or responsibilities under the Contract.

16. The Contractor shall give or provide all necessary superintendence during the execution of the works and as along thereafter as the Chief Engineer Olay consider necessary for the proper fulfilling of the Contractor" obligations under the contract. The contractor or a competent and authorised agent or representative approved of in writing by the Chief Engineer (which approval may at any time be withdrawn) is to b~ constantly on the works and &hall give his whole time to the superintendence' of the same. If such approval shall be withdrawn by the Chief Engineer the Contractor shall as soon as is practicable (having regard tot he requirement of replacing him as hereinafter mentioned) after receiving written notice of such withdrawal remove the agent from the Site and shall not thereafter. employ him again on the site in any capacity shall replace him by another agent approved by the Chief Engineer. Such authorised agent or representative shall receive on behalf of the Contractor directions and instructions from the Chief Engineer or Chief Engineer's Representati ve.

Contractor's Superintendence

17. (1) The Contractor shall provide and employ on the site in connection with the execution and maintenance of the works.

(a) Only such technical assistants s as are skilled and experienced in their respective callings and such sub-agents foreman and leading hands as are competent to give proper supervision to the work they are required to supervise and

(b) Such skilled, semi-skilled and unskilled labour as is necessary for the proper and timely execution and maintenance of the works.

Contractor's Employees

17. (2) The Chief Engineer shall be at liberty to object to and require the contractor to remove forthwith from the works any person employed by the Contractor in or about the execution or maintenance of the works who in the opinion of the Chief Engineer misconduct himself or is incompetent or negligent in the proper performance of his duties or whose employment is otherwise considered by the Chief Engineer to be undesirable and such person shall not be again employed upon the works without the written permission of the Chief Engineer Any person so removed from the Works shall be replaced as soon as possible by a competent substitute approved by the Chief Engineer.

Removal of Employees

18. The Contractor shall be responsible for the true and proper setting out of the works in relation to original grid lines and levels of reference given by the Chief Engineer in writing and for the correctness (subject as above mentioned) of the position levels, dimensions and alignment of all parts of the works and for the provision of all necessary instruments, appliances and labour in connection therewith. If at any time during the progress of the works any error shall appear or arise in the position level, dimensions or alignment of any part of the works, the Contractor on being required so to do by the Chief Engineer or Chief Engineer's Representative shall at his own expenses rectify such error to the satisfaction of the Chief Engineer or Chief Engineer's Representative unless such error is based on in correct data supplied in writing by the Chief Engineer or Chief Engineer's Representative in which case the expense of rectifying the same shall be borne by the Board. The checking of any setting-out of any line or level by the Chief Engineer or the Chief Engineer's Representative shall not in any way relive the Contractor of his responsibility for the correctness thereof and the Contractor shall carefully protect and preserve all bench-marks, sight-rails, pegs and other things used in setting-out the works.

Setting Out

19. If at any time during the execution of the works the chief Engineer shall require the Contractor to make boreholes or to carry out exploratory excavation such requirement shall be ordered in writing and shall be deemed to be an addition ordered under the provisions of Clause 47 hereof unless a provisional sum in respect of such anticipated work hall have been included in the bill or Quantities or Schedule of Quantities and Rates.

Bore Holes and Exploratory excavation

20. The Contractor shall in connection with the works provide and maintain at his own cost all lights, guards and fencing and watching when and where necessary or required by the Chief Engineer or Chief Engineer's Representative or by any duly constituted authority for the protection of the works or for the safety and convenience of the public or others.

Watching and Lighting

21 (1) From the commencement to the completion of the works the contractor shall take full responsibility for the care thereof and of all Temporary works and in case any damage, loss or injury shall happen to the Works or to any part thereof or to any Temporary works from any cause whatsoever (save and except the excepted risks as defined in sub-clause (2) of this Clause) shall at his own cost repair and make good the same so that at completion the works shall be in good order and condition and in conformity in every respect with the requirement of the Contract and the Chief Engineer's instructions. In the event of any such damage, loss or injury happening from any of the excepted risks the contractor shall if and to the extent required by the Chief Engineer and subject always to the provisions of clause 59 hereof repair and make good the same as aforesaid at the cost of the Board. The Contractor shall also be liable for any damage to the Works occasioned by him in the course of any operations carried out by him for the purpose of complying with his obligations under Clause 45 hereof.

Care of works

(2) The "excepted risks" are war hostilities (whether war be declared or not) invasion act of foreign enemies, rebellion revolution, insurrection or military or usurped power, civil war or (otherwise than among the contractor's own employees) riot, commotion or disorder or a cause proved to be solely due to the Chief Engineer's design of the works (all of which are herein collectively referred to as 'the excepted risks').

Excepted Risks

22. (1) The Contractor shall (except if and so far as the specification provides otherwise) indemnify and keep indemnified the Board against all losses and claims for injuries or damage to any person or any property whatsoever which may arise out of or in consequence of the construction and maintenance of the works and against all claims, demands, proceedings, damages costs charges and expenses whatsoever in respect of or in relation thereto, provided always that nothing herein contained shall be deemed to render that Contractor liable for or in respect of or to indemnify the Board against any compensation or damages for or with respect to:-

Damage to persons & property

- (a) The permanent use or occupation of land by the works or any part thereof or (save as hereinafter provided) surface of other damages as aforesaid.
- (b) The right of the Board to construct the works or any part thereof on over under in or through any land.
- (c) Interference whether temporary or permanent with any right of light, airway or water or other easement or quasi-easement which is the unavoidable result of the construction of the works in accordance with the contract.
- (d) Injuries or damage to persons or property resulting from any act or neglect done or committed during the currency of the contract by the Board, his agents, servants or other contractors (not being employed by the contractor) or for or in respect of any claims demands proceedings, damages costs charges and expenses in respect thereof or in relation thereto.

Provided further that for the purposes of this clause the expression "the site" shall be deemed to be limited to the area defined in the specifications or shown on the drawings in which land and crops will be disturbed or damaged as an inevitable consequence of the carrying out of the works.

(2) The Board will save harmless and indemnify the Contractor from and against all claims, demand, proceedings, damages, costs, charges and expenses in respect of the matter referred to in the proviso to sub-clause (1) of this clause.

Indemnity by Employer

23 The Board shall not be liable for or in respect of any damages or compensation payable under Law in respect or in consequence of any accident or injury to any workmen or other person in the employment of the Contractor or any sub-contractor save and except an accident or injury resulting from any act or default of the Board, his agents or servants and the contractor shall indemnify and keep indemnified the Board against all such damages and compensation (save and except as aforesaid) and against all claims, demands proceedings, costs, charges and expenses whatsoever in respect thereof or in relation thereto irrespective of the fact that the Board or the Contractor is liable for the same. The contractor shall also take out on Insurance policy against all risks/accidents to his employees/personnel/

Accident or injury to workmen

24. (1) The Contractor shall give all notices and pay all fees required to be given of paid by any National or State Statute Ordinance or other law or any Regulation or Bye-Law or any local or other duly constituted authority in relation to the execution of the works or of any Temporary works and by the rules and regulations of all public bodies and companies whose property or rights are affected or may be affected in any way by the works or any temporary works.

Giving Notices and payment of fees

(2) The Contractor shall conform in all respects with the provision of any such statute Ordinance or Law as aforesaid and the Regulations or Bye-laws of any local or other duly constituted authority which may be applicable to the works or to any Temporary works and with such rules and regulations of Public bodies and companies as aforesaid and shall keep the Board indemnified against all penalties and liabilities of every kind for breach of any such Statute ordinance of law regulations or Bye laws provided always that the Board will reply or allow to the contractor all such sums as the Chief Engineer shall consider to have been properly payable and paid by the contractor in respect of such fees , other than fees which the contract required the contractor to pay which fees shall be include in the rates and price entered in priced Schedule of quantities.

Compliance with status regulations

25 All fossils, coins articles of value or antiquity and structure and other remains or things of geological or archeological interest discovered on the site of the work shall be as between the Board and the contractor be deemed to be the absolute property of the board and contractor shall take reasonable precaution to prevent his workmen or any other person from removing or damaging any such article or thing or shall immediately upon discovery thereof and before removal acquaint the Chief Engineer 's representative .. of such discovery and carry out at the expense of the Board the Chief Engineer's representative order as to the disposal of the same.

26. The Contractor shall save harmless and indemnify the Board from and against all claims and proceedings for or on account of infringement of any patent rights, design, trade marks or name or other protected rights in respect of any constructional plants, machines work or material used for or in connection with the works or temporary works or any of them and from and against all claims demands proceedings, damages, costs, charges and expenses whatsoever in respect thereof or in relation thereto except where otherwise specified the contractor shall pay all tonnage and other royalties, rent, and other payment or compensation (if any) for getting stones and gravels clay or other materials required for the works or temporary works of any of them.

27. All operations necessary for the execution of the work for the construction of any temporary works shall so far as compliance with the requirements of the contract permits be carried on so as not to interfere unnecessarily or improperly with the public conscience or the access to use and occupation public or private roads and footpath or to or of properties whether in the possession of the Board or of any other person and the Contractor shall save harmless and indemnify the Board in respect of all claims demands, proceedings damage costs charges and expenses whatsoever arising out of or in relation to any such matter.

28. The Contractor shall use every responsible means to prevent any of the high ways or bridge communicating with or on the route to the site from being damaged or injured by any traffic of the Contractor or any of his Sub- Contractor and in particulars shall select route, choose and use vehicles and restrict and distribute loads so that any such extra ordinary traffic as will inevitably arise from the moving of plant and material from and to the site shall be limited as far as reasonable possible and so that unnecessary damage or injury may be occasioned to such highway and bridge

29. (1) The Contractor shall in accordance with the requirements of the Chief Engineer afford all reasonable opportunities for carrying out their work to any other contractors employed by the Board and their workmen and to the workmen of the Board and of any other duly constituted authorities who may be employed in the execution on or near the Site of any work not included in the Contract or of any Contract which the Board may enter into in connection with or ancillary to the works, if, however, the contractor shall on the written request of the Chief Engineer or the Chief Engineer's Representative make available to any such other contractor or to the Board or any such authority any roads or ways for the maintenance of which the contractor is responsible for or permit the use by any such of the Contractor's scaffolding or other plant on the site or provide any other service of whatsoever nature for any such the Board shall pay to the Contractor in respect of such use of service such sum or sums as shall in the opinion of the Chief Engineer be reasonable. Provided also that if the Contractor avails of similar services from such others or the Board, the Board shall be entitled to recover from the Contractor in respect of such services such sum or sums as shall in the opinion of Chief Engineer be reasonable.

Opportunities for other Contractors

(2) The Board reserves the right to let other contracts in connection with the undertaking of such which the work is apart and the contractor shall connect properly and co-ordinate his work with that of others. If any part of the Contractor's works depends for its proper execution or result upon the work of others, the contractor shall in writing report promptly to the Chief Engineer any defects in the work of such others as may interfere with the proper execution of the Contractor's work. Should the contractor fail to inspect and report, he shall have no claim against the Board by reason of the defective or unfinished work of others except as to latent defects not reasonably noticeable at the time of the commencement of the contractor's work. The Contractor shall arrange his schedule of work and method of operation to minimise inconvenience to others on the project. In all matters of conflict of interest, the Chief Engineer shall direct what shall be done by each party.

Co-ordination with others

30. Except where otherwise specified the contractor shall at his own expense supply and provide all the constructional Plant. Temporary Works materials both for temporary and for permanent works labour including the supervision thereof transport to or from the site and in and about the works and other things of every kind required for the construction, completion and maintenance of the works.

Supply of Plant, material and labour

31. Within a period of fourteen days on the completion of the work or on termination of his contract, the contractor shall clear away and remove from the site all constructional plant, surplus materials rubbish and temporary works of every kind and leave the whole of the site and works clean and in a workmanlike condition to the satisfaction of the Chief Engineer. Should the contractor fails to clear the site, the Board shall be entitled to charge the contractor, the rental for the site occupied by him as per port schedule of Rates and deduct the same from any monies due to the contractor in the hands of the Board.

Clearance of Site on Completion

32. The Contractor shall deliver to the chief Engineer's Representative or at his office a return in detail in such form and at such intervals as the chief Engineer may prescribe showing the supervisory staff and the members of the several classes of labour from time to time employed by the Contractor on the site and such information respecting constructional Plant as the Chief Engineer's Representative may require.

Return of Labour etc.

MATERIALS AND WORKMANSHIP

33. (1) All materials and workmanship shall be of the respective kinds described in the Contract and in accordance with the Chief Engineer's instruction and shall be subjected from time to time to such tests as the Chief Engineer may direct at the place of manufacture or fabrication or on the site or at all or any of such places. The Contractor shall provide such assistance, instruments, machines labour and materials as are normally required for examining, measuring and testing any work and the quality, weight or quantity of any material used and shall supply samples of materials before incorporation in the works for testing as may be selected and required by the Chief Engineer.

Quality of Materials and workmanship & Tests

- (2) All samples shall be supplied by the Contractor at his own cost if the supply thereof is clearly intended by or provided for in the Specification or Schedule of Quantities but if not then at the cost of the Board. **Cost of samples**
- (3) The cost of making any test shall be borne by the Contractor if such test is clearly intended by or provided for in the Specification or Schedule of quantities and (in the cases only of a test under load or of a test to ascertain whether the design of any finished or partially finished work is appropriate for the purposes which it was intended to fulfill), is particularised in the specification or Schedule of Quantities in sufficient detail to enable the contractor to price or allow for the same in his Tender. **Costs of Tests**
- (4) If any test is ordered by the Chief Engineer which is either(a)
 Not so intended by or provided for or
 (b) (In the cases above mentioned) is not so particularised, or
 (c) Though so intended OF provided for is ordered by the Chief Engineer. to be carried out by an independent person at any place other than the site or the place of manufacture or fabrication of the materials tested, despite the fact the contractor has facility to carry out such test at site of work.
 then the cost of such test shall be borne by the contractor if the test shows the workmanship or materials are not to be in accordance with the provision of the Contract or the Chief Engineer's instructions but otherwise by the Board. **Costs of Tests not provided for etc.**
34. The Chief Engineer, his representative and any person authorised by him shall at all times have access to the Works and to the site and to all workshops and places where work is being prepared or whence materials manufactured articles or machinery are being obtained for the works and the contractor shall afford every facility for and every assistance in or in obtaining the right to such access. **Access to Site**
35. (1) No work shall be covered up or put out of view without the approval of the chief Engineer of Chief Engineer's Representative and the Contractor shall afford full opportunity for the Chief Engineer or the chief Engineer's Representative to examine and measure any work which is about to be covered up or put out of view and to examine foundations before permanent work is places thereon. The Contractor shall give due notice to the Chief Engineer's Representative whenever any such work for foundations is or are ready or about to be ready for examination and the Chief Engineer's Representative shall without unreasonable delay unless he considers it unnecessary and advises the contractor accordingly attend for the purpose of examining and measuring such work of examining such foundations. **Examination of work before covering up**
- (2) The Contractor shall uncover any part or parts of the works or make openings in or through the same as the chief Engineer may from time to time direct and shall reinstate and make good such part or parts to the satisfaction of the chief Engineer. If any such part or parts have been covered up or put out of view after compliance with the requirements of sub-clause (1) of this Clause and are found to be executed inaccordance with the Contract the expenses of uncovering making opening in or through reinstating and making good the same shall be borne by the Board but in any other case all such expenses shall be borne by the Contractor and shall be recoverable from him by Board or may be deducted by the Board from any monies due or which may become due to the Contractor. **Uncovering and making openings**
36. (1) The Chief Engineer shall during the progress of the works have power to order in writing from time to time.
 (a) The removal from the site within such time as may be specified **Removal of Improper work and materials**

fied in the order or any materials which in the opinion of the Chief Engineer are not in accordance with the contract.

- (b) The substitution of proper and suitable materials and
- (c) The removal and proper re-execution (notwithstanding any previous test thereof or interim payment therefore) or any work which in respect of materials or workmanship is not in the opinion of the Chief Engineer are not in accordance with the contract.

Default by contractor in compliance

- (2) In case of default on the part of the Contractor in carrying out such order the chief Engineer shall be entitled to employ and pay other persons to carry out the same and all expenses consequent thereon or incidental thereto shall be borne by the Contractor and shall be recoverable from him by the Board or may be deducted by the Board from any monies due or which may become due to the contractor.

37. (1) The Contractor shall on the written order of the chief Engineer suspend the progress of the works or any part thereof for such time or times and in such manner as the Chief Engineer may consider necessary and shall during such suspension properly protect and secure the work so far as is necessary in the opinion of the Chief Engineer. The extra cost including all running wages to be paid on the site salaries. Depreciation and Maintenance of Plant, Site on-costs and general overhead cost of the Contract incurred by the Contractor in giving effect to the Chief Engineer's instructions under this Clause shall be borne and paid by the Board unless such suspension is:-

Suspension of work

- (a) Otherwise provided for in the Contract, or
- (b) Necessary for the proper execution of the work or by the reason of weather conditions affecting the safety or quality of the works or by some default on the part of the contractor, or
- (c) Necessary for the safety of the works or any part thereof.

Provided that the contractor shall not be entitled to recover any such extra cost unless he gives notice in writing of his intention to claim to the Chief Engineer within 28 days of the chief Engineer's order. The Chief Engineer shall settle and determine such extra payment to be made to the Contractor in respect of such claim as shall in the opinion of the Chief Engineer be fair and reasonable.

- (2) If on the written order of the Chief Engineer (in this suspension clause referred to as a "suspension order") the progress of the works or any part thereof shall be suspended for a period or consecutive periods amounting in all to 90 days or if the Chief Engineer having previously issued a suspension Order for a period which has lasted less than 90 days shall within less than 90 days from the expiration of that period of Suspension issue, a further suspension order for any reasons other than those specified in the Clause 37, sub-clauses (a), (b) and (c) hereof either in respect of the whole of the works or (where the previous suspension Order has affected only a part) affecting or including that part then and in any such case the Contractor may serve a written notice on the Chief Engineer requiring permission within 28 days from the receipt thereof to proceed with the works or that part thereof in regard to which progress is suspended and if such permission is not granted within that time the contractor by a further written notice so served may (but is not bound to) elect to treat the suspension where it affects part only of the works as an omission of such part under Clause 47 hereof where it affects the whole works as an abandonment of the contract by the Board.

Suspension lasting more than 90 days

COMMENCEMENT TIME AND DELAY

The contractor shall commence on site within the period named in the tender ,after the receipt by him of the Chief Engineer's order to commence work and shall proceed with the same with due expedition.

Commencement of work

and without delay except as may be expressly sanctioned or ordered by the Chief Engineer or be wholly beyond the Contractor's control.

Possession of Site

- 39(1) Save in so far as the Contract may prescribe the extent of portions of the Site of which the Contractor is to be given possession from time to time and the order in which such portions shall be made available to him and subject to any requirement in the contract as to the order in which the works shall be executed after the Chief Engineer's written order to commence the works, Contractor will be given possession of so much of the Site as may be required to enable the contractor to commence and proceed with the construction of the works and otherwise in accordance with such reasonable proposals of the Contractor as he shall be notice in writing to the Chief Engineer make and will from time to time as the works proceed, the contractor will be given possession of such further portion of the Site as may be required to enable the contractor to proceed with the construction of the works. If the contractor suffers delay or incurs expenses from failure on the part of the Board to give possession in accordance with the terms of this clause, the Chief Engineer shall grant an extension of time for the completion of the works, but shall not be entitled to demand any compensation therefor.

(2) The Contractor shall bear all expenses and charges for special or temporary way-leaves required by him in connection with access to the Site. The Contractor shall also provide at his own cost any additional accommodation outside the site required by him for the purpose of the works.

Way leaves etc.

- (3) The Contractor shall on no account allow any huts to be erected on any property of the Board to be inhabited after sunset by anyone except the watchman required for the works and none of his employees except such watchman shall remain at nights on any parts of the works without prior permissions from the Chief Engineer or his Representative.

(4) The Contractor must take all necessary steps to ensure that his operations do not in any way interfere with the traffic on the Port Railway nearby nor infringe Railway Standard dimensions. He shall be solely responsible for any damage or accidents caused by such interference or infringement. He shall abide by all railway rules and regulation in force during the period of execution of this contract.

Port Railway

- (40) Subject to any requirement in the Specifications as to completion of any portion of the works before completion of the whole, the whole of the works shall be completed within the time stated in the Tender calculated from the last day of the period named in the tender as that within which the works are to be commenced or such extended time as may be allowed under Clause 41 hereof.

Time for Completion

41. (1) Should the amount of extra or additional works of any kind or other special reason or circumstances of any kind whatsoever which may occur entitle the Contractor to an extension of time for the completion of the work, the Chief Engineer shall determine and grant the amount of such extension. Provided that the Chief Engineer is not bound to take into account any extra or additional work or other special reason, or circumstances unless the contractor has within 28 days after such work has been commenced or such reasons or circumstances have arisen as soon thereafter as is practicable delivered to the Chief Engineer's Representative full and detailed particulars of any claim to extension of time to which he may consider himself entitled in order that such claim may be investigated at the time. The Chief Engineer shall thereupon decide on the request for extension within 15 days.

Extension of time for Completion

- (2) No claim for compensation for delay or prolongation of contract shall be admissible if the stipulated time of completion is extended due to certain special reasons or circumstances or on account of extra or additional items of work.

42. (1) Subject to any provisions to the contrary specified in the contract, the contractor shall not without the previous consent of the Chief Engineer or his Representative in writing, execute any of the permanent work, beyond the Board's working hours as from time to time stipulated or at nights or on Sundays and other Port Holidays, except in so far as it is necessary to do so in the case of tidal work, or for the safety of the works in which case the contractor shall immediately advise the Chief Engineer or his representative

Night work & work on Holidays

in writing, PROVIDED ALWAYS that the provision of this Clause shall not be applicable in the case of any work which it is customary to carry out by rotary or double shifts. Refusal to permit work during night shall not entitle the Contractor for any extension of time.

- (2) The whole of the materials plant and labour to be provided by the Contractor under clause 6 thereof and the mode, manner and speed of execution and maintenance of the works are to be of a kind and conducted in a manner to the satisfaction of the Chief Engineer, should the rate of progress of the works or any part thereof be at any time in the opinion of the Chief Engineer too slow to ensure the completion of the works by the prescribed time or extended time for completion, the Chief Engineer shall so notify the Contractor in writing and the contractor shall thereupon take such steps as the contractor may think necessary and the Chief Engineer may approve to expedite progress so as to complete the works by the prescribed time or extended time for completion. If the work is not being carried on by day and by night and the contractor shall request permission to work by night as well as by day then if the *Chief* Engineer shall grant such permission, the contractor shall not be entitled to any additional payment for so doing but if such permission shall be refused and there shall be no equivalent practicable method of expediting the progress of the work, the time for completion shall be extended by such period as is solely attributable to such refusal. All work at night shall be about without unreasonable noise and disturbance, the contractor shall indemnify the Board from and against any liability for damages on account of noise or other disturbance created while or in carrying out the work and from and against all claims demands, proceedings, costs, charges and expenses whatsoever in regard or in relation to such liability.

- (3) The Contractor at his own expenses shall on the order of the Chief Engineer or his Representative in writing carry out the work by day and night and on Sundays and public holidays, if in the opinion of the Chief Engineer or Chief Engineer's Representative either the works are not being proceeded within a manner to ensure completion by the prescribed date or are being endangered by an act or neglect on the part of the Contractor. Refusal to grant such permission will not be accepted as a ground or excuse for not completing the work within the stipulated period. If for any reason other than the aforesaid, the Chief Engineer or his Representative orders in writing the work to proceed by night or on Sundays and other Public Holidays, or beyond the Board's normal hours of work, the extra cost involved shall not be taken into account in ascertaining the amount of the Contract Price.

Rate of Progress

43. If the Contractor shall fail to complete the work within the time prescribed by clause 40 hereof or extended time then the Contractor shall pay to the Board the sum stated in the Tender as liquidated damages for such default and not as penalty for every day including Sundays, Holidays, or part of a day which shall elapse between the time prescribed by clause 40, hereof or extended time as the case may be and the date of completion of the works. The Board may without prejudice to any other method of recovery deduct the amount of such damages from any monies in their hand due or which may become due to the Contractor. The payment or deduction of such damages shall not relieve the Contractor from his obligation to complete the works or from any other of his obligation and liabilities under the Contract. The amount of liquidated damages shall constitute a debt due to the Board and recoverable as such.

Liquidated Damages for delay

NOTE: In case of structures/buildings where the Board is able to utilize certain portions of the completed works, the liquidated damages may be levied only on the undelivered portions of the work. The decision of the Board shall be final and binding in this regard and without any prejudice to the contract.

44. (1) As soon as in the opinion of the Chief Engineer the works shall have been completed and shall have satisfactorily passed any final test that may be prescribed by the Contract, the Chief Engineer shall on receiving a written intimation from the Contractor issue a certificate of Completion of the work. The Period of Maintenance of the work shall commence from the date of such certificate, if the contract provides for maintenance period.

Certificate of completion of work

- (2) All the works comprised in this Contract, until handed over to the Chief Engineer shall stand at the risk of the contractor. who shall be responsible and make good at his own cost of all loss and damage caused by fire or any other cause and the Contractor shall hand over all the works complete in every respect at the completion of the Contract.
- (3) The Contractor agrees that before payment of final bill shall be made on the contract, he shall sign and deliver up to the Chief Engineer a valid release and discharge from any and all claims and demands, whatsoever for all matters arising out of or connected with the contract, save provided that nothing in this clause shall discharge or release the contractor from liabilities under the contract.

Risk pending completion

MAINTENANCE AND DEFECTS (APPLICABLE IF THE CONTRACT PROVIDES FOR MAINTENANCE)

45. (1) In these conditions the expression the "Period of Maintenance" shall mean the period of maintenance named in the Tender calculated from the date of completion of the works certified by the Chief Engineer in accordance with Clause 44 hereof.
- (2) To the intent that the works shall or as soon as practicable after the expiration of the period of maintenance be delivered up to the Board in as good and perfect a condition (fair wear and tear excepted) to the satisfaction of the Chief Engineer as that in which they were at the commencement of the period of Maintenance, the contractor shall execute all such work of repairs, amendments, reconstructions, rectification and making good or defects, imperfections, shrinkages or other faults as may be required of the contractor in writing by the Chief Engineer during the Period of Maintenance or within 14 days after its expiration as a result of an inspection made by or on behalf of the Chief Engineer prior to its expiration.
- (3) All such work shall be carried out by the Contractor at his own expenses, if the necessity thereof shall in the opinion of the Chief Engineer be due to the use of materials or workmanship not in accordance with the contract or to neglect or failure on the part of the contractor to comply with any obligation expressed or implied on the Contractor's part under the Contract, even though the work may have been previously passed or even if the Contractors attention had not been previously drawn to the unsatisfactory nature thereof. If in the opinion of the Chief Engineer such necessity shall be due to any other cause the value of such work shall be ascertained and paid for as if it were additional work.
- (4) If the Contractor fails to do any such work as aforesaid required by the Chief Engineer, the Board shall be entitled to carry out such work by their own workmen or by other Contractors and if such work is work which the Contractor should have carried out at the Contractor's own cost shall be entitled to recover from the Contractor the cost thereof or may deduct the same from any monies due or that become due to the Contractor.
46. The Contractor shall if required by the Chief Engineer in writing search for the cause of any defect imperfection or fault under the directions of the Chief Engineer. Unless such defect, imperfection or fault shall be one for which the Contractor is liable under the Contract the cost of the work carried out by the Contractor in searching as aforesaid shall be borne by the Board. But if such defect, imperfection or fault shall be one for which the Contractor is liable as aforesaid the cost of the work carried out in searching as aforesaid shall be borne by the Contractor and he shall in such case repair, rectify and make good such defect, imperfection or fault at his own expense in accordance with provisions of Clause 45 thereof.

Definition of "Period of Maintenance"

Execution of work of Repair etc.

Cost of Execution of work of repair etc.

Remedy on Contractor's failure to carry out work required

Contractor to search

ALTERATIONS, ADDITIONS AND OMISSIONS

47. (1) The Chief Engineer shall make any variations of the form quality or quantity of the works or any part thereof that may in his opinion be necessary and for that purpose or if for any other reason it shall in his opinion be desirable shall have power to order the contractor to do and the contractor shall do any of the following ;

Variations

- a) Increase or decrease the quantity of any work included in the contract.
- b) Change the character or quality or kind of any such work.
- c) Omit any such work.
- d) Change the levels, lines, position and dimensions of any part of the works and
- e) Execute additional work of any kind necessary for the completion of the works.

and no such variation shall in any way vitiate or invalidate the contract but the value (if any) of all such variations shall be taken into account in ascertaining the amount of Contract Price.

(2) No such variation shall be made by the Contractor without an order in writing of the Chief Engineer. Provided that no order in writing shall be/ required for increase or decrease in the quantity of any work where such increase or decrease is not the result of an order given under this clause but is the result of the quantities exceeding or being less than those stated in the Schedule of Quantities. Provided also that if for any reason the Chief Engineer shall consider it desirable to give any such order verbally the Contractor shall comply with such order and any confirmation in writing of such verbal order given by the Chief Engineer whether before or after carrying out of the order shall be deemed to be an order in writing within the meaning of this clause. Provided further that if the contractor shall confirm in writing to the Chief Engineer any verbal order of the Chief Engineer and such confirmation shall not be contradicted in writing by the Chief Engineer it shall be deemed to be an order in writing by the Chief Engineer.

Order for variation to be in writing

48(1) The Chief Engineer shall determine the amount (if any) which in his opinion should be added to or deducted from the sum named in the Tender in respect of any extra or additional work done or work omitted by his order. All such work shall be valued at the rates set out in the contract if in the opinion of the Chief Engineer the same shall be applicable. If the Contract shall not contain any rates applicable to the extra or additional work, then the rate of the new item shall be calculated by the Chief Engineer as per sub-clause (2) below.

(2) The rates for extra/additional items will be worked out by the Chief Engineer on the basis of actual cost of materials and labour as required and used by the contractor for the extra/additional works with a provision of 10% to cover the contingencies, contractors overheads, profit etc., provided that the Contractor produces necessary data and bills etc., as directed from time to time, should the contractor fail to produce necessary data and bills then the Chief Engineer shall work out the rates based on market rates obtained by him.

Valuation of Variation

- (3) All parts, sub-estimates, etc. under the contract shall be considered as one schedule for the purpose of substitutions etc.
- (4) The Contractor shall send to the Chief Engineer's Representative once in every month before 10th day of every month, an account giving particulars (as full and detailed as possible) of all claims for any additional expense or compensation to which the Contractor may consider himself entitled and of all extra or additional work ordered by the Chief Engineer which he has executed during the preceding month and no claim for payment for any such work will be considered which has not been included in such particulars. Provided always that the Chief Engineer shall be entitled to authorise payment to be made for any such work notwithstanding the Contractor's failure to comply with this condition if the Contractor has at the earliest practicable opportunity notified the Chief Engineer that he intends to make a claim for such work and furnishes

of the said month.

PLANT, TEMPORARY WORKS AND MATERIALS

49. (1) All Constructional Plant. Temporary works and materials provided by the Contractor shall when brought on the site be exclusively intended for the construction and completion of the works. No Constructional Plant, Temporary works or materials or any part thereof (except hired plant) shall be removed from the Site without the written consent of the Chief Engineer which consent shall not be unreasonably withheld where the same is no longer immediately required for the purpose of completion of the works but the Board will permit the contractor the exclusive use of all such Constructional Plant. Temporary works and materials in and for the completion of the works until the occurrence of any event which gives the Board the right to exclude the contractor from the Site and proceed with the completion of the Works.
- Plant etc. Exclusive use for the works**
- (2) Upon completion of the works the contractor shall remove from the site all the said Constructional Plant and Temporary Works remaining thereon and any unused materials provided by the Contractor.
- Removal of Plant etc.**
- If the Contractor fails to remove any such Constructional Plant, temporary works, or unused materials within such reasonable times after the completion of Works as may be allowed by the Chief Engineer, then the Board may sell the same and shall after deducting from the proceeds costs, charges, and expenses of and in connection with such sale pay the balance, if any, to the contractor.
- (3) The Board shall not at any time be liable for the loss of or injury to any of the said Constructional Plant, Temporary Works or materials save as mentioned in Clause 21 and 59 hereof.
- Board not liable for damages to plant etc.**
- (4) With a view to securing in the event of forfeiture under Clause 57 hereof the continued availability for the purpose of executing the works of any Essential Hired Plants the Contractor shall not bring on to the site any Essential Hired Plant unless the agreement for hire thereof contains a provision that the owner thereof will on request in writing made by the Board within seven days after the date on which any such forfeiture has become effective and on the Board undertaking to pay all hire charges in respect thereof from such date hire such essential Hired Plant to the Board on the same terms in all respects as the same was hired to the Contractor save that the Board shall be entitled to permit the use thereof by any other Contractor employed by him for the purpose of completing the works under the terms of the said clause 57.
- Condition of hire of certain plants**
- (5) The Board shall in order to avoid seizure by the owner of any Hire Purchase Plant be entitled to pay to such owner the amount of any overdue installments or other sum payable under any agreement for hire purchase and in the event of Board doing so any amount so paid by it shall be a debt due from the Contractor to the Board and may be deducted by the Board from any monies due or that may become due to the Contractor under the Contract or may be recovered by the Board from the Contractor at law.
- Hire purchase payment by the Board**
- (6) In the event of the Board entering into any agreement for hiring of Essential Hire plant pursuant to the provisions of sub –clause (5) of this Clause all sums properly paid by the Board under the provisions of any such agreement and all expenses incurred (including stamp duties) in entering into such agreement shall be deemed for the purpose of Clause 57 hereof to be part of the cost of completing the works.
- Cost for purposes of Clause no. 63**
- (7) The Contractor shall upon request made by the Chief Engineer at any time in relation to any item of Essential Hired forthwith notify to the Chief Engineer in writing the name and address of the owner thereof and shall certify that the agreement for the hire thereof contains a provision in accordance with requirements of sub clause (3) and (5) of this clause. The contractor shall also upon request as aforesaid give a like`
- Contractor's Certificate as to Hiring Provisions**

notification (but without certificate) in regard to any Hire Purchase Plant.

50. The Operation of Clause 49 hereof shall not be deemed to imply any approval by the Chief Engineer of the materials or other matters referred to there in nor shall it prevent the rejection of any such materials etc., at any time by the Chief Engineer. **Approval of Materials, etc. not implied**

MEASUREMENT

51. The quantities set out in the Schedule of Quantities are the estimated quantities of the work but they are not to be taken as the actual and correct quantities of the works to be executed by the Contractor in fulfillment of his obligations under the Contract, as the quantities may increase or decrease during the execution of the work. **Quantities**
52. The Chief Engineer shall except as otherwise stated ascertain and determine by measurement the value in accordance with the Contract of work done in accordance with the Contract or he shall when he required any part or parts of the works to be measured give notice to the Contractor's authorised agent or representative who shall forthwith attend or send a qualified agent to assist the Chief Engineer or his representative in making such measurement and shall furnish all particulars required by either of them. Should the Contractor not attend or neglect or omit to send such agent, then the measurements made by the Chief Engineer or approved by him shall be taken to be correct measurement of the works and it shall be open for the contractor to contest the said measurement that the said measurement were not taken in his presence. For the purpose of measuring such permanent work as is to be measured by record drawings the Chief Engineer's representative shall prepare new drawings month by month of such work and the Contractor as and when called upon to do so in writing shall within 14 days attend to examine and agree such record drawings with the Chief Engineer's Representative and shall sign the same when so agreed and if the Contractor does not so attend to examine and agree any such record drawings, they shall be taken to be correct. If after examination of such record drawings the contractor does not agree the same or does not sign the same as agreed they shall nevertheless be taken to be correct unless the Contractor shall within 14 days of such examination lodge with the Chief Engineer's Representative, for decision by the Chief Engineer notice in writing of the respects in which such record drawings are claimed by him to be incorrect. **Works to be measured**
53. The works shall be measured notwithstanding any general or local custom except where otherwise specifically described or prescribed in the contract. **Method of measurement**

CERTIFICATE AND PAYMENT

54. (1) (a) The Contractor shall submit to the Chief Engineer each month on or before the tenth of the month, a statement on the standard form showing the estimated contract value of the permanent work executed upto the end of the month computed on the basis of measurement taken by Chief Engineer or his representative in terms of clause 52 (if such value shall justify the issue of an interim certificate) and the contractor will be paid monthly on the certificate of the Chief Engineer the amount due to him on account of the estimated contract value of the permanent work executed upto the end of the month since last month. **Monthly payment**
- (b) Payment 'on account' shall also be made on the Chief Engineer certifying the same of a sum not exceeding 75% of the cost (as assessed by the Chief Engineer) of any materials which are in the opinion of the Chief Engineer reasonably required in accordance with the Contract and have been brought to site for incorporation in the permanent works, provided that they are of an imperishable nature and that a formal agreement is drawn up by the Contractor with the Board under which the Board secure a lien on the materials and is safeguarded against losses due to the Contractor postponing the execution of the work or to the

shortage of misuse of materials and against the expenses entailed for the proper watch and safe custody or due to any cause whatsoever. The 'on account' payments for materials shall be adjusted from the Contractor's bills as and when materials are utilised in the works.

- (c) Payment 'on account' shall also be made of a sum not exceeding 75% of the cost (as assessed by the Chief Engineer) in respect of non-perishable materials, like steel which are reasonably required after fabrication in accordance with the contract for incorporation in the works, but which are not brought to site but have been delivered for fabrication to some other workshop or factory of the Contractor against the Contractor furnishing a bank guarantee acceptable to the Board.

The 'on account' payment made shall be adjusted as and when materials are utilised in the works.

- (d) All the above payments as per the sub-Clauses (a), (b) and (c) are subject to a retention of a percentage named in the Tender until the amount so retained shall reach the 'Limit of Retention Money' named in the Tender (hereinafter called as "the Retention Money"). After this limit is reached no deduction is made for the retention money except for payments in respect of extra work done which shall be subject to a retention of 5% provided always that no interim certificate shall be issued for a sum less than that named in the Tender at one time. However, the retention money as specified above can be deposited by the Contractor alongwith and in similar manner as detailed for Security Deposit in Clause 11(1) in which case above detailed deductions will not be made except for payment in respect of extra works.

- (e) The term of payments mutually agreed to between the Board and Contractor will be applicable to the undisputed running bills provided that joint measurements are taken and recorded prior to the preparation of such bills.

- (2) The Retention Money shall be paid to the Contractor after the issue of Substantial Completion Certificate by the Chief Engineer, notwithstanding that at such time there maybe outstanding claims by the Contractor against the Board.

Payment of retention money

- (3) The Security Deposit shall be paid to the Contractor after the issue of the certificate for maintenance by the Chief Engineer notwithstanding that such time there maybe outstanding claims by the Contractor against the Board.

Payment of Security Deposit

- (4) 90% payment of the R.A. bill supported by interim certificate shall be made within 10 days and the balance within 15 days of the date of interim certificate,

Time of Payment

Delay in making such payments by the Board due to exceptional circumstances shall not nullify or vitiate in any way the other conditions of the contract and the Contractor shall have no claim on the account provided always that the payments are made within three months from the date of submitting the certificate.

- (5) The Chief Engineer may by any certificate make any correction or modification in any previous certificate which shall have been issued by him and shall have power to withhold any certificate if the works or any part thereof are not being carried out to his satisfaction.

Correction and withholding of Certificates

- (6) All payments made to the Contractor under the Contract shall unless otherwise agreed be made to the Contractor in Indian Currency.

Indian Currency

55. No certificate other than the Maintenance Certificate referred to in Clause 56 thereof shall be deemed to constitute approval of any work or other matter in respect of which it is issued or shall be taken as an admission of the due performance of the contract or any part thereof or of the accuracy of any claim or demand made by the Contractor of additional or varied work having been ordered by the Chief Engineer nor shall any other certificates conclude or prejudice any of the power of the Chief Engineer. However, when no maintenance period is prescribed, approval of the works shall be on issue of Certificate of Completion.

**Approval only by
Maintenance Certifi-
cates**

56. (1) The Contract shall not be considered as completed until a maintenance certificate shall have been signed by the Chief Engineer stating that the work has been completed and maintained to his satisfaction. The Maintenance Certificate shall be given by the Chief Engineer twenty eight days after the expiration of the period of Maintenance or as soon thereafter as any works ordered during such period pursuant to Clause 45 and 46 thereof shall have been completed to the satisfaction of the Chief Engineer and full effect shall be given to this Clause notwithstanding any previous entry on the works or the taking possessions, working or using thereof or any part thereof by the Board. However when no maintenance period is prescribed, the Contract shall not be considered as completed until issue of Completion Certificate.

**Maintenance Certifi-
cate**

(2) The Board shall not be liable to the Contractor for any matter or thing or claim arising out of or in connection with the contract or the execution of the works unless the Contractor shall have made a consolidated claim in writing in respect, thereof before the giving of the Maintenance Certificate under this Clause, if maintenance period is prescribed otherwise within 2 months of issue of Completion Certificate, such claim shall include any claims made earlier under clause 48(4) but, if no such claim which the contractor could have made under clause 48(4) has not been made, then the contractor shall not be entitled to make any such claims under this clause.

Cessation of liability

(3) Notwithstanding the issue of the Maintenance Certificate or the completion as the case maybe, the contractor and (Subject to sub clause (2) of this clause) the Board shall remain liable for the fulfillments of any obligation incurred under the provision of the Contract prior to the issue of the Maintenance Certificate/Completion Certificate as the case maybe, which remains unperformed at the time such certificate is issued and for the purpose of determining the nature and extent of any such obligation, the Contract shall be deemed to remain in force between the parties hereto.

**Unfulfilled
obligations**

(4) No interest will be payable by the Board with respect to any monies or balance which may be in its hands owing to a dispute between itself and the Contractor or with respect to any delay on the part of the Board in making interim or final payments or otherwise, nor shall the Arbitrator be entitled to grant such interest on any such claim or monies for any period prior to the date of the awards.

REMEDIES AND POWERS

57. (1) If the Contractor shall become bankrupt or having a receiving order made against him or shall present his petition in bankruptcy or shall make an arrangement with or assignment in favour of his creditors or shall agree to carry out the Contract under a committee of inspections of his creditors or (Being corporation) shall go into liquidation (other than a voluntary liquidation for the purposes of amalgamation or reconstruction) or if the Contractor shall assign the Contract without the consent in writing of the Board first obtained or shall have an execution levied on his goods or if the Chief Engineer considers that in his opinion the Contractor

Forefeiture

(a) has abandoned the Contract, or

(b) without reasonable excuse has failed to commence the works or proceed with the works with due diligence or has suspended the progress of the works for 28 days after receiving from the Chief Engineer written notice to proceed, or

(c) has failed to remove material from the site or to pull down and replace work for 28 days after receiving from the Chief Engineer written notice that the said material or work had been condemned and rejected by the Chief Engineer, under these conditions, or

(d) is not executing the work in accordance with the contract or is persistently or flagrantly neglecting to carry out his obligations under the Contract, or

(e) has to the detriment of good workmanship or in defiance of the Chief Engineer's instructions to the contrary sub-let any part of the contract.

then the Chief Engineer may after giving 14 days' notice in writing to the Contractor enter upon the Site and the works and expel the Contractor therefrom without thereby avoiding the contract or releasing the contractor from any of his obligations or liabilities under the contract or affecting the rights and powers conferred on the Board or the Chief Engineer by the Contract and may himself complete the works or may employ any other contractor to complete the works and the Chief Engineer or such other contractor may use for such completion so much of the Constructional Plant, Temporary Works and materials which have been deemed to be reserved

exclusively for the construction and completion of the works under the provision of the contract as he or they may think proper and the Board may at any time sell any of the said constructional plant, temporary works and unused materials and apply the proceeds of sale in or towards the satisfaction of any sums or which may become due to the Board from the Contractor under the Contract.

(2) The Chief Engineer shall as soon as may be practicable after any such entry and expulsion fix and determine ex-parte or by or after reference to the parties or after such investigation or enquiries as he may think fit to make or institute and shall certify what amount (if any) had at the time of such entry and expulsion been reasonably earned by or would reasonably to the Contractor in respect of work then actually done by him under the contract and what was the value of any of the said unused or partially used materials, any constructional plant and any Temporary works.

Valuation
of date of
forfeiture

(3) If the Chief Engineer shall enter and expel the Contractor under this Clause, the Board shall not be liable to pay to the Contractor any money on account of the Contract until the expiration of the period of Maintenance and thereafter until the costs of completion and maintenance damages for delay in completion (if any) and all other expenses incurred by the Board have been ascertained and the amount thereof finalised by the Chief Engineer, the Contractor shall then be entitled to receive only such sum or sums (if any) as the Chief Engineer may certify would have been due to him upon completion by him after deducting the said amount. But if such amount shall exceed the sum which would have been payable to the contractor on due completion by him then the Contractor shall upon demand pay to the Board the amount of such excess and it shall be deemed a debt due by the Contractor to the Board and shall be recoverable accordingly.

Payment
after
forfeiture

(4) If so required by the Board or the Chief Engineer the Contractor shall before the expiration of the notice referred to in sub-clause (1) of this clause assign to the Board without payment the benefit of any agreement which the contractor has entered into for the supply of materials and/or for the execution of any works for the purposes of the Contract but on the terms that a supplier or sub-contractor shall be entitled to make any reasonable objection to any further assignment thereof by the Board and the Board may pay the supplier or sub-contractor for any such materials supplied and delivered to the site or works executed under such agreement (whether the same be assigned as aforesaid or not) before or after the giving of the notice the amount due by such agreement in so far as the supplier or sub-contractor or by the Board to the Contractor.

**Assignment of benefit
of Agreement**

58. If by reason of any accident or failure or other event occurring to in or in connection with the works or any part thereof either during the execution of the work or during the Period of Maintenance (if any) any remedial or other work or repair shall in the opinion of the Chief Engineer

Urgent Repairs

neer or the Chief Engineer's Representative be urgently necessary for security and the contractor is unable or unwilling at once to do such work or repair, the Board may by his own or other workmen do such work or repair as the Chief Engineer or the Chief Engineer's Representative may consider necessary. If the work or repair so done is by the Board work which in the opinion of the Chief Engineer the Contractor was liable to do at his own expenses under the Contract all costs and charges properly incurred by the Board in so doing shall on demand be paid by the Contractor to the Board or may be deducted by the Board from any monies due or which may become due to the contractor. Provided always that the Chief Engineer and the Chief Engineer's Representative (as the case may be) shall as soon after the occurrence of any such emergency as may be reasonably practicable notify the Contractor thereof in writing.

SPECIAL RISKS

59. (1) Notwithstanding anything in the Contract contained, the Contractor shall be under no liability whatsoever whether by way of indemnity or otherwise for or in respect of destruction of or damage to the works (save to work condemned under the provisions of Clause 36 hereof prior to the occurrence of any special risk hereinafter mentioned) or Temporary Works or to property whether of the Board or third parties or for in respect of injury or loss of life which is the consequence whether direct or indirect of war hostilities (whether war be declared or not) invasion act or foreign enemies rebellion, revolution, insurrection or military or usurped power, civil war or (otherwise than among the Contractor's own employees) riot, commotion or disorder and other kinds of risks as specified in sub-clause 21(2) (hereinafter comprehensively referred to as "the said special risks") and the Board shall indemnify and save harmless the contractor against and from the same and against and from all claims, demands, proceedings, damages, costs, charges and expenses whatsoever arising thereout or in connection therewith and shall compensate the contractor for any loss of or damage to property of the Contractor used or intended to be used for the purpose of the works (including property in transit to the Site) and occasioned either directly or indirectly by said special Risks.
- (2) If the works or Temporary works or any Materials (whether for the former or the latter) on or near or in transit to the site shall sustain destruction or damage by reason of any of the said special risks the contractor shall nevertheless be entitled to payment for any permanent work and for any materials so destroyed or damaged and the contractor shall be entitled to be paid by the Board the cost of making good any such destruction or damage whether to the Work or the Temporary Works and of replacing or making good such materials so far as may be required by the Chief Engineer or as may be necessary for the completion of the works.
- (3) Destruction, damages, injury or loss of life caused by the explosion or impact whenever and wherever occurring of any mine bombshell, grenade or other projectile missile, ammunition or explosive of war shall be deemed to be consequence of the said Special Risks.
- (4) If during the currency of the Contract there shall be an outbreak of war (whether war is declared or not) in any part of the world which whether financially or otherwise materially affects the execution of the works, the Contractor shall unless and until the contract is terminated under the provisions in this clause contained use his best endeavours to complete the execution of the works provided always that the Board shall be entitled at any time after such outbreak of war to terminate this Contract by giving notice in writing to the contractor and upon such notice being given this contract shall (save as to the rights of the parties under this clause and to the operation of Clause 66 hereof) terminate but without prejudice to the rights or either party in respect of any antecedent breach thereof.
- (5) If the Contract shall be terminated under the provisions of the last proceeding sub-clause the Contractor shall with all reasonable dispatch remove from the Site all Constructional Plant, and shall give similar facilities to his sub-contractors to do so.
- (6) If the Contract shall be terminated as aforesaid the Contractor shall be paid by the Board (in so far as such amounts or items shall not have already been covered by payments on account made to the contractor) for all work executed prior to the date of termination at the rates and prices provided in the contract and in addition:
- (a) The amounts payable in respect of any preliminary items so far as the
- No liability for war etc. Risks**
- Damage to works, etc. by Special Risks**
- Projectile Missile etc.**
- Outbreak of war**
- Removal of Plant on Termination**
- Payment if Contract Terminated**

work or service comprised therein has been carried out or performed and a proper proportions as considered by the Chief Engineer or any such items the works or service comprised in which has been partially carried out or performed.

(b) The cost of materials or goods reasonably ordered for the works or Temporary works which shall have been delivered to the Contractor or of which the Contractor is legally liable to accept delivery (such materials or goods becoming the property of the Board upon such payment being made by him).

(c) A sum to be considered by the Chief Engineer being the amount of any expenditure reasonably incurred by the Contractor in the expectation of completing the whole of the works in so far as such expenditure shall not have been covered by the payments in this sub-clauses before mentioned.

(d) Any additional sum payable under the provisions of sub'-clauses (1) and (2) of this clause.

(e) The reasonable cost of removal under sub-clause (6) of this clause and (if required by the Contractor) return thereof to the Contractor's main plant yard in his country of registration or to any other destination at no greater cost.

(f) The reasonable cost of repatriation of all the Contractor's staff and workmen employed on or in connection with the works at the time of such termination.

Provided always that against any payments due from the Board under this sub-clause the Board shall be entitled to be credited with any outstanding balances due from the Contractor for advance in respect of plant and materials and any sum previously paid by the Board to the Contractor in respect of the execution of the works.

Payment in the event of Frustration

FRUSTRATION

60. In the event of the Contract being frustrated whether by war or otherwise howsoever the sum payable by the Board to the Contractor in respect of the work executed shall be the same as that which would have been payable under Clause 59 hereof if the Contract had been terminated under the provisions of Clause 59 hereof.

Service of Notices on contractor

NOTICES

61. (1) Any notice to be given to the Contractor under the terms of the Contract shall be served by sending the same by post to or leaving the same at the Contractor's principal place of business (or in the event of Contractor being a company to or at its registered office).

Service of Notices on Board

(2) Any notice to be given to the Board under the terms of the Contract shall be served by sending the same by post to or leaving the same at the office of the Chief Engineer, Mormugao Port Trust.

Contract price not subject to Variation of price

VARIATION OF PRICE

62. Subject to the provisions of clause 70 hereof in its applicability, the Contract Price shall not be adjusted in respect of any increase or decrease of cost to the contractor in carrying out the works by reason of alteration in the rates of Wages and allowances payable to labour or change in the conditions of employment thereof or change in the cost of materials (whether for the permanent or temporary works) consumable stores fuel and power or variation in the rates of freight and insurance or in the incidence of rates of landing charges or the operation of any law or statute or variation in the cost of any other matter or thing of whatsoever nature subsequent to the date of Tender.

Major Economic

Dislocation

63. In the event of there being subsequent to the date of tender such a major economic dislocation within the Republic of India as to result in the impositions by the Government of India of currency restrictions or in devaluation of the currency of that country, the Board shall pay to the contractor any increased cost or incidental to the execution of the works which is howsoever attributable to or consequent on or the result of or any way whatever connected with such economic dislocation provided always that nothing in this Clause contained shall prejudice the right of the Contractor to exercise any other rights or remedies to which the Contractor may entitled in such event.

64. The Contractor shall abide by all the Port Rules and Regulations in force from time to time.

Port Rules and Regulations

SECURITY RISK

65. (1) The Contractor shall take all reasonable steps necessary to ensure that all persons employed in any works in connection with the contract, have full knowledge of the Official Secret Act 1923 and Regulations framed thereunder.
- (2) Any information obtained in the course of the execution of the contract by the Contractor, his servants and agents or any persons so employed as to any matter whatsoever which would or might be directly or indirectly useful to any enemy of India must be treated as secret and shall not at any time be communicated to any person.
- (3) Any breach of the aforesaid condition shall entitle the Board to cancel the contract and authorise the execution of the work at the risks and cost of the contractor. In the event of such cancellation the Chief Engineer shall fix and determine "ex-parte" or after such investigation or enquiries as he may think fit to make or institute and shall certify what amount (if any) had at the time of such cancellation been reasonably earned by or reasonably accrued to the contractor in respect of the work actually done by him under the contract and what was the value of any of the said unused or partially used materials, any constructional plant and any temporary works.
- (4) If the Board shall cancel the contract under this clause, Board shall not be liable to pay the contractor any money on account of the contract or until the expiration of the period of maintenance and thereafter until the costs of completion and maintenance damages or delay in completion (if any) and all other expenses incurred by the Board have been ascertained and the amount thereof certified by the Chief Engineer. The Contractor shall then be entitled to receive only such sum or sums (if any) as the Chief Engineer may certify would have been due to him upon due completion by him after deducting the said amount. But if such amount shall exceed the sum which would have been payable to the contractor on due completion by him then the contractor shall upon demand pay to the Board the amount of such excess and it shall be deemed to be a debt due by the contractor to the Board and shall be recoverable accordingly.

Security Risks

ARBITRATION CLAUSE

64. (1) If any dispute or difference of any kind whatsoever shall arise between the Chief Engineer and the contractor in connection with or arising out of the contract or the carrying out of the works (whether during the progress of the works, after the termination, abandonment of or breach of the contract) it shall in the first place be referred by the contractor within 45 days after they have arisen to the Chief Engineer who within a period of 45 days after being requested by the contractor shall give written notice of his decision to the contractor. If the Chief Engineer shall fail to give notice of his decision as aforesaid within a period of 45 days after being requested by the contractor as aforesaid or if the contractor be dissatisfied with any such decision then and in any such case, the contractor shall, within a further period of 30 days from the expiry of the first 45 days or from the date of receipt of Chief Engineer's decision write to the Chairman putting forth his views why he is not in agreement with the decision given by the Chief Engineer. If the Contractor, after receiving notice of the decision of the Chief Engineer does not refer the dispute to the Chairman seeking his decision, within a period 30 days of the Chief Engineer's decision then the Chief Engineer's decision will be final and binding upon the contractor and no further claim will exist thereto.
- (2) The Chairman shall within a period of 45 days from the receipt of the request from the contractor, give written notice of his final decision if the matter under dispute to the contractor. If the Chairman fails to give written notice of his final decision within a period of 45 days after being

Settlement of Disputes

requested by the contractor as aforesaid or if the contractor be dissatisfied with any such final decision given then the Contractor may within a period of 30 days after the expiry of the period of 45 days from the date of his application to the chairman, or within a period of 30 days after receiving notice of such final decision as the case may be require that the matter or matters in dispute be referred to arbitration as hereinafter provided. If the Chairman has given written notice of his final decision to the contractor and no claim to arbitration has been communicated to the Chairman by the Contractor, within a period of 30 days from the receipt of Chairman's decision, the said decision shall remain final and binding upon the contractor. If the Chairman fails to give written notice of his final decision to the contractor within a period of 45 days and no claim to arbitration has been communicated to the Chairman or the Chief Engineer by the contractor within a period of 30 days thereafter, then the decision given by the Chief Engineer shall remain final and binding upon the contractor.

- (3) Save as hereinafter provided, such decision in respect of every matter as referred shall be final and binding upon the Contractor until the completion of the work and shall forthwith be given effect to by the contractor who shall proceed with the works with all the diligence whether he requires arbitration as hereinafter provided or not.
- (4) The reference to be made by the contractor to the Chief Engineer for the latter's decision shall be detailed and contain all particulars with supporting reasons, grounds, evidence and whatsoever on which the contractor bases his claims and he shall not be entitled to produce anything further thereafter unless called upon by the Chief Engineer. The said reference alone shall be the reference which will be adjudicated by the Arbitrator.
- (5) All disputes or differences in respect of which the decision (if any) of the Chief Engineer or the Chairman has not become final and binding as aforesaid shall be referred to the sole arbitration of a senior Civil Engineer, serving or retired from the Central Government agencies including Defence Services and/or a member of Indian Council of Arbitrators to be appointed by the Chairman, pursuant to and so as with regard to the mode and consequence of the reference and in all other respects to conform to the provisions of the Arbitration and Conciliation Act 1996, or any re-enactment or statutory modification thereof for the time being in force. The Sole Arbitrator shall have full power to open up, review and revise any decision, opinion, direction, certificate or valuation of the Chief Engineer, the Chairman and neither party shall be limited in the proceedings before the arbitrator to the evidence or argument put before the Chief Engineer or the Chairman for the purpose of obtaining his said decision. No decision given by either the Chief Engineer or the Chairman in accordance with the foregoing provisions shall disqualify them from being called as a witness and giving evidence before the sole Arbitrator as aforesaid.
- (6) The Arbitrator shall not enter on the reference until after the completion or the alleged completion of Works, unless with the written consent of the Board/Chairman/Chief Engineer and the contractor provided always.
 - (i) That such reference may be opened before such completion or alleged completion in respect of the withholding by the Chief Engineer of any certificate or the withholding of any portion of the retention money to which the contractor claims in accordance with the conditions set out in the clause 54(1) to 54(6) to be entitled in respect of the exercise of the Engineer's power to give a Certificate under Clause 57(1) hereof.
 - (ij) That the giving of Certificate of completion under Clause 44(1) hereof shall not be a Condition precedent to the opening of any such reference.
- (7) In the event of the Arbitrator to whom the matter is originally referred is unable to act for any reason the Chairman shall appoint another Sole Arbitrator, who shall be a senior civil Engineer, serving or retired from the Central Govt. agencies including Defence Services and/or a member of Indian Council of Arbitrators and he shall be entitled to proceed with the reference afresh or from the stage at which it was left by his predecessors.

In all cases, where the amount of the award exceeds Rs. 5.00 lakhs the sole arbitrator shall give reasons for the award.

The Arbitration clause is applicable for only such contract works, the value of Which exceeds Rs.5.00 crores (Rupees Five crores).

LABOUR

67. (1) The Contractor shall provide all skilled, semi-skilled and unskilled labour and all supervisory and skilled staff necessary for the execution of the work, and all transport, sanitary and other accommodation and convenience as may be necessary for its employees, the intention being that the contract price shall be inclusive of all expenses whatsoever in connection with the Contractor's staff and labour force.

The Contractor shall comply fully with the local laws dealing with the employment of persons, including the Indian Employment of Children Act, 1938, Indian Workmen's Compensation Act, 1923, Factories Act, 1948 and the Minimum Wages Act, 1948 and all other Central and State Acts relevant to the employment of labour under the Central and State Acts relevant to the employment of labour under the Central and any statutory amendments, enactments or re-enactments thereof for the time being in force.

(2) The Contractor shall pay rates of wages and observe hours and conditions of labour not less favourable than those established as fair for the trade or industry in the local area where the work is carried out either by Government notification or by the machinery of negotiation or arbitration to which the parties are organisations of employers and trade unions representatives respectively or substantial proportion of the employers and workers engaged in the trade or industry in the district.

In the absence of any rates of wages hours or conditions of labour so established the Contractor shall pay rates of wages and observe hours and conditions of labour which are not less favourable than the general level of wages, hours and conditions observed by other employers in the local area where general circumstances in the trade or industry in which the contractor is engaged are similar.

(3) The Contractor shall recognise the freedom of its employers or workers to be members of trade union

(4) The Contractor shall at all times during the continuance of the Contract display for information of its work people in any vessel, factory, workshop of place occupied or used by him for the execution of the Contract a copy of this clause.

(5) The Contractor shall so far as is reasonable practicable having regard to local conditions provide on the site to the satisfaction of the Chief Engineer's Representative an adequate supply of drinking and other water (or use of the Contractor's staff and work people.

(6) The Contractor shall not otherwise than in accordance with the Statutes Ordinances and Government Regulations or orders for the time being in force import, sell give, barter or otherwise dispose of any alcoholic liquor or drugs or permit or suffer any such importation sale gift barter or disposal by his sub-contractors, agents or employees.

(7) The Contractor shall not give, barter or otherwise dispose of to any person or persons any arms or ammunition of any kind or permit or suffer the same as aforesaid.

(8) The Contractor shall at all times take all reasonable precautions to prevent any unlawful, riotous or disorderly conduct by or amongst his employees and for the preservation of peace and protection of persons property in the neighbourhood of the works against the same.

(9) In the event of any outbreak of illness of an epidemic nature, the Contractor shall comply with and carry out such regulations, orders and requirements as may be made by the Government of the local Medical or Sanitary Authorities for the purpose of dealing with and overcoming the same.

(10) The contractor shall in all dealings with the labour in his employ have the regard to all recognized festival days of rest and religious or other Customs.

(11) The Contractor shall at times during thje continuance of the Contract comply fully with all existing regulations and bye – laws including any

Engagement of labour

**Trade Union
Membership
Copy of Clause to be
Displayed**

Supply of water

**Alcoholic Liquor or
Drugs**

Arms and Ammunition

**Dis-orderly Conduct,
etc.**

Epidemics

**Festivals and
Religious customs**

**Compliance with
Regulations etc.**

statutory amendments and re-enactments of the State or Central Government and other local authorities regarding Labour Enactment, Minimum Wages and Factory Acts, Workmen's Compensation Act, Provident Fund regulations, Employees Provident Fund Act, 1952 and the Schemes made under said Act, Health and Sanitary Arrangements for workmen, insurance and other benefits and shall keep the Board indemnified in case any action is commenced for contravention by the Contractor.

- (12) The Contractor shall be responsible for observance by his sub-contractors of the foregoing provisions.
- (13) The Contractor shall maintain records of wages and other remuneration paid to his employees in such forms as maybe convenient and to the requirement of the Chief Engineer and Conciliation Officer, Central Ministry of Labour, Government of India or such other authorised persons appointed by the State Governments.
- (14) The Contractor shall, within 24 hours of the occurrence of any accident at or about site or in connection with the execution of the work report such accidents to the Chief Engineer and the Chief Engineer's representative. The Contractor shall also report such accidents to the competent authorities to whom such report is required by Law.
- (15) The Contractor shall, before he commences the work display and correctly maintain in a clean and legible condition at a conspicuous place on the site notices in English and in a local language spoken by the majority of the workers, stating therein the rates of wages which have been fixed as fair wages and the hours of work for which such wages are earned and send a copy of such notices to the Chief Engineer or his representative.
- (16) The Contractor shall allow inspection of the aforesaid Wage records and wage slips to the Chief Engineer or his representative at a convenient time and place after the notice is received or to the Board or any other person authorised by it on its behalf. The Wage Books and the wage slips shall be preserved for a period of not less than 12 months after the date of the last entry made in it.
- (17) The Board and the Chief Engineer or any other representative authorised him on his behalf shall have power to make inquiries with a view to ascertaining and enforcing due and proper observance of the fair wage clause. He shall also have the power to investigate into any complaint regarding any default made by the contractor or sub-contractor in regard to such provision.
- (18) The Board shall have the right to deduct from the money due to the Contractor, any sum required or estimated to be required for making good the loss suffered by a worker or workers by reason of non payments of the aforesaid fair wages, except on account of any deductions that may be permissible under law for the time being in force.
- (19) (1) A workman shall be entitled to be represented in any investigation or enquiry under this clause by:
- (a) An officer of a registered Trade Unions of which he is member.
 - (b) An officer of a Federation of Trade Union to which the Trade Union referred to in previous sub-clause is affiliated.
 - (c) Where the worker is not a member of any registered Trade Union, by an officer of a registered Trade Union connected with or by any other workman employed in the industry in which the worker is employed.
- (2) The Contractor or sub-contractor shall be entitled to be represented in any investigation or enquiry under this clause by an officer or any Association of Employer's of which he is a member.
- (3) No party shall be represented by legal practitioner in any investigation or enquiry under this Clause, unless an parties agree.
- (20) The Contractor shall comply with all precautions as required for the safety of the workmen by LL.O. Convention (No. 62) as far as they are applicable to the contract

Observance by Sub-contractor

Wage Records

Accidents

Notices

Inspection of Wages Records

Representation of ar-ties

Safety Provisions

- (21) Maternity leave on full pay for a period which may extend upto the end of three months from the date of its commencement or to the end of six weeks from the date of confinement whichever be earlier shall be granted to a female employee.
- Maternity leave shall also be granted in case of miscarriage including abortion subject to the conditions that:-
- (i) the leave does not exceed six weeks and
 - (ii) the application for the leave is supported by a certificate from a registered medical practitioner.

Maternity benefits for Female Workers

- (22) For work carried within P011 area or in the vicinity of any wharf of quay the contractor shall abide by the requirements of rules and regulations etc., relating to safety, health and welfare as may be in force from time to time, under Dock Safety Regulations and such other statutory regulations as may be stipulated from time to time.
- (23) The Contractor shall at his own expense provide the footwear and hand gloves to all labour doing cement mixing and all other similar types of works involving the use of tar, mortar, etc., protective glasses, gloves to welder or any other such protective measures required for other craftsman/worker as the case may be to the satisfaction of the Chief Engineer or his representative, and on his failure to do so the Board shall be entitled to provide the same and recover the cost thereof from the contractor.

Dock Labour Regulations

Provisions of Protective measures

68. MATERIALS SUPPLIED BY THE DEPARTMENT

- (1) The cost of these materials shall be recovered by means of deductions by the Chief Engineer from the Contractors bills as and when the materials are consumed in items of work for which payment is being certified by the Chief Engineer. At the time of submission of bills the Contractor shall certify that balance of materials supplied is available at site. All materials supplied to the Contractor shall remain the absolute property of the Board and shall not be removed from the site without the written permission of the Chief Engineer. The materials at all times be open to inspection by the Chief Engineer's representative.
- (2) On completion of the works all materials supplied by the Department! Board which are surplus shall be returned to the Department at the Ports General Stores or any other stores in the Port Area except that any short lengths of steel materials or A.C. sheets which are not required by the Department / Board may be retained or disposed off by the Contractor, shall be credited to him by the Chief Engineer at the rates not exceeding at which these were originally issued to him after taking into consideration any deterioration or damage which may have been caused to the said materials whilst in the custody of the Contractor.
- If on completion of works the contractor fails to return surplus materials out of those supplied by the Board, then in addition to any other liability which the contractor would incur, the Chief Engineer may by a written notice to the contractor require him to pay within a fortnight of the notice for such unreturned surplus materials at double the issue rates or market rate whichever is higher.
- (3) The Contractor shall maintain a proper account of all materials received from the Board and used on the works and shall submit returns as and when directed by the Chief Engineer, Unaccountable wastage to the extent of 5% or as decided by the Chief Engineer is permissible, in case of steel.

Return of Surplus Materials

Account of Materials used

MOBILISATION ADVANCE

69. The Board may pay to the contractor a lumpsum advance if so stipulated in Appendix-I against a bank guarantee as loan towards initial mobilisation at interest rate as stipulated in the Appendix-I provided that the contractor shall obtain and furnish at his own expenses towards security an advance guarantee bond in the approved form issued by a Schedule Bank for a sum equal to the advance. The advance will be 2:iven within 30 days of the receipt of acceptable guarantee from the Contractor.

Mobilisation Advance

The entire sum of the advance together with the interest accrued thereon shall be recovered from the running account bills submitted by the Contractor from time to time. Interest will be calculated every month on the outstanding amount of advance and added to the Principal. Recovery will commence after the end of 3rd month from the date of payment of advance to the contractor, the installments being as stipulated in the Appendix-I.

VARIATION IN PRICE OF LABOUR AND MATERIALS

70. The Contract price will be subject to adjustment on account of variation of prices of materials and labour. The adjustment will be made according to the formula given below:

FORMULA: $V = VI + V2$

$$= 0.75 \left(\frac{(I-IO)}{Io} \times (XR - M) \right) + 0.60 \left(\frac{(C - Co)}{Co} \times (YR) \right)$$

- (1) V : Total variation on account of materials and labour during the month under consideration.
- (2) VI: Variation on account of materials during the month under consideration.
- (3) V2: Variation on account of labour during the month under consideration.
- (4) X : Component of materials cost @ 65% of Contract Price.
- (5) IO : Index Number of wholesale prices in India (for all commodities) at the time of opening of the tender (base 1981-82 = 100) released by, the Economic Adviser, Ministry of Industry and Civil Supplies, Government of India.
- (6) I : Index Number of Wholesale Prices in India (for all commodities) for the month under consideration. Base 1981-82 = 100 released by the same agency.
- (7) R: Value of the work during the month under consideration.
- (8) M : Cost of materials supplied by the Department at fixed rates, incorporated in the works during the month under consideration and recovered from the bills.
- (9) Y: Component of labour calculated at 35% of the contract price. (10)
- (10) Co: All India Consumer Price Index number for Industrial Workers at the time of opening of the tender, base 1982 = 100 released by Labour Bureau., Government of India.
- (11) C : All India Consumer Price Index Numbers for Industrial Workers during the month under consideration. Base 1982 = 100 released by the same agency.

The amount of variation will be calculated monthly. All claims for reimbursement or refund on account of variation shall be prepared for each month separately and shall not be included in the monthly bills of the works carried out by the Contractor. Payment of such claims for reimbursement/refund would be made within a reasonable period of the due verification by the Chief Engineer.

The Clause No. 70 above when made applicable, as stipulated in Appendix- I will supercede the Clause No. 62 of the General Conditions of the Contract.

In the event of any liability devolving on the Port on account of the implementation of the Contract Labour (RNS) Act, 1970 and Rules therein the labour escalation payable to the contractor under the above mentioned formula will be adjusted against the monies payable by the Port to the Contractor provided that the contractor maintains appropriate records for the purpose of working out the liability due to implementation of Contract Labour Act.

This clause is applicable only for works costing
Rs.5 crores and above

and whose stipulated period of completion is not less than twelve months. Further, escalation as per the above formula will be paid only upto the stipulated/validly extended date of completion and no escalation will be paid thereafter.

The claim if any for escalation, however shall be for the relevant period i.e. upto the stipulated/extended date of completion of work and the same shall be claimed within six (6) months from the said stipulated/ extended date of completion of the work.

71. While evaluating tenders, regard would be paid to national defence and security considerations

MORMUGAO PORT TRUST

SPECIAL CONDITIONS

1. DUTIES AND DUES ETC.

1.1 General: The Contractor shall ascertain and provide for payment of Income Tax, Super Tax, Excise Duty, Sales Tax and other Taxes, Rates, Dues etc., as are chargeable under the laws for the time being in force in respect of contract and the Contract Price shall be deemed to be inclusive of all such payments.

1.2 Port and Other Charges: The Contractor shall pay all port and other charges arising from the importation into India of materials and equipment for the work or temporary work.

2. TAXATION:

2.1 Income Tax: The Contractor shall pay Income-Tax and all other taxes whatsoever payable in respect of payments received from the Board in accordance with the laws and regulations for the time being in force. If required by the authorities concerned the Board shall deduct such amounts as may be directed by the said authorities from the monies due under Interim and Final Certificates before payment under these Certificates. The Board shall furnish the Contractor with the necessary proof of all such deductions.

2.2 Income Tax payable by staff: The Contractor's staff shall pay Income Tax and other taxes in respect of such salaries and perquisites as are chargeable therewith under the laws for the time being in force and the Contractor shall perform such duties in regard to deductions and transmission thereof as may be lawfully required by the Government.

2.3 Sales and Excise Tax: The Contractor shall pay all Sales and Excise Tax payable in respect of materials, equipment, plant and other things required for the Contract.

2.4 Sales and Excise Tax on temporary work and on completed Permanent work: Sales and Excise Tax on Temporary work and on completed permanent work of the contract, if any, will be on the contractor's account and the contractor shall take this into account while quoting the rates for items in the schedule of quantities and Rates of the Tender.

3. DRAWINGS:

3.1 Working Drawing: For the official design all drawings which are reasonably required for execution of the work will be supplied by the Chief Engineer.

3.2 Drawing of Temporary Works: At least one month before the date when the Contractor intends to start erecting any part of the Temporary Works staging required for carrying out their works, he shall furnish to the Chief Engineer complete drawings of that part of the temporary works and staging. The Contractor shall at the same time if so required by the Chief Engineer, furnish calculations in respect of such temporary works. The Contractor shall also furnish to the Engineer drawings showing the method proposed for the erection of the various parts of the works.

The furnishing to the Chief Engineer of any design for any of the Temporary works and stagings shall not relieve the Contractor of any liability or obligations under the contract in respect of such temporary works and stagings.

4. OTHER CONTRACTORS:

4.1 Other Contractors: The Contractor shall take note of the fact that other contractors employed by the Board may be working in the vicinity.

5. RETURNS AND REPORTS:

5.1 Schedule of Progress: The Contractor shall furnish the Chief Engineer within one month from the date of commencement of works with Bar Chart showing in an approved form the estimated dates of commencement and completion of the several parts of the works including anticipated dates for delivery, erection etc., of the various sections of the work for this contract. Bar Chart shall be updated by the Contractor every three months and two copies of these shall be supplied expeditiously to the Chief Engineer for his information.

5.2 Progress Report: The Contractor shall submit to the Chief Engineer and the Board on the first day of each week or such longer periods as the Chief Engineer may from time to time direct, a progress report for the preceding period showing up-to-date progress and progress during the previous period on all important items of each section or portion of the works, in relation to and in consideration of his Bar Chart.

5.3 Programme and Diagram: The Contractor shall furnish the Chief Engineer within one month from the date of order to commence work, with a detailed programme and diagram showing in an approved form the estimated details of commencement and completion of the several parts of the temporary and permanent works and including anticipated dates and arrangements for delivery, erection, etc., of materials for the various sections of the works, also in relation to and in a form commensurate with the detailed Bar Chart.

5.4 Returns of Labour and Plant: The Contractor shall supply to the Chief Engineer by 09.00 a.m. every working day a return of the men employed by him in previous working day and of the work on which they were engaged, specifying also the number employed in each trade. He shall also supply monthly and other returns which may be required as to the number of men and constructional plant employed and the nature and quality of the work done.

6. OBSTRUCTIONS

6.1 Removal of Sunken Plant: The Contractor shall forthwith and with dispatch at his own cost raise and remove any craft or plant (floating or otherwise) belonging to him or to any subcontractor employed by him (including also any plant which is held by the Contractor or any sub-contractor under agreement for the hire-purchase), which may be sunk in the course of construction, completion, or maintenance of the works or otherwise deal with the same as the Chief Engineer may direct and until the same shall be raised and removed by the contractor shall set all such buoys and display at night such lights and all such things for the safety of navigation as may be required by the Chief Engineer. In the event of the contractor not carrying out his obligation imposed upon him by this Clause, the Board may buoy and light such sunken craft or plant and raise and remove the same (without prejudice to the right of the Board to hold the Contractor liable under General Conditions Clauses 20 and 21 hereof) and the Contractor shall refund to the Board all costs incurred in connection therewith.

6.2 Removal of Wrecks: The Contractor shall if required by the Chief Engineer or by the Chief Engineer's Representative take away and remove all wrecks or remains of vessels or other obstacles not being natural formations which may be found in or may come upon the site or water adjoining or adjacent thereto or the approaches thereto and which there may be occasion to remove for or in connection with the execution and completion of the works. In the case of such wrecks or obstacles other than those consequent upon his operations requiring removal the Contractor shall submit and obtain the approval of the Chief Engineer or his representative to the method of execution for the said removal where upon the Chief Engineer shall fix a price or rate at which the Contractor shall be paid.

7. SECURITY AND SAFETY:

7.1 Security Requirements: The Contractor shall comply within all regulations imposed by the Customs and Port Security Authorities in respect of the passage of plant, vehicles, materials and personnel through Customs and Port barriers.

7.2 Safety Precautions:

- (1) The Contractor shall take all possible precautions to prevent outbreaks of fire on the site and in all offices, stores, camps and other places and things connected; therewith and especially with respect to the safe storage of petroleum products, explosives and all other dangerous or hazardous goods. He shall comply with all rules regulations and orders of any Statutory Authority and of the Chief Engineer, at no extra cost to the Board and necessary Fire Extinguishers shall be provided by the Contractor.
- (2) The Contractor shall obtain from the Chief Engineer details of any restricted areas in or around the site and shall have prominently and clearly displayed for the information of his staff and work-people notices defining any such restricted areas. Such notices shall be provided at his own expenses.
- (3) The Contractor shall give every facility to the authorised safety officers of the Board to inspect the works whenever required and shall observe and abide by any instructions given by the Chief Engineer in regard to the use of plant, equipment and temporary works in respect of general safety, compliance with such requirements shall not be used as the basis of a claim against the Board.
- (4) Only such vehicles as licensed by the Board will be permitted to enter into the harbour premises. Tenderer should obtain permits from the Port's Security Office of the Mormugao Port Trust for gaining entry of vehicles.

7.3 Life saving and First-Aid Appliances: The Contractor shall at his own expense provide and maintaining upon the works to the satisfaction of the Chief Engineer sufficient proper and efficient life saving and First Aid Appliances which shall at all times be available for use.

7.4 **Light and Signals:** Any light provided by the Contractor shall be so placed or screened as not to interfere with any signal or navigation lights or other markings.

8. TIDAL WORKING:

8.1 **Allowance for Tidal Working:** Where the work to be undertaken is in and over tidal waters, the Contractor shall, allow for all necessary tidal working and for all delays and damages due to weather & wave action in his programme and in his rates and prices affixed to the Schedule of Quantities. The following clauses shall be applicable in relation to tidal working.

8.2 **Tide Gauge:** Tide Gauge boards clearly marked in 10 cm graduations are to be provided and maintained at the site throughout the contract. They shall be erected as directed by the Chief Engineer's Representative and the zero of the Tide Gauge is to be set to Indian Spring Low Water Datum.

8.3 **Marker Buoys, etc.:** The Contractor shall as a contingency of the Contract install and maintain marker buoys to define the extent of the Site as directed by the Chief Engineer or other competent authority. All beacons and markers for getting out works and for defining the limits of the permitted working areas shall be of such size as shall be clearly visible at all times and lights shall be fitted where necessary or required by the appropriate authority. Any marker buoys and beacons and lights installed by or for the Chief Engineer shall be carefully preserved. Working shall be suspended for such times as necessary for checking the lines and levels on any part of the works, at no extra cost to the Board.

8.4 **Divers:** When divers are employed, the Contractor is to arrange for competent linesman to be in attendance at all times during diving operations. Complete equipment and a stand by diver must be ready for use whenever operations by a single diver are in progress.

8.5 **Inspection of underwater work:** If divers are employed, the Contractor shall make available at such times as the Chief Engineer may direct, a diving boat with all necessary equipment and attendance to enable inspection of underwater work to be made by the Chief Engineer. The Contractor shall provide a stand by diver with independent equipment during the period of the inspection. All the above shall be provided at the expense of the Contractor.

9. MISCELLANEOUS:

9.1 **Explosives:** Except as may be provided in the Specifications or approved by the Chief Engineer, the Contractor shall not use explosives.

9.2 **Navigation:** The Contractor shall comply with all orders and directions given to him from time to time by the Chief Engineer's Representative or by the Board in respect of navigation and shall comply in every way with their requirements in respect of marking lighting and watching any structure craft or equipment which may be used for the construction of the works.

9.3 **Property in Excavated Materials:** All materials and objects of any kind obtained from excavation or found on or under the site or under any additional site which the Contractor may be allowed to occupy shall remain the property of the Board and shall not be used in the works or sold or otherwise disposed off without the written authority of the Chief Engineer or the Chief Engineer's Representative unless otherwise expressly provided in the Specification. No excavation are to be made upon the site or Additional Site beyond those shown on the Drawings or described in the Specification without the previous written authority of the Chief Engineer or the Chief Engineer's representative.

9.4 **Temporary Jetty, Office, etc:** The Contractor shall submit to the Chief Engineer for his approval, drawings and proposals for any temporary work such as jetty, landing stage, office, store, precasting yard, workshop, etc., which he intends to construct for the execution of the contract and no such work shall be constructed before obtaining the written approval of the Chief Engineer. The cost of such work shall be borne by the Contractor.

9.5 **Entry on Private or Other Property:** The Contractor shall not enter upon or commence any work in or upon, across or through any land, building or place being private property until authorised in writing by the Chief Engineer or other competent authority to do so.

9.6 **Bribes and Commission:** Any bribes, commission, gift or advantage given, promised or offered by or on behalf of the Contractor or his partner, agent or servant or anyone on his or their behalf to any officers, servant, representative or agent of the Chief Engineer or to any person on his behalf in relation.

to the obtaining or to the execution of this or any other contract with the Board, shall in addition to any criminal liability which he may incur subject the Contractor to the cancellation of this and all other contracts with the Board and also to the payment of any loss or damage resulting from any such cancellation, and the Board shall be entitled to deduct the amount so payable from any money otherwise due to the Contractor under this or any other contract.

9.7 Photographs: The Contractor shall, if required, supply the Chief Engineer monthly or at such periods as he may direct with well executed unmounted photographs showing the progress of works, and also such particulars section of the work site plant, machinery or materials as the Chief Engineer may direct. No photographs of the works or any part thereof or plant employed shall be taken or permitted by the Contractor to be taken by any of his sub-contractors' employees without the approval of the Chairman and no such photographs shall be published or otherwise circulated without the approval of the Chairman.

9.8 Advertising: No advertisement may be placed on any boarding fencing, building or scaffolding erected in connection with this contract without the written permission of the Board.

9.9 Contract supersedes Previous Document: The Contractor shall have no right to any increase in the rates in the Schedule of Quantities nor any other rights whatsoever by reason of any representative explanation or statement or alleged representative explanation or statement made or by reason of any information promises or guarantee given or alleged to have been given to him by any person (whether in the employ of the Board or not) before the date of the Contract is being understood, that the Contract embodies the whole arrangement between the parties with reference to the Contract hereby constituted and all previous correspondence, negotiations, statements, promises or guarantees whether oral or written shall be excluded.

9.10 Notice of Operation: No important operation shall be commenced nor shall work outside the usual working hours be carried out without the consent in writing of the Chief Engineer, or without full and complete notice also in writing being given to him sufficiently in advance of the time of the operation so as to enable him to make such arrangements as may deem necessary for its inspection.

9.11 Surveys and levels to be Agreed: Before the work or any part thereof are begun, the Contractor's Agent and the Chief Engineer or his representative shall together survey and take levels of the site of the works both above and below water level, and agree all particulars on which the survey is to be made and on which the measurements of the works are to be based. Such particulars shall be plotted by the Contractor and after agreement the drawings shall be signed by the Chief Engineer's Representative and the Contractor's Agent and shall form the basis of the measurements for the Chief Engineer's Certificate. Failing such surveys and agreements being prepared and/or signed by the Contractor's Agent, the survey of the Chief Engineer's shall be final and binding on the Contractor.

9.12 Notice for setting out of works: The Contractor shall give the Chief Engineer not less than 24 hours notice in writing of his intention to set out or give levels for any parts of the work in order that arrangements may be made for checking.

9.13 Joint Measurements of Extras: In the event of the Contractor having to execute any work or provide any material in regard to which he may propose to claim extras, he shall immediately notify the Chief Engineer in writing and shall at once make arrangements to take the measurements of the said work or materials with the Chief Engineer or his representative.

If these measurements are not taken jointly and booked and agreed at the time the work is being executed, the Contractor's measurements will not afterwards be recognised by the Chief Engineer.

The fact of such joint measurement having been made will in no way commit the Chief Engineer to a recognition of the claim if he considers such claim without foundation. The Chief Engineer shall at all times have full access to the site time book and may daily check the time or any extra works with the Contractor's time keeper or otherwise but the fact of his agreeing upon any time shall in no way bind the Chief Engineer to value the work other than by measurement if he thinks fit to do so.

9.14 Order of Works: The order in which the works are to be carried out shall be to the approval of the Chief Engineer and shall be such as to suit the detailed method of construction adopted by the contractor

out in such a manner so as to enable the other contractors to work concurrently at the site of work.

9.15 Site Order Book: The Contractor shall maintain a site order book at site of work wherein orders and instructions to the contractor shall be written by the Chief Engineer or his representative. The order book shall be in the custody of the contractor at the site of work during the progress of work and shall be handed over to the Chief Engineer's representative after completion of work. The instruction in the site order book will be duly signed by the Contractor or his Agent in token of having received the same.

9.16 Operation of the Employer and Others: The ordinary business and works of the Board and others as carried out on and in the vicinity of the site will be continued during the construction, completion and maintenance of the works and the contract shall be conducted in such a way so as to avoid interference with traffic of every kind by land and by water and with any other works in progress in the vicinity.

9.17 Sanitary facility: The Contractor shall provide and maintain in a clean and sanitary condition adequate latrines and wash places which may be required on the various parts of the site for the use of the employees to the satisfaction of the Chief Engineer.

The Contractor shall make all arrangements for the disposal of sewage or drainage in accordance with the directions of the Chief Engineer.

9.18 Filling holes and trenches: The Contractor immediately upon completion of any work under the contract shall, at his own expense, fill up all holes or trenches which have been made or dug, level or remove mounds of earth that may have been made and clear away all rubbish occasioned in the execution of the works or temporary works.

The Contractor shall bear and pay all cost, charges, damages and expenses which may be incurred or sustained on account or in consequence of any accident which may happen by reason of holes and trenches connected with the work being left unfenced or materials being left or placed in improper situation.

9.19 Water Supply:

(1) Supply points for fresh water will be arranged by the Board from the nearest available pipeline and in sizes determined by the Chief Engineer. The Contractor shall arrange at his own cost for any extension from these points to places where required by him. He shall also arrange for the storage of water required by him.

(2) The quantity of water supply may vary depending on availability.

(3) If the Contractor requires more water than that which is available from the above supply points, the Contractor shall make his own arrangements for the water required for the works to the approval of the Chief Engineer.

All fresh water supplied by the Board will be metered and will be charged at the rate fixed by the department from time to time. The Contractor will have to provide water meter at his cost after getting it tested by the departmental representative. In case of failure of water meter, water consumption will be calculated at 500 litres per bag of cement consumed for works, where use of cement is predominant and in case of works, where use of cement is limited or nil, water consumption will be calculated on an average of 3 immediate previous months consumption or as assessed by the Chief Engineer or his representative according to the type of work in question which will be final and binding on the Contractor. The Department will not be responsible for any delay or loss caused in case of inadequate or no water supply, for any reason.

9.20 Supply of Electric Power: To the extent that can conveniently be spared by the Board from time to time electric power for lighting and operations of plant of the Contractor can be obtained from the Board at nearest available points on the site to be decided by the Chief Engineer. Such power shall be available only in A.c. 3 phase 400 V, 50 cycles. The Contractor shall arrange for his supply there from at his own expenses in a manner approved by the Chief Engineer. The Board shall recover costs of all power consumed, by the Contractor at the rate indicated in the tender. The Contractor shall have to provide the meter at his own cost after getting it tested by M.R.T. Margao or the nearest approved testing centre. If the Contractor requires more power than which is available from the above supply points, or in the event of the Board's supply points, not being conveniently located, the Contractor shall make his own

Electricity Department, Government of Goa at his own expenses.

9.21 Existing Services : Drainage, pipes, cables, overhead wires and similar services encountered in the Contractor at his own cost, so that they may continue in full and uninterrupted use to the satisfaction of the Owners thereof, and the Contractor shall not store materials or otherwise occupy any part of the 'Site' in a manner likely to hinder the operation of such services.

Should any damage be done by the Contractor to any mains, pipes, cable or lines (whether above or below grounds) whether or not shown on the Drawings the Contractor must make good or bear the cost of making good the same without delay to the satisfaction of the Chief Engineer and of the Owners.

9.22 Keeping Site Clean: The Contractor shall at all times keep the site free from all surplus excavated materials, rubbish and offensive matter which shall be disposed off in a manner to be approved by the Chief Engineer which clearance and disposal shall be a contingency of the Contract.

9.23 Transportation of Personnel: Transportation of personnel shall be the Contractor's responsibility.

10. LAW COVERING CONTRACT:

10.1 Indian Contract: The Contract shall be interpreted and have effect in accordance with the Law of India and no suit or other proceedings relating to this contract shall be filed or taken by the Contractor in any Court of Law except in a Court of competent jurisdiction in Goa .

MORMUGAO PORT TRUST
GENERAL SPECIFICATIONS

CHAPTER · I
GENERAL PARTICULARS, ETC.

1. Unless otherwise specified in the specifications that follow, current Indian Standard Specification or specifications contained in Bombay P.W.D. hand-book (latest edition) or M.D.S.S. or Hand Book for Building Engineers of N.B.O. or All India Standard Schedule of Rates, or any other standard specifications such as B.S./DIN as decided by the Chief Engineer shall be applicable whose decision will be final.
2. The intending contractor shall visit, inspect and examine the site of work and acquaint himself with the local conditions for obtaining necessary information for submitting a proper and complete tender. Some general particulars of the area are given below for the information of the tenderer who does not know the local conditions.
3. The land belonging to the Port can be divided into three parts (1) operational area of the port, which adjoins the berths, which is about 4 to 5 m above L.W.O.S.T. the area in general has been reclaimed from the sea from time to time and consists of sandy material with clay pockets here and there. Ground water is likely to be met within about 2 to 3 mts. from the general ground level. (2) A hilly promontory called 'Head-land' just behind the operational area of the Port rising to a maximum height of 80 mts. The hill has a fairly flat terrain and the area on top of it measures about 400 acres. The soil on the Headland is ordinary soil, soft and hard murrum, laterite rock along with laterite rock or boulders interspersed with murrum etc., in general. The rock is classifiable under ordinary rock as per Indian Standard Specifications which generally does not require blasting. The ground water is not likely to be met within the ordinary depths required for foundation for general building structures and area in the town of Vasco-da-Gama and Baina. This area generally consists of compact sand and soft rock, which can be excavated by means of crow-bars, soft rock is likely to be met at a depth of about 1.5 to 2 mts. from the general ground level. The ground water is not likely to be met up to a depth of about 2 mts. in this area.
4. As the Port is situated to the west of the Western Ghats, South West Monsoon has a good influence over this area. The average rainfall is about 2500 mm. 80% of this fall is during the months of June, July and August.
5. The area does not come under the cyclonic zone. Winds of force of more than 10 on the Beaufort Scale are not expected. The highest wind velocity observed in the recent past was 80 kms. per hour.
6. The information given above regarding the particulars of the area is for the information of the Contractor and no guarantee can be given as to the exact correctness of the same.
7. All dimensions shall be measured to nearest centimeter and quantity calculated to the second decimal place, unless otherwise specified.
8. A rate for any one description of work in the Schedule of Quantities shall include such items of other work as are obviously necessary for its due completion to standard specifications and no separate charges will be admitted for these neither for the wastages, etc.
9. The Chief Engineer shall have the right to substitute any item with another, delete, increase or decrease the quantities to any extent. The quantities in the schedule are to be considered only indicative and liable to be increased or decreased to any extent.
10. The rates by the Contractor shall include all leads and lifts in carrying out the works under the Contract in different floors (ground plus upper floors) and carriage of construction materials to different floors, etc. No claim will be entertained for extra lift etc. due to tall heights of the structures.
11. The Contractor shall not infringe the specifications and contract conditions and directions of the Chief Engineer or his representative on the plea "Custom Prevailing".
12. Specifications in the I.S.I relevant for heavy rainfall area shall be applicable.

13. The Contractor agrees that before payment of final bill, shall be made on the contract, he shall sign and deliver up to the Chief Engineer a valid release and discharge from any and all claims and demands, whatsoever for all matters arising out of or connected with the contract. Provided that nothing in this clause shall discharge or release the contractor from his liabilities under the contract.
14. The terms providing and fixing/supplying and fixing shall include fixing in position and in a manner as directed by the Chief Engineer or his representative.

CHAPTER-II

EARTHWORK EXCAVATION, FILLING, SOLING, ETC.

1. Unless otherwise specified in the schedule earth-work shall include lift of 1.5 m and lead upto a distance of 50m obvious lifts shall only be paid for and lifts inherent in the lead due to the ground slope shall not be paid.
2. The rates of earthwork shall include the cost of clearing of obstructions such as shrubs, small vegetation, grass, trees and saplings up to a girth of 30 cm measured at a height of 1m. above ground level. The roots of trees shall be removed up to a minimum depth of 60cm. below ground level. All the rubbish removed from the area of constructions shall be removed upto a distance of 200m from the area of construction unless otherwise specified. The roots exposed in the foundation trenches shall be applied with coat of tar before any work is started.
3. Earthwork excavation for the foundation of columns, walls, etc. of the building and septic tank and soak pit, etc. shall include cost of shoring, shuttering, etc. required to retain the sides and bailing out water if met with during construction. The foundation trenches shall be kept dry during concreting and construction.
4. Payment for earthwork will be limited to the exact dimensions of the bottom most footing required as per drawing. Any extra excavation required for working space, shuttering for concrete, plastering in case of masonry walls, etc. will not be paid and necessary allowances in the rate shall be made by the contractor himself.
5. Excavation shall be done to the required level as indicated in the working drawing or to the depth indicated by the Chief Engineer or his representative. Every time excavation is ready to the required dimensions the contractor shall intimate the Chief Engineer or his representative for approval and for taking measurement. The quantity for excavation will be measured as a rectangle and any extra work due to the side slip etc. will not be paid. In case of excess depth of excavation below the required level, the additional depth shall be made good by the contractor with foundation concrete and not by loose earth, at his own cost.
6. Excavated earth from the foundation shall generally be used for filling in the plinth unless it is found unsuitable for the purpose by the Chief Engineer's representative. In such cases the contractor shall stack the excavated material within a lead of 50m neatly without any extra charge, unless otherwise specified in the schedule. Removal of excavated materials includes separation of useful material from the useless materials as decided by the Chief Engineer or his representatives.
7. Excavation from the foundation trenches shall be refilled after the foundation masonry, concrete etc. below the ground level are measured by the Chief Engineer's representative. The trenches shall be cleared of all debris, organic matter etc. and filled with excavated material in layers not exceeding 20 centimeters, being watered, rammed and consolidated before the next course is laid. The plinth shall also be filled with earth from the excavated material or earth brought from outside as the case may be in layers of not exceeding 20 centimeters, as specified above. Each layer shall be watered and consolidated by Power roller of 10 ton capacity in case of flooring of sheds or by ramming with iron rammers or butt ends of crowbars as directed. When the final level is reached the surface shall be flooded with water for at least 24 hours and allowed to dry and then again rammed to avoid any settlement at a future date. The final slope of the surface shall be kept at a slope intended for final flooring. Measurement for plinth filling will be based on consolidated thickness laid at site and measured correct to the nearest centimeter. The rate for plinth filling shall include all the operations mentioned above. Laying of flooring concrete above the plinth fill shall not be started till the Chief Engineer or his representative has inspected, measured and approved filling. Any royalty or permission for digging from Municipal, Government or private land shall be arranged by the contractor himself at his cost if necessary for earth to be brought from outside.
8. In case of constructions which adjoin the existing structures excavation shall not be done without necessary precautions for shoring etc. as per the direction of the Chief Engineer or his representative for which no extra payment will be made. The Contractor shall examine the site of work and satisfy himself about the requirement for the above purpose before quoting for the work. Damage caused to the adjoining structures, if any, shall be made good by contractor at his cost.
9. In case where septic tanks are provided, excavation and masonry work for the same shall be completed before superstructure work of main building commenced in case any face of the tank is situated within 3m from the building.

10. The bottom of excavation in case of footing and walls shall be in one level. In case it is found necessary and instructed by Chief Engineer's representative stepping shall be provided in the excavation for walls only.
11. Pit holes and weak spots shall be dug out square and filled with the materials approved by the Chief Engineer's representative which will be included in measurement.
12. The rate of excavation shall hold good for all types of excavations such as for foundations, pavement, flooring, drainage, manholes, chambers, etc.
13. In case cement concrete footings, rafts, old foundation footing etc. are met with during excavation the cost of dismantling and removing the same will be paid at the rate fixed by the Chief Engineer.
14. Earth work excavation for which areas other than for foundation footings shall be measured based on levels taken at suitable intervals as decided by the Chief Engineer or his representative. The plan of block levels shall be signed by the Contractor and the Chief Engineer's representative, before the earthwork excavation is started. The labour required for taking levels etc. shall be supplied by the contractor at his cost.
15. In case of excavation for trenches for laying water supply and sanitary pipelines or any other work where cutting roads are involved, the contractor shall bring the road surface back to the original condition without any additional cost. He shall examine this aspect before quoting and include in his rate for earthwork excavation. No extra payment for excavation in roads surface (asphalt, concrete, road metal, soling etc.) will be made.
16. Soling under flooring and column footings shall be of hard laterite rubble stones of size 15 to 20 cms. Well packed and set over the murrum/earth filling and properly rammed and consolidated to the specified thickness and slope. The interstices between the stones shall be filled with stone chips, removing all projections above the general level of soling, care being taken not to loosen the already set stones. The soling shall be well watered and rammed. It should be rolled using 10 ton roller where considered necessary and directed by the Chief Engineer or his representative, without any extra cost. Measurements for soling shall be taken in-situ only after the same has been watered and rammed to the required depth,
17. In case live water supply and sewage lines, telephone lines etc. are met with during excavation the contractor shall dismantle the same and lay the same in the alternative layout if so desired by the Chief Engineer's representative. Payment will be based on respective items in tender or as specified elsewhere.
18. Blasting operations are generally not necessary in laterite rocks, If the contractor resorts to blasting he can do so with the specific prior permission of the Chief Engineer or his representative whose decision to allow or not to allow blasting is final and binding. No extra rate on account of this will be paid to him nor any extra claim from the contractor for disallowing blasting will be entertained .
19. He shall arrange necessary licence from the appropriate authorities for use and storage of explosive for blasting work, if prior permission is given by the Chief Engineer for blasting. He shall take all necessary safety precautions in accordance with current regulation in force for storing and using the same.
20. The contractor may ascertain the nature of strata to be excavated by trial pits at his own expenses and with prior permission of the Chief Engineer or his representative before tendering for the work. The description in the schedule is only in general terms of the soil likely to be met with and the same shall not be contradicted by the contractor.
21. In case of the trenches excavated for laying the pipes for water supply, drainage lines etc. the width of excavation measured and paid will be minimum of the actual excavated width or the width given below:
 - (1) For depth upto 1.0 mts. External diameter of pipe (not the socket) plus 15 cms. on each side.
 - (2) Depth from 1.0 to 2,0 mts - external diameter of pipe (not the socket) plus 25 cms, on each side.
 - (3) Depth from 2.0mts to 3.0mts – external diameter of pipe (not the socket) plus 35cms. On each side

EARTH FILLING, EMBANKMENT ETC.

22. Measurement will be of borrow pits, trenches, etc. from which the material was obtained. However, if this is found difficult or impracticable, measurements of the finished embankment or earth filling after consolidation shall be taken and 10% deducted to allow for voids if not specified otherwise. No deduction shall be made in case of consolidated fills, in confined places such as floors, etc.

23. PRE-CONSTRUCTION ANTI-TERMITE TREATMENT

1. **Chemicals:** The chemicals used for the soil treatment shall be anyone of a combination of the following with concentration shown against each in aqueous emulsion:

Chemicals (E.C.S.)	Concentration
Chlorpyrifos 20EC	1.0% (by weight)

2. **Treatment for masonry foundation and basements:** The bottom surface and sides (upto a height of 30 cm from the bottom) of the excavations made for masonry foundations and basements shall be treated with the chemical emulsion mentioned above at the rate of 5 litres per Sqm. Of surface area.
3. **Treatment to backfill earth:** After the masonry foundations and retaining walls of the basement, the backfill in immediate contact with the foundation structure shall be treated with the chemical emulsion at the rate of 7.5 litres per sqm of the vertical surface of the sub-structure for each side. The earth is usually returned in layers and the treatment shall be carried out in similar stages. The chemical emulsion shall be directed towards the concrete or masonry surfaces of the columns and walls so that the earth in contact with these surfaces is well treated with the chemical.
4. **Treatment for R.C.C. foundation and basements:** The treatment described in 2 and 3 above applies essentially to masonry foundations where there are voids in the masonry through which termites can seek entry into the superstructure. Hence the foundations require to be completely enveloped by a chemical barrier. In the case of RCC foundations the concrete is dense being a 1 :2:4 mix or richer, the termites are unable to penetrate it. It is therefore unnecessary to start the treatment from the bottom of excavations. The treatment shall start at a depth of 50 cm below the ground level except when ground level is raised or lowered by filling or cutting after the foundations have been cast. In such cases the depth of 50 cm shall be determined from the new soil level resulting from filling or cutting mentioned above and soil in immediate contact with the vertical surface of RCC foundation. From this depth the backfill around the columns, beams and basement walls shall be treated at the rate of 7.5 litres per sqm. The other details of the treatment shall be as laid down in 3 above.
5. **Treatment of top surface of plinth filling:** The top surface of the consolidated earth within the walls shall be treated with the chemical emulsion at the rate of 5 litres per sq. m. of the surface before the sand bed or sub grade is laid. If the filled earth has been well rammed and the surface does not allow the emulsion to seep through, holes upto 50 to 75mm deep at 150mm centres both ways may be made with 12mm dia M.S. rod on the surface to facilitate absorption of the emulsion.
6. **Treatment at junction of walls and floor:** Special care shall be taken to establish continuity of the vertical chemical barrier on inner wall surfaces from the ground level (where it had stopped with the treatment described in 3 above) upto the level of the filled earth surface. To achieve this, a small channel 3 cm x 3 cm shall be made at all the junctions of walls and columns with the floor (before laying the sub grade) and rod holes made in the channel upto the ground level 15 cm apart and the rod moved backward and forward to break up the earth and chemical emulsion poured along the channel at the rate of 7.5 litres per sqm of the vertical wall or columns surface of the sub structure so as to soak the soil right to the bottom. The soil should be tamped back into place after this operation.
7. **Treatment to soil along external perimeter of building:** After the building is complete, the earth along the external perimeter of the building should be rodded at intervals of 15 cm and to a depth of 30cm. The rods should be moved backward and forward parallel to the wall to break up the earth and chemical emulsion poured along the wall at the rate of 7.5 litres per sqm of vertical surfaces. After the treatment, the earth should be tamped back into place. Should the earth outside the building be graded on completion of building this treatment should be carried out on the completion of such grading. In the event of filling being more than 30 cms, the external perimeter treatment shall extend to the full depth of filling upto the ground level so as to ensure continuity of the chemical barrier.
8. **Treatment of soil under apron along external perimeter of building:** Top surface of the consolidated earth over which the apron is to be laid shall be treated with chemical emulsion at the rate of 5 litres per sqm of the vertical surface before the apron is laid. If consolidated earth does not allow emulsion to seep through holes upto 50 to 75 mm deep at 150 mm centres both ways may be made with 12 mm dia mild steel rod on the surface to facilitate saturation of the soil with the chemical emulsion.
9. **Treatment for walls retaining soil above floor level:** Retaining walls like the basement walls or outer walls above the floor level retaining soil need to be protected by providing chemical barrier by treatment of retained soil in the immediate vicinity of the wall, so as to prevent entry of termites

through the voids in masonry, cracks and crevices, etc., above the floor level. The soil retained by the walls shall be treated at the rate of 7.5 litres per sqm of the vertical surface so as to effect a continuous outer chemical barrier in continuation of the one formed under 2.

10. **Treatment of soil surrounding pipes, wastes and conduits:** When pipes, wastes and conduits enter the soil inside the are of the foundations, the soil surrounding the point of entry must be loosened around each such pipe waste of conduits for a distance of 15 cm and up to a depth of 7.5 cm before the treatment is commenced, when they enter the soil external to the foundations, they shall be similarly treated unless they stand clear of the walls of the building by about 7.5 cm for a distance of over 30 cm.
11. **Treatment for expansion joints:** Expansion joints at ground floor level are one of the biggest hazards for termite infection. The soil beneath these joints should receive special attention when the treatment under 5 is carried out. This treatment should be supplemented by treating through the expansion joint after the sub grade has been laid at the rate of 2 litres per linear metre.
12. **,Spraying equipment:** A pressure pump shall be used to carry out spraying operations to facilitate proper penetration of chemicals into the earth.
13. The above specifications are in line with the I.S. Code of practice for Anti-termite Measures in Buildings. IS:6313 (part II) - 1981 -- First revision.

CHAPTER - III

MASONRY - LATERITE, BRICKS AND CONCRETE

HOLLOW/SOLID BLOCK MASONRY

1. Laterite stones used in the masonry shall conform to I S. 3620 (latest Edition). The stones shall be of approved quality with small pores and shall be brought from quarries approved by the department. All stones to be used in masonry shall be well dressed before use. The edges of the blocks shall be square and the face of the edges shall be chisel dressed. A tolerance of up to 2 cms. in length width for dressing purposes may be allowed if approved by the Chief Engineer. However, the thickness of masonry will be taken as per the thickness given in the detailed drawings and the quantity will be computed on the basis of the nominal thickness of the masonry as shown in the drawings.
2. Laterite blocks be exposed for a period of at least 3 months after quarrying before being used in the masonry work and even though the blocks are exposed for the above specified period, the contractor, if directed, shall bring and stack the blocks for the weathering for a period of 3 months before using them in the work and no claim shall be entertained on this account.
3. Absorption of water by laterite blocks shall not be more than 12 per cent of its weight after 24 hours immersion in cold water.
4. Bricks used for brick masonry shall be whole, sound, well burnt, free from cracks and twists and not to crack or break when soaked in water. All bricks shall be of uniform size and correspond to 1.S. 1077 (Latest Edition). However, a tolerance upto 1cm. in length of bricks may be allowed if approved by the Chief Engineer. The thickness of the brick masonry will be taken as per the thickness given in the detailed drawing for brick masonry work and the quantity will be computed on the basis of the nominal thickness or brick masonry as shown in the drawing. This mode of measurement will not be applicable for constructing half brick masonry walls where payment is on area basis.
5. Bricks for use in the masonry shall not absorb more than 20 per cent of its weight after immersion in cold water for a period of 24 hours.
6. Bricks shall be soaked in water before use for a period that is sufficient to penetrate the whole depth as directed by the Chief Engineer or his representative. This period shall not be less than 4 hours at any rate. The soaked bricks shall be removed from water tank sufficiently early so that they are skin dry at the time of using in masonry.
7. Broken bricks shall not be used in the work except as closers.
8. The compressive strength of bricks shall not be less than 50kgs.lcm².
9. Hollow blocks used in the masonry shall correspond to 1.S. 2185 (latest edition) and shall be made to the proportions mentioned in the schedule. Unless otherwise specified they shall be of 1 :6:4 (1 cement, 6 sand and 4 trap stone aggregate from 6 to 12 mm size) proportion. Broken blocks shall not be used in the masonry.
10. Concrete solid blocks wherever specified shall be made to proportions 1:8:6 (1 cement, 8 sand and 6 aggregate 20mm graded trapstone metal) unless otherwise specified in the schedule.
11. All masonry shall be built to plumb and in such bonds as the Chief Engineer or his representative may direct and shall be carried out in a thoroughly workman -like manner to the entire satisfaction of the Chief Engineer or his representative. Unless otherwise directed, masonry shall be built in English bond.
12. Masonry shall be constructed with cement mortar as specified in the schedule. The proportion of the mortar shall be 1:6 unless otherwise specified. The rate of masonry shall include all costs towards providing scaffolding, all lifts, raking out joints curing etc. involved.
13. Brick masonry shall be constructed with frogs down. Vertical joints of the masonry shall break with course above and below joints shall not exceed 12mm in thickness and shall be full of mortar well pressed and nicely struck.

14. Masonry shall be carried out at one uniform level throughout and where breaks are unavoidable the joints shall be made in steps to prevent cracks arising between old and new work.
15. The height of masonry at any place shall not be more than one metre compared to the general height at other places in a building. All joints shall be raked to a minimum depth of 10mm before the mortar fully sets.
16. The masonry shall be kept wet by proper curing for a minimum period of seven days commencing from 24 hours after the course is laid. The Chief Engineer or his representative shall be at liberty to water the masonry work at the expense of the contractor if he fails to cure the work to the satisfaction of the Chief Engineer or his representative without giving him any notice and deduct the expenses from his bills.
17. New built masonry shall be covered with tarpaulin or gunny bags to prevent the mortar being washed away by rains in time of inclement weather.
18. The work of masonry shall include work in footing of any shape and to any depth, work of masonry in walls of various thickness and height, masonry in pillars and pilasters, compound walls and coping, corbels, sills, fiat arch lintels, staircase steps walls in cupboards under kitchen platform, band and cornices, filling the gaps of any size and shape, etc.
19. Payment for masonry will generally be made for cubic contents without any deduction for pipes, fittings, horns and holdfasts inserted in the masonry.
20. Wooden blocks shall be provided in masonry as directed without any extra cost for purpose of fixing pegs, shelves, racks, etc.
21. Scaffolding shall be provided to allow for easy approach to every part of work. It shall conform to latest edition of I.S. 3696. Overhead work shall not be allowed generally. Put log holes shall be made good with bricks or stones and shall be plastered to match with the face work as soon as the scaffolding is removed.

HALF BRICK MASONRY

22. Unless otherwise specified, two numbers of 6mm dia M.S./ Torsteel bars shall be provided in every fourth course or as directed. They shall be suitable bonded with the dowel bars left in the columns if directed by the Chief Engineer or his representative. Payment for these bars will be made under relevant steel reinforcement items.
23. The bond length in reinforcement shall not be less than 30 cms.
24. Unless otherwise specified in the schedule the cement mortar for laying the bricks shall be of a, proportion (1:3). The thickness of mortar between the reinforcement bar and brick shall not be less than 5 mm
25. Unless otherwise specified all half brick partitions shall be plastered on both side with cement mortar (1:3) 19 mm thick. The work of plastering will be paid under the items of plastering.
26. In case of partition walls which are not going upto the bottom of the roof, they shall be plastered on the top with cement mortar of the same proportion without any extra cost.
27. Payment for half brick masonry unless otherwise specified shall be made on square metre basis.

CHAPTER-IV

CEMENT CONCRETE AND REINFORCED CONCRETE

1. Cement required for the work will normally be supplied by the Department at the rates specified in 'Schedule of materials to be supplied by the Department'. The contractor should specify clearly whether he wishes to draw the cement from the department. The recovery charges will be based on each tonne measuring 20 bags of 50 kgs. nominal weight.
2. In case the contractor procure cement on his own, it shall correspond to LS. 269 - Latest edition - for Portland cement and shall be from the source approved by the Chief Engineer or his representative in writing.
3. Minimum quantities of cement to ensure continuous progress of the work shall only be stored at the site of the work.
4. Cement shall be stored at the site of work properly in a covered shed to the approval of the Chief Engineer or his representative and the floor of the shed shall be at least 25cm above the general ground level in order to prevent the bags from attracting moisture. They should be stored on proper dunnage.
5. Cement damaged by exposure or otherwise shall not be used for the works.
6. Any excess cement over and above the quantity required calculated as per the standard norms adopted by the Port shall be returned to the Department if directed by the Chief Engineer in good condition, in case cement is supplied by the Department.
7. Allowance in quantity of cement for temporary structures built by the contractor such as storage shed for cement, site office., survey pillars, etc. will however be made.

AGGREGATES

8. All aggregates shall conform to I.S. - 383 latest edition.
9. Sand shall be of approved quality, clean, sharp, free from injurious amounts of harmful material such as dust, mica, coal, shells, alkali, soft and flaky particles, organic matter, loam or other deleterious materials. Sand shall be brought from a source approved by the Chief Engineer. Sand shall be washed thoroughly, if desired by the Chief Engineer or his representative, by the Contractor at his own expense and shall include this in his rate. Unless otherwise desired by the Chief Engineer or his representative, the grading shall correspond to Grade II as per I.S. 383 for sand.

COARSE AGGREGATE

- 10 All coarse aggregate required for the work shall be brought from the quarries approved by the Chief Engineer or his representative and shall not contain soft or elongated pieces of weathered surfaces. The coarse aggregate shall be of hard black trap variety generally available in this area. The aggregate shall be washed and screened at the expenses of the contractor if so desired by the Chief Engineer or his representative. He shall include the rate of washing in his rates.

- 11 The aggregate shall be classified as under:

Aggregate NO.1: The whole of the aggregate to be retained on 4.75mm screen and passing through 10mm screen.

Aggregate NO.2: The whole of the aggregate to be retained on 10mm screen and passing through 20mm screen.

Aggregate NO.3: The whole of the aggregate to be retained on 20mm screen and passing through 40 mm screen.

- 12 The sand and aggregate shall be measured by means of suitable boxes provided by the contractor to the satisfaction of the Chief Engineer or his representative. Additional quantity of sand shall be added to take in to account the bulking of sand to be determined at site at regular intervals or as decided by the Chief Engineer or his representative. The contractor shall provide the necessary graduated glass jar etc, required for the purpose.

Note: When laterite aggregate or broken bricks are proposed to be used as coarse aggregate the above specifications will be applicable in general only.

MILD STEEL REINFORCEMENT

13. Mild steel shall conform to I.S. 226 – I. S. 432 – I. S. 1977 - S.T. 42 quality.

14. Test Certificates from the appropriate authorities showing the quality of steel procured by the contractor shall be submitted by the contractor.
15. Where specifically provided in the schedule cold twisted deformed steel such as "TOR STEEL" or hot rolled deformed bars such as "TISTRONG" high tensile grade steel shall be used. Necessary test certificates to the effect that they conform to I.S. 1786 - I.S. 1139 latest edition as the case may be shall be submitted by the contractor. Hooks for such steel may not be provided. The bars in case of TOR steel before cold working shall conform in all respects with the requirements of mild steel Grade I bars specified in I.S. 432(Part I) latest edition. All twisting shall be carried out when cold.
16. In case the Chief Engineer or his representative desires to have further tests on steel brought by the contractor, the contractor shall arrange for the requisite tests at his own expenses in the nearest laboratory.
17. Steel corresponding to I.S. 1977 - S.T. 32 quality shall not be used on the works where they are used as structural members.
18. All steel used for reinforcement shall be free from loose scales or rust oil, grease or other harmful materials which shall be removed before they are placed in position in the forms.
19. Reinforcement cage shall be properly braced, lapped, supported, tied with binding wire and held in position to prevent any displacement during concreting. Spacing bars required between two tiers of reinforcement will be paid. Necessary horses shall be provided with planks for the concreting labour to move on. Reinforcement cage shall be made exactly to the drawings issued from time to time or to the directions of the Chief Engineer or his representative at site. Reinforcement cage shall be approved by the Chief Engineer or his representative before any concrete is started.
20. All protruding bars from columns, beams and slabs, to which other bars are to be spliced later, shall be protected from rusting by applying cement slurry.
21. All bendings shall be done cold, to the dimensions shown on the relevant drawings without any jerk.
22. Cover blocks of required sizes shall be provided. Unless otherwise specified a cover of 50mm for foundation footings, 40mm for columns, 25mm for beams, 20mm for the bottom of slabs, 15mm at the top of slabs shall be provided. End cover for beams and slabs shall be 25mm.
23. Over laps for M.S. bars unless specified otherwise shall be of 40 times of the diameter of bars in beams and slabs and 24 times of the diameter of bar in columns, excluding hooks, provided wherever required. Overlaps shall always be staggered. Unnecessary overlaps shall be voided.
24. Welding of steel may be permitted by the Chief Engineer or his representative. The percentage of welds at any particular cross section shall not exceed 50% or as directed.
25. Unless otherwise specifically stated hooks of U type with 9 times of diameter of the bar shall be provided for all bars.
26. The binding wire required for tying reinforcement grills shall not be measured and paid. It shall be of approved quality annealed G.I. wire of 18 S.W.G. diameter.

FORM WORK

27. The contractor shall provide sufficiently strong form work and centering using good quality planks and ballies to take the load of wet concrete, vibrators, workmen, etc. The form work shall be properly strutted and braced so as to remain sufficiently rigid during the placing and compacting of concrete and shall be sufficiently tight to prevent the loss of liquid from the concrete. For all major works the forms shall be steel plated lines. In case of wooden form work the surface shall be free of holes open joints and other imperfections. The surface of forms coming in contact with the concrete shall be provided with a coating of suitable form releasing agent to prevent the concrete adhering to the form work. The forms shall have an even surface. All gaps shall be covered with G.I. strips, jute rags, paper or clay to prevent such loss of liquids. Water proof paper shall be used over form work wherever desired by the Chief Engineer or his representative without any extra cost.
28. The dimensions and construction of the form work, levels, centering bracing etc., shall be got approved

by the Chief Engineer or his representative before the work of concreting is started. Notwithstanding this the contractor shall take full responsibility for any damage, loss, etc. due to any fall.

29. Form work for columns, beams, slabs, etc. shall be such as to give smooth concrete surface, perfect edges and true shape to the specified dimensions.
30. Chambers of required sizes to the edges of beams, columns, slabs, chajjas, etc. shall be provided wherever directed by the Chief Engineer or his representative at no extra cost.
31. Necessary openings in the form work for the columns shall be provided for one or two sides to facilitate pouring of concrete from a height not exceeding 1.8m or directed by the Chief Engineer or his representative. Concrete shall not be allowed to be poured in columns (or in any work) from a height of more than 1.8 mts.
32. The arrangement of forms and centering shall be such that the slab centering and sides of beams and columns forms may be removed first allowing the bottom of the beams to be supported for a longer time. Shores supporting successive storeys shall be directly over those below or so designed that the load will be transmitted directly to them.
33. Any honeycombed R.C.C. members may be required to be dismantled or gunited at no extra cost as directed by the Chief Engineer or his representative.

MIXING PLACING AND TESTING OF CONCRETE

34. The sand and coarse aggregate used for various mixes shall be measured in suitable boxes approved by the Chief Engineer or his representative.
35. The maximum quantity of water used per bag of cement of 50 Kgs. nominal weight shall not exceed 27 litres for M-15 and 21litres for M-20 or as directed by the Chief Engineer or his representative which shall include free water carried by the aggregates.
36. The consistency of the concrete shall be checked with a standard slump test wherever desired by the Chief Engineer or his representative.
37. The recommended range of slump for various types of construction shall be as given below and the actual slump shall be decided by the Chief Engineer or his representative.

Sr. No.	Type of Work	Range in slumps in mm	
		Vibrator used	Vibrator 'not used
1.	Mass concrete in foundations, footings retaining walls and pavements	10 to 25	30to 75
2.	Thin flooring of less than 75mm thickness	25 to 40	75 to 100
3.	Mass concrete in R.C.C. foundations, footings and retaining walls	10 to 25	10
4.	Beams, slabs & columns simply reinforced	25 to 40	100 to 125
5.	Thin R.C.C. section with congested steel	40 to 50	125 to 150

38. The following proportions of aggregate shall be used unless otherwise specified by the Chief Engineer or his representative.

40mm graded aggregate

Aggregate NO.1 20%

Aggregate No.2 30%

Aggregate No.50%

20mm graded aggregate

Aggregate NO.1 50%

Aggregate No.250%

39. The concrete for R.c.c. work shall be mixed in an efficient power driven batch mixer. Mixing shall continue for at least 1/1/2 minutes after the materials including water are placed in the drum and before any part of the batch is discharged. The drum shall revolve at no less than 14 and no more than 18 revolutions per minute. The volume of the mixed materials of each batch shall not exceed the mixer's rated capacity as specified by the manufacturers. The drum shall be thoroughly washed out when mixing operations are stopped for a period longer than one hour .
40. Hand mixing concrete may be permitted by the Chief Engineer or his representative for minor items at work such as lintels etc. When the quantity of concrete to be laid on any day is very small. Hand mixing shall be done on a water tight platform or through so that the slurry does not escape.
41. Dry sand and cement shall first be mixed till the mixture attains an uniform colour. The specified quantity of coarse aggregate shall then be added and mixed thoroughly. Water shall then be added through a rose attached to the water can when the process of mixing is carried out.
42. The contractor shall use 10% additional quantity of cement whenever hand mixing is approved by the Chief Engineer or his representative without any extra cost.
43. For all general building works and works of ordinary nature nominal mixes specified shall be used.
44. For major works contractor can design the mix with approval of the Chief Engineer or his representative to get the specified strength. Necessary equipment for mix design shall be procured by the contractor at his own cost. The cement content shall however not be less than the standard norms followed which are given below for reference for Volumetrix mix.

M-25 (1:1:2)	11.76	bags/m3 of concrete
M-20 (1:11/2:3)	8.00	- do-
M-15 (1:2:4)	6.50	- do-
M-10(1:3:6)	4.50	- do-
Concrete mix 1 :4:8	3.50	- do-
Concrete mix 1:5:10	2.50	- do-

45. For structures used for storing water, concrete, mix not weaker than M.25 shall be generally used, unless otherwise specified.
46. No concrete work shall be started unless the reinforcement form work and centering availability of materials, equipment, sufficient labour force and other general arrangements etc. are checked by the Chief Engineer or his representative.
47. All concrete shall be deposited in the forms within ten minutes after leaving the mixer or after being hand mixed, and the concrete shall be worked round the various reinforcement so that no gaps or voids are left in the form. All concreting shall be vibrated by an approved Power vibrator unless otherwise desired by the Chief Engineer or his representative.
48. All concreting shall be done in one continuous operation unless unavoidable. If due to unavoidable reasons, work has to be discontinued for a period longer than the initial setting time of cement mortar of 1: 2 proportions shall be used to get proper bond with the old concrete.
49. In case the delay is more than final setting time of the cement or 10 hours, necessary construction joints should be provided as outlined below:

COLUMNS: These shall be left about 5cm below the junction of the column with the underside of the deepest beam or haunch and shall be at right angles to the axis of the columns. At least 2 hours must elapse after depositing concrete in the columns or walls before depositing the same in beams, girders or slabs.

BEAMS AND SLABS : Joints in the beams and slabs be left invariably above the soffit of the beams along its centre line. If unavoidable, they shall be left at centre or span perpendicular to the main steel.

WATER TANKS: Construction joints if unavoidable shall be along the vertical walls at a height above bottom slab as directed by the Chief Engineer or his representative. Whenever such joints are provided aluminium strips shall be provided to act as water stops. Relevant I.S.1. stipulation shall be followed while providing construction joints of this type.

CANTILEVERS SLABS AND CANOPIES: Construction joints shall be provided within the body of the support and not at the face of Cantilever and canopies and at a distance not less than half the depth from the face of the support.

50. All concrete shall be cured for a minimum period of 21 days. All the exposed surface should be kept constantly wet with frequent spraying of water, wet gunny bags, by ponding or by any other method approved by the Chief Engineer or his representative. The Chief Engineer or his representative shall be at liberty to get such concrete surfaces watered for the period at the expense of the contractor without giving any notice to him in case of non or insufficient curing on the part of the contractor and deduct the expense from his bills.

51. When the work is restarted on a surface which is rough, it shall be thoroughly cleaned and wetted with cement mortar of 1:2 or thick cement slurry without any extra payment.

52. Concrete, after it has been placed in the forms, shall not be disturbed and the exposed surfaces shall be kept damp or covered with water or wet gunny bags for at least three weeks to ensure proper setting. In no case shall be centering or any concrete work be removed without obtaining prior permission of the Chief Engineer or his representative. Great care shall be exercised while removing the centering. Unless otherwise specified the following stripping time shall be adhered to:

Parapet and partition wall	.....	2 days
Sides of beams, slab and columns	.....	2 days.
Bottoms of staircase, floor slabs and chajjas		
	. ....	7 days.
(a) Span less than 4.5m.	.....	14 days.
(b) Span more than 4.5m.		
Bottom of beams	.. ....	14 days.
(a) Span less than 6m.	.. ....	21 days.
(b) Span more than 6m.		

If directed by the Chief Engineer or his representative temporary supports and shores shall be installed under beams, slabs, etc. immediately after the original form work is removed for the period's specified by him.

53. Immediately after the removal of the work the exposed surfaces of all R.C.C. work shall be thoroughly roughened by making indentations as directed by the Chief Engineer or his representative.

54. In case the concrete has become uneven due to the bulging of form work etc. the surface shall be made even followed by applying cement mortar 1:3 before any further plastering to the surface is given without any extra cost to the department.

TEST ON CONCRETE:

55. Periodical test cubes of concrete shall be taken at the time of placing the concrete in different parts of the building for testing if desired by the Chief Engineer or his representative. The samples cubes should be of sizes 15cm x 15cm and eight cubes should be taken at a time. 4 cubes should be tested after 7 days curing and the remaining cubes after 28 days curing. The minimum compressive strength should be not less than the following:

GRADE OF CONCRETE	7days strength	28 days strength
M10	7 N/mm ²	10N/mm ²
M 15	10N/mm ² 13.5	15
M20	N/mm ²	N/mm ²
		20N/mm ²

A register of concrete cubes shall be maintained at site clearly indicating the date of casting, nos. of samples cubes taken on the day, identification mark, etc. attested by the Officer in whose presence

after7 The cubes are taken. The quantity of concrete represented, proportion of mix, strength obtained

days and 28 days tests, should also be recorded. The contractor or his authorized representative should invariably sign the register of each entry therein.

The contractor shall arrange to his own cost for periodical testing of the cubes in the nearest laboratory in the presence of the departmental representative.

Concrete below specified crushing strength:

Should the test cubes fail to meet the minimum specified crushing strength for each class of concrete, the Chief Engineer may take one of the following decisions.

- (a) Instruct the contractor to carry out such additional tests and/or works to ensure the soundness of the structures at the contractor's expense.
- (b) The Chief Engineer may accept the work. Any decision to accept the work shall be entirely at the discretion of the Chief Engineer who may make reduction in the rate of the appropriate item.
- (c) Reject the work and instruct that the section of the works to which the failed cubes relate shall be cut out and replaced at the contractor's expense.

FAULTY WORK:

Concrete defections from any cause, whatsoever, shall if so directed by the Chief Engineer be cut out and the work reconstructed at the contractor's cost. Concrete thus cut out shall not be used again. No reconstruction or repairs to faulty works shall be done without the permission of the Chief Engineer and in such manner as he shall direct or approve.

MEASUREMENT FOR R.C.C. WORK

56. All R.C.C. work will be measured and paid for the design dimensions excluding the increase caused by the plaster finish columns shall be measured from floor to floor. Beams shall be measured between columns, depth of the beam being taken from the bottom of the slab to the bottom of the beam except for inverted beam, where it shall be measured from top of beam. Slab shall be continuously running through the beam. In case of the chajjas average thickness will be taken as the thickness of the slab for purpose of measurement and dimensions of the projections from the face of support will be measured considered for computing the quantity. No extra payment will be made in case of staircase slabs for their inclination. They will be measured as ordinary slabs taking the inclined length into account. The item of foundation for footing shall include all types of footings such as isolated footings, rafts with beams and slabs/raft with flat slab etc.
57. Columns shall include unless otherwise specified all type of columns such as square column, circular column, rectangular column, etc. The item of beam include all items such as T-beams, L-beams, Cantilever beams, inclined beams, plinth bracing beam, inverted beams, beams of varying depth and their haunches lintels, corbels and other projection connected with the beams, staircase steps, curved beams etc. unless otherwise specified.
58. The slab shall include all types of slabs such as floor slab, loft slab, roof slab, any cantilever slabs, canopy slab, staircase slabs, kitchen platform, (Cooking Platform) sink, cupboard slab, slab projecting beyond walls etc. wherever directed the surface shall be left rough to form a good key to the subsequent finish and fair finish of top of lofts etc.
59. The vertical slab of various thickness shall include parapet wall, side walls of the staircase, R.C.C. fins, pardi walls, sun breakers, chajjas drops etc.
60. Deduction for pipes and other fittings passing through the concrete will not be made. However, fixing these in the concrete shall be done by the contractor at no extra cost to the directions of the Chief Engineer or his representative.
61. No extra payment for providing depressions in floor slabs for W.C seat, nahni trap etc. will be made to the contractor. He should make necessary allowances in the slab rate. Extra steel and extra depth of beam if provided will be paid for as per the working drawings or to the direction of the Chief Engineer.
62. No extra payment will be made for providing openings in slabs, beams, etc. for nahni trap W.C outlets etc. Additional steel around these openings which will be paid for shall be provided as directed by the Chief Engineer or his representative.
63. Necessary drainage pipes, outlet pipes, etc. with metal flanges welded around the pipe shall be embedded in concrete to act as water stops for all the water tanks. The contractor shall have to execute the same without any extra charge.
64. Fan hooks out of 16 mm dia M.S bar shall be provided as directed by the Chief Engineer or his representatives for which no extra payment other than ordinary steel reinforcement will be made.
65. Necessary conduits, blocks, for light for electric connections shall be embedded in concrete slabs etc. as directed without extra cost.
66. The rate for concrete shall include lifting of materials to all floors and no separate charges for lift will be allowed.
67. Suitable slopes in the roof slabs shall be provided for providing grading to the water proofing course as desired by the Chief Engineer or his representative without any extra cost. This slope shall be 1: 100 unless otherwise directed by the Chief Engineer or his representative.

68. In case of R.C.C Jally, the rate shall hold good for the design/pattern attached along with the tender. If a change in the design/pattern of the jally is subsequently ordered by the Chief Engineer whereby the quantity of either steel or concrete exceeds by 10% of the earlier one, the excess quantity of steel or concrete over 10% will be paid to the contractor at the rate fixed by the Chief Engineer.
69. Payment for the jally will be made for the clear dimension of the opening excluding the portion embedded in the concrete, plaster, etc.
70. For all precast works also the concreting shall be done after the mould/shuttering and reinforcement is checked and approved by the Chief Engineer or his representative. The curing, shifting, lifting, placing etc. shall be done as directed by the Chief Engineer or his representative taking proper care to prevent any damage to the corner, edges or structural part. All damages or spoiled units should be destroyed if directed by the Chief Engineer or his representative and no claim, in any form will be entertained on this accounts. Necessary lift holes shall be left in the members as directed by the Chief Engineer or his representative.
71. Wherever directed, all the exposed surfaces of the RC.C. works shall be finished with C.M. (1 :3) 6 to 12mm thick (av) in single coat either smooth or to match the finishing of the adjoining parts of the structures as directed by the Chief Engineer or his representative. Necessary drip mould vata, along the junction, beading etc. shall be provided without any extra cost. The above mentioned RC finishing with C.M. 1:3 will be measured and paid separately. However, for the item like slabs of cooking platform, lofts, slabs over cupboards, shelves etc. where finishing smooth the exposed surface with C.M. 1:3 is described and mentioned in the description and specification of this item in the Schedule of Quantities and Rates, the rate quoted shall include finishing which will not be measured and paid separately.

SHUTTERING:

72. This item should include all that is necessary to provide approved type of shuttering for the relevant M.S./ concrete item including necessary supports/proper wedges, nails, joining, oiling bracing sealing joints to prevent leakage of slurry as directed necessary runners, stiffners to prevent bulging and to keep concrete items to correct and specific shape and size and removal thereof after the required period of curing or as directed. The areas for the purpose of measurement and payment of shuttering items will be computed on the basis given below the dimensions being the dimensions of shuttering surface in contact with concrete or dimensions of concrete members shown in the drawing/or as directed whichever is less.
 - (a) Column footing: Side shuttering (only vertical sides)
 - (b) Columns: Between top of footing to the top of the column. Deduction will not be made for the beams junction.
 - (c) Beams: Shuttering will be measured between the column faces or supporting beams etc. as the case may be. Bottom and sides will be measured, the depth measured being from bottom of slab to bottom of beam. For in verted beams, side shuttering from the top of the slab to the top of the beam will be measured.
 - (d) Slab: Bottom shuttering in between the beams and vertical side shuttering at the edges will be measured. Side shuttering provided for the construction/expansion joint etc. will not be measured.
 - (e) For lintels, vertical slabs etc. other RC. members like steps etc., the shuttering quantity will be computed on the dimensions of the necessary shuttering surfaces in contact with the concrete.

CHAPTER-V

WOOD WORK WROUGHT AND PUT UP DOORS WINDOWS ETC.

1. All wood work used in construction shall be of well seasoned quality and shape free from cracks, splits, knots, saps, shakes and other defects.
2. All wood work used for structural work as well as door, window, ventilator frames and shutters shall be of grade-I quality corresponding to I.S. 3629 and I.S. 4021 (latest edition) respectively unless otherwise specified.
3. All wood work shall be planed smooth wherever they are exposed. Wood work shall be worked to various sizes and shapes as per the working drawing issued or as directed by the Chief Engineer or his representative. The shapes of frames for doors and ventilators shall correspond to I.S. 4021 (latest edition).
4. Unless otherwise specified all wood work wrought and put up i.e. wood work in trusses, purlins, rafters, etc. shall be of matti wood. Samples of wood proposed to be used for all works shall be got approved by the Chief Engineer or his representative before taking mass procurement action.
5. All timber work shall be accurately worked and all mortises tenons, mitres, etc., shall fit snugly and shall be fitted with wood glue of approved quality before joining them together.
6. All wood works which are embedded in masonry or which come in contact with masonry or concrete shall be given two coats of coal tar without any extra cost.
7. A minimum number of three fold-fasts and 2 hold-fasts shall be fixed on each side of door and window/ventilator frames respectively at places approved by the Chief Engineer or his representative. The size of the hold fast shall be 40mm x 3mm x 25cm bend in 'Z' section. The holdfast shall be fixed to the frame by screws of adequate length and necessary block of cement concrete 1:3:6 mix using 20 mm graded trap stone of appropriate size shall be provided for fixing the holdfast. In case the position of door/window/ventilator is such that the hold fast cannot be fixed, necessary alternative arrangement for fixing the door with clamps, nuts and bolts, etc. as directed shall be done at no extra cost.
8. The wooden frames shall be rebated on one side for 12mm width and for the full length of the frame and have the return head moulded on the other side of chamfered as directed by the Chief Engineer or his representative.
9. Unless otherwise specified all finished door, window, ventilators and cupboard shutters shall be of 60 x 100mm for single shutter and 60 x 140mm for double shutters.
10. All styles, rails, glazing bars of doors, windows, ventilators and cupboard shutters shall be of 40 mm thickness unless otherwise specified in the schedule ..
11. All panels shall be 20 mm thickness unless otherwise specified. All doors shall have 3 panels and all windows 2 panels unless otherwise specified in the scheduled and drawing. All panels shall be made up of a single piece and shall be moulded as specified in I.S. 1003 part I (latest edition). The sizes of rails, style, etc., shall be as per I. S. 1003 (latest edition). Partly paneled doors and windows shall be of 1/3 panelled and 2/3 glazed variety unless otherwise specified in the schedule.
12. Unless otherwise specified, timber used for styles, rails and panels should be of the same species. All joints in styles and rails shall be tight fitting and shall be painted with priming coat of white lead prior to joining and shall be provided with sufficient number of wooden pins.
13. Unless otherwise specified in the schedule, best quality anodized aluminium fittings of approved manufacture shall be provided.
14. Unless otherwise specified, doors shall have the following fittings:
 - (1) 3Nos, hinges 10cm long for each shutter.

15. Unless otherwise specified, windows shall have the following fittings:

- (1) 2 Nos. 10cm long hinges per shutter.

16. Unless otherwise specified all top hung ventilators shall be provided with the following fitting:

- (1) 2 Nos. 8cm long hinges.

17. Unless otherwise specified swing ventilators shall be provided with:

- (1) 2 Nos. plate type pivots.

18. Unless otherwise specified, cupboard shall be provided with:

- (1) 2/3 Nos. hinges 8 cm long per shutter, as specified in tender schedule.

19. Shutters for cupboard under the cooking platform shall include for:

- (1) 2 Nos. hinges 8 cm long for shutter.
- (2) Brass wire netting with 12 meshes for every 25mm using 22 BWG standard brass wire, or nylon fly proof netting 16 x 16 meshes for every 25mm as detailed in the description of the item.

20. All other fittings such as tower bolts aldrops handles, plate type hooks and eyes, ventilators catch, door stoppers, cupboard locks etc. will be paid for separately as specified in the schedule.

21. Necessary screws for fixing shall be included in the rate.

22. All glasses used for glazed doors, windows and ventilators shall be of good and durable quality. 3mm thick pinhead figured variety shall be provided unless otherwise specified in the schedule.

23. All glass shall be free from blisters or optical distortions or wavy formations and other defects and shall be set in good putty and have the rebate neatly chamfered.

24. All glass shall be cut to fit exactly to the rebates of the sashes they shall be bedded, puttied and pinned to the frames and finished well in a workman like manner. All stains on the surface shall be removed.

25. All broken glass shall be replaced with good ones and all damaged putty repaired at the time of handing over the work to the department.

26. Wooden beading of triangular/segment shape shall be used for fixing the glass if so desired by the Chief Engineer or his representative without any extra charge.

27. Putty shall correspond to relevant I.S.I special metal putty shall be used in case of glazing work with steel doors and windows.

28. All flush doors, unless otherwise specified, shall be of the solid core type with block board core. Face veneers shall be as specified in the schedule and shall have plywood (commercial) facing if no specific mention in the schedule.

29. Unless otherwise specified, all flush doors shall have lipping on all sides, provided internally. The depth of the lipping (beading all round) shall not be less than 25mm excluding the tongue for the joints. The beading provided all round shall be fixed by a tongue and groove joints using adhesive confirming to relevant I.S.I. and the beading shall be further strengthened by providing additional screws of adequate length. The timber used for the beading shall be of the same species as that of the veneers in case of decorative veneers are used.

30. All flush doors shall correspond in relevant I.S.I. except for the deviations made above.

31. Unless otherwise specified in the schedule, all bath and lavatory doors shall be of a single leaf variety and other paneled doors double leaf variety except in case of flush doors.

32. Rebating for the double leaf variety shall be slopping as per I.S. 1003 Part I (latest edition).

33. No. of shutters for windows shall be such as not to exceed 60cm in width unless otherwise specified.

All ventilators shall be of top hung variety unless otherwise specified in the schedule.

34. Unless otherwise specified all cupboards shall have two shutters.
35. The rate quoted for doors, windows and structural timber shall be exclusive of painting polishing and other protective finishes unless otherwise specified in the schedule.
36. The rate quoted for fixing shelves in cupboard shall include providing necessary grooves in the wall side planks providing necessary wooden bracket fixed to the wall /side planks.
37. Payment for doors and windows shall be made on the basis of area, dimensions being outside to outside of frames including rebate provided for keying in plaster. The rates for doors and ventilators shall include the cost of fittings mentioned above as well as hold fast. Payment for other fitting will be made separately as specified in the schedule.
38. Cupboards and wardrobes shall be measured in square metres for the overall dimensions of shutters including frames.

39. Factory made paneled doors/windows frames:

Factory made paneled doors shall be of approved species of timber kiln seasoned and chemically treated with panels made up of wood particle board bonded with Phenol formaldehyde synthetic resin, waterproof quality and brought from an approved manufacturer. Number of panels and their sizes shall be as approved by the Chief Engineer. Unless otherwise specified, the vertical styles and top rail shall be of size 100 x 40mm and lock rail and bottom rail of sizes 150 x 40mm and thickness of the panels shall be 12mm.

40. Factory made door/window frames shall be of approved species of timber kiln seasoned, chemically treated and brought from an approved manufacturer. The size of door and window frames shall be 100 x 60mm unless specified and the types of joints shall be dovetail or any other as approved by the Chief Engineer. Measurements will be on the basis of the cross sectional area without taking into account rebate etc. and will be on volumetric basis.

GRILLS AND JALLY

41. Mild steel or wrought iron grills to balcony, walls, staircase etc. and R.C. jally in walls etc. shall be of approved design and sections to be approved by the Chief Engineer. The grills shall comprise of squares, flats, and such other approved section of first class quality and rigid in construction. They shall be painted with a primary coat of red lead or zinc chromite and 2 coats of approved colour ready mixed synthetic enamel paint. R.C.C. jallies suitably reinforced with 6mm dia M.S./Torsteel bars as directed shall be precast to the pattern as per drawing and finished very smooth. The rate shall include necessary reinforcement. Any rough or honey combed or non-uniform jally will not be allowed to be used. They shall be embedded in concrete or masonry and finished with 2 coats of cement paint or white or colour washing as the case may be. The measurements shall be taken for the clear exposed area of the jally on square metre basis. The grills as well as jallies shall be firmly fixed in position to line, level and plumb as directed by the Chief Engineer. The drawing supplied is only indicative. The contractor should be prepared to provide any other pattern as directed, without any extra payment.
42. Ornamental grill work as per design and of sections approved by the Chief Engineer or horizontal bars of M.S. rods 16mm dia at approximately 10cm shall be provided and firmly fixed to window frames as directed. For windows wider than 1.0m (with horizontal bars) central frame or wood or 2 nos. M.S. flats (50 x 3mm) shall be provided as directed by the Chief Engineer or his representative. The grills and M.S. bars and flats if provided shall be painted with a primary coat of zinc chromite and 2 coats of approved paint.
43. The measurement of grills if on the basis of area, shall be of clear dimensions between the inside faces of supporting frames.

CHAPTER VI

STRUCTURAL STEEL WORKS

1. The steel used shall conform to I.S. 226 (latest edition). The steel should be free of scale, blisters, laminations, cracked edges and defects of any sort. All steel shall be checked carefully for its straightness and any bend noticed should be removed by straightening under pressure and not by hammering. Necessary test certificates shall be furnished to the Chief Engineer.
2. The cutting of steel sections shall be by punching, shearing machine. The plates may be cut by oxyacetylenic flame and cut edge should be properly finished smooth by files. The ends of the structural member shall be sawn or cropped to length and whenever directed shall be chipped off. Steel templates shall be prepared from detailed drawings and the sizes and shape shall be marked by using template and cut by a shearing machine. The cut sizes shall be within the tolerance specified for structural steel work by I.S. 800 latest edition. The holes in plates, angles, etc., shall be drilled and not punched or gas cut.
3. **WELDING:** Welding should be arc welding type conforming to I.S.I. 816 -latest edition. Electrodes conforming to I.S.I. 814,8 SWG or 10 SWG welding rods 'Ferrosprod electrodes' from Indian Oxygen Co. Ltd., or any other equivalent approved quality may be used. In all cases where welded joints are liable to be exposed to weather conditions the jointing edge of contact surfaces shall be sealed by welding or parts shall be efficiently connected by welding so that contact surface are securely held to prevent the entry of moisture.
4. In built up members in which parts are connected by intermittent fillet welding continuous side fillet welds should be used at the ends for length not less than the width of plate connected. Where butt welding or fillet welding is provided the locations of the weld and the form and dimensions of weld surface shall be such as to provide access for the filler rod to the surface to be welded and enable the welder to see clearly the work in progress.
5. The total thickness of the weld deposited shall be achieved by series of runs of smaller thickness along the joint. After each run the surface of weld shall be thoroughly cleaned, by light hammering and wire brushing so as to remove all slag before depositing second run of weld.
6. The edges of members to be welded should be properly matched and held in position by tack welds if necessary before starting the work in joint proper.
7. Welds showing cavities or lack of proper fusion or under cuts lumps etc., shall be cut out and rewelded to the satisfaction of Chief Engineer at no extra cost of welders shall be provided with such staging and protection as will enable them to perform welding properly.
8. All the welding shall be in good condition and capable of enabling the welder to provide and maintain uniform melting of welding rod.
9. The welder shall be provided with protective glasses and gloves. The welder shall be an experienced hand and if the quality of work is not to the satisfaction of the Chief Engineer he shall be replaced.
10. Whenever necessary the joint after welding shall be ground smooth by flat grinders to the satisfaction of Chief Engineer at no extra cost. If any defects like blowsides or porous weld are exposed after grinding the same they shall be rectified by chiseling and light run of weld all over and regrinding the same smooth, at no extra cost.
11. **ERECTION:** Anchor bolts shall be installed in position by grouting to keep proper alignment of columns. Care shall be taken to see that side masonry wall etc. are not damaged during the erection. Trusses shall be checked for alignment spacing and level. Erection work shall be started after the approval of the Chief Engineer. For lifting trusses, hoists and pulleys shall be used. Purlins and bracers shall be welded to the trusses after checking alignment.
12. In case of erection of framed steel structures contractor should ensure adequate temporary ties and cross supports to keep unfinished structures in stable position and alignment before permanent bracings are welded in position.
13. Final alignment vertically etc. should be checked and got approved before the frame is rigidly connected by cross ties and bracing and no attempt which may induce damage, should be done to rectify

the same at later stage.

14. **PAINTING:** The whole of the steel work shall be scrapped and thoroughly cleaned of all scales and rust. Before fabricating all parts in contact or accessible after assembling shall be painted with minimum one coat of zinc chromite in addition to shop coat, done by suppliers. After fabricating all parts and members which are not to be embedded in concrete shall be given a coat of zinc chromite and which are to be embedded in concrete or masonry with a coat of cement wash. Other parts which are to remain exposed shall be painted with two coats of approved enamel paint. The paint shall conform to relevant Indian Standard Specification. The primary coat and first coat shall be applied before fixing the roof sheets. Final coat shall be applied, after roofing is over. All the operations shall conform to I.S. 1477 Part I of latest edition.
15. No subsequent coat shall be applied before the first one dries up. No painting shall be done in wet weather. Painting shall not be started until the structural work is inspected by Chief Engineer or his representative. The make as well as the colour of the paint shall be got approved by the Chief Engineer before applying.
16. The structural steel work and iron work shall be measured by weight in kilogram except otherwise mentioned. Unless otherwise specified in schedule, the net weight of cleats, brackets, gussets, anchor bolts, fish plates etc. calculated on the basis of weight of steel section given in relevant I.S. shall be added to the weight of respective items. The weight of steel, sheet, plate and strip shall be taken from relevant Indian Standards based on 7.85kg/m² for every milli-metre sheet thickness, or rolled steel sections, rods etc. The weights given in the relevant I.S. shall be used without any tolerance for rolling margin. The rate quoted for the structural steel work shall include all fabrication and erection. In the case of welded connections payment will not be made for weld separately. The item shall include necessary bolts, nuts, rivets, etc. as specified. The rate for structural steel shall include the cost of bolts, nuts and rivets and will not be separately measured for payment.
17. Collapsible gates and rolling shutters shall be measured in square meters and the measurements will be based on the dimensions of the openings for which the shutter is used.
18. **SLIDING DOORS:** The sliding doors are in two halves made of M.S. angles frame and plate welded to it. The shutters shall be mounted on rollers on the top and will move on an angle iron edge. The bottom will be guided through a channel / angles in floor. A clearance of 5 mm should be kept at the bottom for easy movement of shutters. The rate for door quoted shall include runner angle, angles embedded in lintel and lug angles at bottom pulleys, handless, door stoppers, bottom guides, etc. Payment will be based on the clear dimensions of the opening.

19. STEEL DOORS CASEMENT WINDOW ETC.

Steel doors, windows, ventilators etc. shall be manufactured from extruded sections of approved manufacturers. They shall be of uniform section, to the standard sizes and designs, complete with fittings, ready for being fixed into the building. The steel shall be of weldable quality. In all other respects the rolled steel section shall conform to I.S. 226 latest edition.

20. Adjustable M.S. lugs with machine screws and nuts shall be provided for fixing door and windows in masonry or concrete. Dimensions of the rolled steel sections shall correspond to I.S. 1038 - latest edition. For industrial buildings it shall conform to I.S. 1361 - latest edition. All the frames shall be constructed of sections which have been cut to length mitred and welded at the corners. All the subdividing bars shall be tenoned and rivetted into the frames. All the frames shall have the corners welded to a true right angle.
21. Side hung shutters shall be hung on specially designed extended or projecting hinges with brass pins. Friction hinges shall be provided wherever necessary. Top hung shutters shall be provided with heavy butt hinges. Horizontally centre hung windows shall be pivoted on bronze cup centres accurately machined and fitted for easy operation, the kick panels for doors shall be 18 SWG mild steel sheets and shall be welded or screwed to the frame and the glazing bar. Steel hinges for doors shall be of the same type as in the windows but of large size. The hinges shall normally be of the 5cm projecting type. Other type of hinges as given in I.S. 1038 shall be adopted if approved by the Chief Engineer or his representative.

Fittings of heavy pattern cast manganese brass shall be provided as follows:

1. DOOR: Typical door handles as shown in I.S. 1038 shall be provided.

2. SIDE HUNG WINDOWS: Each leaf to be provided with one/two point locking brass handle and one of 30cm long adjustable brass or Gun metal casement stay.

3. HORIZONTALLY CENTRE HUNG Spring catch with cord eye and pulley.

WINDOWS:

4. TOP HUNG VENTILATORS: 20 to 25cm long adjustable casement, brass or gun metal stay arranged to lock the shutter from inside.

22. A suitable lock for the door openable either from inside or outside shall be provided.
23. In double shutter doors the first closing shutter shall have a concealed brass or steel bolts at top and bottom. It shall be so constructed as not to work loose or drop by its weight. If required single and double shutter doors may be provided, with a three way bolting device.
24. The sizes of the doors, windows and ventilators given in drawings are only indicative and the rate quoted by the contractor shall hold good for any size approved by the Chief Engineer.
25. Steel doors, windows and ventilators shall be given 2 coats of approved ready mixed enamel paint, over a coat of approved quality anti corrosive paint in addition to the shop coat already given.

HANDLING AND FIXING

26. Care shall be taken in unloading and stacking the doors, windows and ventilators. They shall be stacked upright on level ground. Doors shall be stacked upside down, with the kick plates at top.
27. They shall be fixed into prepared openings. The clear unfinished opening should be above 25 mm more than the overall sizes of doors, window, etc. to allow for a margin of 12.5mm of each of the four sides for facilitating embedment work. The contractor shall take care to see that no scaffolding are tied to the steel windows fixed in position. All the operations shall conform to latest edition of I.S. 1081.
28. GLAZING: Before glazing the frame shall be completely cleaned and beading putty shall be placed in the rebate. Glass panes of 4mm thickness weighing not less than 10 kg/m² frosted variety or as specified in the schedule shall then be cushioned into this beading putty and shall be fronted with front putty. Glazing clips shall be provided as directed by the Chief Engineer. Special spring glazing clips shall be inserted in holes already provided in the shutter frames before applying the front putty where the pane size exceeds 60 x 30cm. The putty shall be of metal putty as per the latest edition of I.S. 420.
29. The contractor shall make good or replace without extra cost any glass broken before the completion and handing over the work.
30. The measurement of all steel doors, windows and ventilators shall be in square metres for the area outside to outside of frames. The rate should include the cost of providing and fixing windows complete with all the fixtures and fastenings complete including glazing and painting with 2 coats of approved quality enamel paint over coat of anti-corrosive paint.

CHAPTER VII

ROOFING

1. **A.C. SHEETS IN ROOFING:** The sheeting shall be of 6.00mm nominal thickness to I.S. 459 of 'Big Six' variety unless otherwise specified. The sheets should be sound, free from cracks and with unbroken ends and corners.
2. The sheets shall be fixed to purlins by galvanised iron J or L hooks of 8mm dia. There shall be minimum 4 hooks for each sheet. Each bolt shall have Everest bitumen washers, G.I. flat washer and G.I. nut. There shall be minimum 12mm length of bolt left over after tightening hook by nut. The bolt shall be tightened sufficient only to secure bitumen washer over the corrugations so that natural movements in the sub-structure of the roof may not damage sheeting. The J and L bolts shall be inserted through the ridge portion of the sheet and not in the valley portions. The fixing of sheet in case of roof shall start from left to right and from bottom to top. The overlap in sheets shall be-uniform so that the uniform lines are seen at every overlap. The side lap should be at least 45 mm and the horizontal lap should be at least 15cm unless specified otherwise in the detailed drawing. No extra payment will be made on account of the contractor providing more over lap even if the sheets are supplied by the department.
3. to ensure perfect fitting where two or more sheets overlap, the corners of all underlying sheets shall be cut or mitred at site, the length of Mitre being equal to the end lap and width equal to that of corrugations. Care should be taken in mitring to ensure a close fit.
4. Other Asbestos cement accessories such as Everest Barge Boards, Eaves filler pieces, ridges shall be secured either to the structure or to the sheets by 'seam bolts'.
5. Cat ladders or roof boards should always be used when working to avoid damage to the sheets and to provide security to the workmen.
6. Roof sheeting shall be measured in square metres of the over-all laid widths and lengths without any allowance for laps.
7. The ridges, apron pieces, eave fillers hips, valleys etc. shall be measured in running metres on overall laid length.
8. **NORTHLIGHT GLAZING:** The glass to be used for north light shall be of reinforced glass 6 to 7 mm thick approved by the Chief Engineer or his representative. The glass shall be properly fixed to Truss by means of aluminium tees, clips, etc. as per specification of 'Aluminex' or approved pattern and shall be guarded against leakage to the satisfaction of the Chief Engineer or his representative.
9. **FIBRE GLASS REINFORCED SHEETS:** The fibre glass reinforced polyster roof light sheets shall be of maxlite E type or equivalent average 1.1mm thick brought from approved manufacturer and shall match with the profile of asbestos cement sheets specified for roofing etc. They shall be properly fixed using necessary G.I. bolts, nuts and G.I bitumen washers. Overlaps shall be as approved by the Chief Engineer or his representative.

Payment for the above sheets will be made for the complete area of the sheets fixed including approved overlaps. Breakage/cutting and other wastages however, will not be measured and paid.

CHAPTER VIII

FLOORING

GENERAL - APPLICATION FOR ALL FLOOR FINISHING

1. Payment will be made for actual areas in square metres. Clear of unplastered walls. Deductions will not be made for pipes and fittings, column projections. Indian pattern WC pan etc. if any. Deductions will be made for freely exposed column. No extra payment will be made for cutting the tiles to required shape filling the edges, any wastage etc. for any of the above.
2. The rate of finishing flooring shall hold good for providing skirtings, dadoing, thread lining etc. to the walls unless specified otherwise.
3. Wherever directed necessary sills for the external door and doors in bathroom, W.e. or any other doors shall be provided without extra cost.
4. The rates quoted shall hold good for flooring on staircase, treads, finishing of cooking platform, sink, mid landing etc. unless specified otherwise in the schedule.
5. Holes shall be drilled and ferrules fixed for tower bolts etc. as directed without extra cost. Necessary slope to be given to the finished flooring as directed without extra cost.
6. No extra payment will be made for fixing bottom guides etc. for sliding or collapsible doors etc.
7. The measurement for skirting dadoing shall be above the finish level of the flooring. No deduction will be made for door frames sanitary water fittings etc.
8. **CEMENT CONCRETE FLOOR:** The top of soling shall be thoroughly cleaned and well watered, before laying the cement concrete flooring. The sizes of panels shall be determined depending upon the total dimension and shall normally not exceed 2.5m x 2.5m. Alternate panels shall be cast at a time. Cement concrete 1:2:4 shall be laid in the panels spread over uniformly and vibrated to get a uniform thickness and to the required slope. The edges of the concrete shall be painted with thick coat of approved quality of asphalt of 80/100 penetration. The top surface shall be finished rough or smooth as directed by the Chief Engineer or his representative. Concrete shall be cured for 21 days by proper ponding or flooding. Deductions for any pipes and fittings embedded will not be made.

FLOOR FINISHERS (A) I.P.S. FLOORING

9. A wearing surface consisting of cement concrete (1:2:3)4cm average thickness with 20mm graded aggregate shall be laid either over the bedding concrete of not less than 8cm thick or directly over the floor slab. The topping shall be laid after the base is allowed to harden as directed. All undulations or defects in the base concrete/slab shall be made good by laying the topping concrete to required slopes at the contractor's cost.
10. The base surface shall be thoroughly scrapped to remove lites, sand etc. washed clean and soaked with water until no more water is absorbed. A coat of a mixture of cement and water of the consistency of thick cream shall be brushed on to the surface just prior to placing the topping. The 1:2:3 concrete shall be laid on the surface immediately after the mixing is complete. It should be spread evenly to the required slope. The surface shall be rapidly compacted by ramming or beating, scrubbed to the uniform line and level and floated. Finally it shall be trowelled smooth before the initial set has commenced.
11. Concrete shall be laid in the bays of size as directed by the Chief Engineer or his representative. Cement vata at the edges shall be provided without extra cost, if so desired by the Chief Engineer or his representative.
12. Alternatively floors and slabs shall be finished with a topping of cement mortar (1:3) 15mm thick as Specified in the schedule.
13. Work on borders, skirting etc. shall be laid before the work of flooring is started. They shall be laid and finished in the same manner as flooring by using dividing strips or as directed. The rate for finishing flooring shall hold good for providing thread lining and skirting and dadoing etc. to the walls unless specified otherwise.
14. Wherever specified red oxide shall be mixed with cement in appropriate proportion and laid over the topping before it sets in the form of slurry to an even thickness of not less than 3mm. Necessary thread lining shall be provided if necessary as directed by the Chief Engineer or his representative without any extra cost.

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15. The quantity of red oxide used shall be at the rate of 0.75 kg/m². The final finishing shall be carried out as directed above. After final set the surface shall be kept wet by proper ponding or flooding for a period of not less than 21 days.

(B) MOSAIC TILES

16. The marble mosaic tiles shall be of good quality, hard, durable and of approved make and colour. The thickness of tile shall not be less than 20mm and of size 20x20 cm, 25cm x 25cm or as approved by the Chief Engineer or his representative. The colour and texture should be uniform. The thickness of joints should be uniform. The thickness of joint should not be more than 1.5mm (1/16").
17. The tiles shall be laid on a bedding of C.M. (1:6), 20mm thick average laid over the slab/ bedding concrete to the required slope. Neat cement grout of honey like consistency shall be spread over the mortar bed and the tiles shall be fixed in the grout. The tiles shall then be gently placed and pressed and brought to the required level. The excess mortar will ooze out from the joints. After the setting of tiles, the top surface shall be treated with cement screeding of the same colour of matrix of tiles so that all the joints are filled up. The floor shall then be kept cured for one week.
18. After the floor is set the top surface shall be machine polished and the dado hand polished by pumice stone and washed with oxalic acid. All tiles damaged or discoloured during the progress of polishing shall be replaced by good polished tiles.
19. After the surface has dried a final gloss shall be given by wax polishing the surface to the satisfaction of the Chief Engineer or his representative.
20. Necessary specials such as corner piece shall be used in the junction wherever directed without extra cost.

(C) WHITE GLAZED TILING

21. All white glazed tiles shall be of first class quality, pure white, uniform colour and glaze. They shall be from best Indian Manufacturer approved by the Chief Engineer or his representative. No chipped, cracked or warped tiles shall be used in the work. Fittings associated with glazed tiles viz. cover base round edge file, angles, corner cups etc. shall be provided wherever necessary without any extra cost. Similarly, half round channels shall be provided in the W.C. blocks whenever directed without extra cost. All the specifications shall conform to I.S. 777 latest edition.
22. Before spreading the cement mortar bedding the floor/wall be cleaned of all dirt, scum and of loose material and then wetted down without forming any water pools on the surface in the case of R.C. floors the top surface shall be kept rough and the surface shall be scoured with brush while the base concrete spread over the base by the use of screed battens. The thickness of this bedding shall be not less than 10mm and not more than 20mm in any place. The slightly rough surface left by the screeding board shall form a satisfactory key for tiles. Neat cement grout of honey like consistency shall be spread over the mortar bed and the tiles shall be fixed in this grout. As each tile is laid it shall be tapped with a wooden mallet till it is properly bedded and in level with adjoining tile. The joints between the tiles shall not exceed 1.5mm which shall be neatly pointed with white cement. The work shall conform to I.S. 1443 latest edition. All broken tiles shall be replaced with good ones.
23. White glazed tile skirting, where required shall be fixed only after laying the tiles on the floor. If tiles are to be fixed on walls (dado work) the portion of the wall shall be left unplastered. Before fixing the tiles on the walls, the surface shall be first wetted with clean water. It shall then be uniformly covered with coating of cement mortar average 15mm thick. Before it hardens the back of each tile to be fixed shall be covered with thin layer of neat cement paste and the tile shall be gently tapped against the wall ceramic tiles if used in floor/dado shall conform to latest I.S. specifications.
24. The entire work shall be cleaned of all paint, marks etc. and shall be washed with oxalic acid.

(D) MOSAIC IN SITU FINISHING FOR DADOING FOR WALLS AND STAIRCASE RAILINGS, STEPS ETC.

25. Marble chippings shall be of the colour or colours (mixed) in approved proportions as desired by the Chief Engineer or his representative. The chipping shall be of approved gauge and quality.
26. Cement shall be used in proportion of 30% white Portland cement of approved make and quality and 70% grey or coloured cement as required and as directed. The above proportions are liable to be altered if the required shade is not obtained.
27. 16 gauge 19mm wide aluminium strips shall be provided horizontally and vertically as directed.
28. **BASE COURSE:** The surface over which the terrazzo finish is to be applied shall be thoroughly cleaned of all dust, all joints in brick work raked to a depth of 10mm and all concrete surface neatly hacked, the surface then shall be watered profusely.
29. A base course of cement and sand mortar (1:3) and about 15mm thick shall be applied over this roughened surface
30. **FINISH COURSE:** This shall consist of 6mm thick layer of cement and marble chips mixed in the proportion of 1:2 (one part of cement and two parts of marble chips).

31. Be well trowelled into the surface of the base. The layer shall be well compacted and all obvious voids should be filled in with further materials. A layer of neat cement of specified colour is then to be well trowelled into the surface leaving a plain smooth surface.
32. After twenty four hours the surface shall be evenly and smoothly rubbed with carborandum blocks of coarse, medium and fine grades to ensure that all marble chips are evenly spread. If not due to bad workmanship, the contractor will have to pull down the surface and re-do the same.
33. The surface shall be left undisturbed for two or three weeks. After this period of surface shall be cleaned off dirt and dust by rubbing gently with pumice stone with sufficient water. If the surface has become dirty, it must be washed with washing soda. Three days after the surface has been cleaned, it will be rubbed hard with oxalic acid (1: 10) solution, using felt or old blanket. The surface then shall be cleaned and washed with plenty of water. After the surface has dried a final gloss shall be given by wax polishing the surface to the satisfaction of the Chief Engineer.
34. Waterproofing of terrace slabs etc. shall be done by any approved patented standard method and the specifications and details for the method proposed shall be given along with the tender. Any further particulars/details required by the Chief Engineer shall be furnished and the work shall be done accordingly to the method approved by the Chief Engineer. The average loading due to the method proposed per square metre area of the terrace slab also shall be indicated. The contractor should get the work of water proofing terrace done by the recognized firm and shall arrange to hand over a certificate from a firm to the department giving guarantee of minimum 10 years for satisfactory performance of the treatment. Any leakage, dampness etc., noticed during the guarantee period shall have to be repaired by the contractor through the appropriate agency at his own cost. A minimum slope of 1: 120 shall be generally given to the flat roof for effective drainage towards the down take pipe.
35. The measurement for payment shall be based on the plan area of roof clear of unfinished parapet walls and shall include the C.M. filling also. No allowance shall be made for the tar-felt vata laid vertically over the parapet and the portion taken inside chasing .
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CHAPTER IX

PLASTERING

1. Before the plastering work starts all joints in the masonry work shall be raked out to a minimum depth of 12mm and all R.C.C. and concrete surfaces shall be thoroughly hacked to the entire satisfaction of the Chief Engineer or his representative and the area to be plastered shall be washed and wetted thoroughly before plastering is commenced.
2. All service pipes, wires, etc., that are to be embedded in the masonry/plaster shall be completed and suitably protected against corrosion before plastering is begun.
3. The plastering more than 15mm thick shall be carried out in two coats unless otherwise specified.
4. Before the work is started patches of plaster shall be put at suitable intervals to ensure plumb and even thickness and plaster is applied in even squares or strips.
5. The first coat of cement mortar in the proportion as given in scheduled shall be applied uniformly all over the surface to thickness of minimum 10mm to 12mm with a trowel and flat board and in exact plumb. Identations shall then be made on the surface in the form of waves by a broom in order to form key for a second coat.
6. The second coat shall be applied after an interval of not less than 24 hours between first coat and finishing coat.
7. Unless otherwise specified, all the external plaster shall be sand faced and internal plaster finished smooth. The surface shall be tapped with cork piece or rubber sponges to give a desirable uniform sandy granular appearance for external surface. For external plaster the plastering operations may be started from the top floor and carried downwards.
8. The work shall conform to 1.5. 1661 latest edition in all respects.
9. The plastered surface shall be allowed to cure at least for seven days.
10. The plastering will be measured in square meters which shall include all lifts Deductions for openings shall be made as follows and no additions shall be made for reveals, joints, sills, etc., of these openings.
 - (i) When both faces of wall are plastered with the same plaster, deductions made for one face only.
 - (ii) When two faces of wall are plastered with different types of plasters, deductions shall be made from the plaster on the sides of frames for doors, windows etc., on which the width of reveals is less than that on the other side but no deductions shall be made on the other side. In case if the widths of revel are equal, deduction will be made from internal plastering area.
 - (iii) In case of openings of area above 3 sq.m. each deductions shall be made for the openings but jambs, soffits and sills shall be measured separately.
11. Measurements for plaster shall be the actual area of the wall to be provided with plaster measured above the skirting to the underside of the finished slab. The length for the wall will be between unplastered walls for the two opposite sides and between the plastered walls for the remaining two sides so as to exclude overlapping at corners.

12. For opening, deductions will be made for overall sizes of openings between unplastered walls, plaster for sides of opening will be measured separately but no allowance will be made for plaster within the plaster groove of the door and window frames. No deductions will be made for pipes and fittings. All moulding which will be required to be worked out true to a template and drawn neat, clean and level and all the exposed angles and junctions with door frames etc., shall be included in the rate for plastering. No extra amount will be paid for any architectural features in column capital and elsewhere. Vatas required to meet the skirting, pavement, weather shades, arises and chamfers at inward and outward corners of wall and joints of doors and windows etc., and for the plaster drip groove to be provided wherever directed measurements shall also comply with the requirements laid down in I.S. 1200 (latest edition)

ROUGH CAST CEMENT PLASTER

13. **COATS:** The plaster shall be laid in two coats. The first coat shall consist of 1 part of cement and 2 parts of clean and sharp sand. The thickness of the first coat shall be just sufficient to fill unevenness in the surface under treatment. The second coat shall consist of 1 part cement, 1 part of fine sand, 1 part of coarse sand or 6mm (1/4") size gravel. The thickness of this coat shall be 12 mm (1/2").
14. **APPLICATION:** The first coat shall be dashed on to the prepared surface with trowel to even up inequalities, but the surface shall not be smoothened. The second coat shall be applied while the first coat is still soft.
15. **MIXING:** Cement and sand shall be mixed dry in the proportion specified and water shall be added to form an easily worked paste. In no case shall mortar which has been allowed to stand for more than half an hour after mixing, be used.
16. The contractor shall prepare a samples batch of the rough cast plaster and get the same approved by the Chief Engineer. The exact extent of roughness etc. shall be as desired by the Chief Engineer and to his entire satisfaction.
17. **NEERU FINISH:** Neeru finish shall be made of best quality of lime slaked with fresh water and sifted lime neeru shall be mixed with finely chopped Hessian in the proportion of 0.8 kg. of hessian to 1 cu.m. of lime or as directed. The neeru i.e. weathered lime and hessian shall be kept moist until used on the work and not more than that required for 6 days of work should be prepared at a time.
18. Before commencing neeru finishing, the mortar that projects above the cement plaster surface shall be removed by brooming the surface with a steel trowel. If the contractor specially desires he may be allowed to apply neeru after plaster has finally set. Lime neeru shall be spread evenly to the minimum. practicable thickness over the well wetted plastered surface. The surface then shall be rubbed and finally trowelled to a fine uniform finish. All unevenness must be rubbed down with fine sand paper. The finished surface must be kept wet for a period of 4 days. If any cracks are noticed, these must be sprinkled with lime water and rubbed again with steel trowel till the surface is rendered smooth and crackless. Plaster of Paris shall be used for filling up cracks, if satisfactory surface without cracks are not obtained.

CHAPTER X

PAINTING CONCRETE, MASONRY & PLASTER SURFACES

a) OIL BOUND DISTEMPER:

1. The internal faces of walls and ceilings where specified shall be given two coats of oil bound distemper of approved make on one primary coat of warm glue as per specifications of approved manufacturer.
2. If the surface is rough a coat of Spanish white or chalk mixed with a solution of glue shall be employed to render the surface smooth. Holes and inequalities shall be filled with gypsum and be set before distempering. The coating shall be rubbed clean and as even as possible. The colour/shade of the distemper shall be as selected by the Chief Engineer. It shall not be mixed in large quantity than is actually required for a day's work and hot water should be used in preparing the mixture. It shall be applied as per specifications of approved manufacturer in dry weather with a broad stiff brush and only after the first coat has thoroughly dried, the second coat shall be laid on.
3. The first coat shall be of a lighter shade and the second one shall be of the exact selected shade. The second coat shall be applied allowing 24 hours after the 1st coat. The finished walls shall not show difference in shades, patches of uneven application of coats or hair marks from brush left on the distemper.

4. b) PLASTIC EMULSION PAINT:

The internal faces of walls where specified shall be given 2 coats of approved quality plastic emulsion paint. It shall be applied to a dry and non-absorbant surface. If the surface to be painted is not smooth, it shall be rendered with a solution made up of 5 parts by volume of plaster of paris to 4 parts of water and 3 parts of paint to obtain a smooth paste and brushed on to the surface. After this dries well (about 2 hours) it shall be rubbed down smooth with sand paper, before applying the paint. Two coats of paint shall give a satisfactory result allowing at least one hour interval between any 2 coats. It shall be applied by brush, roller or spray as directed by the Chief Engineer.

5. Surface previously painted shall be rubbed down by sand paper and thoroughly cleaned. Powdery surface shall first be given a coat of white cement and masonry primer before applying the paint.

6. c) WATER PROOF CEMENT PAINT:

Cement paint shall be of snowcem or other equivalent make approved by the Chief Engineer. Unless otherwise specified by the manufacturer, to one volume of water in a clean contained, two volumes of cement paint should be added and stirred in a tick paste. This paste should be diluted to suitable paint consistency by adding while stirring a further % to 1 volume of water. The quantity prepared each time shall not be more than one which can be used in one hour.

7. All surfaces to receive the cement paint shall be cleaned to remove loose dust or dirt by use of a stiff wire brush. The surface should be well wetted before starting the work, The first coat should be well brushed into the surface to form a good bond. Second coat should be applied carefully to give good finished appearance. Each cement paint application should be wetted at the end of the day with a fine water spray.
8. Measurements for the items of oil bound distemper, plastic emulsion paint and cement paint shall be in square metres of the portion actually covered without deductions for sanitary and water supply fittings and peg racks. Deductions for openings etc., shall be made as per plastering.
9. Cornices, hands and such other features shall be girthed and included in the wall measurements. All the operations and workmanship shall conform to r.S. 2395 (Part I and II) latest edition in all respects.
10. In case of painting exposed surfaces, the rate should cover painting of rain water, down-take pipes, soil pipe, ventilation pipes etc. No extra payment will be made on account of this or for highlighting in Architectural features , projections, flutings, bands, vata, etc.

11. The contractor shall be required to use paint for the work in quantities as per the covering capacity specified by the manufacturer for the particular paint approved by the Department.

12. d) WHITE WASHING AND COLOUR WASHING:

Lime for white washing shall be prepared from fresh burnt white stones lime or from shell lime. The lime shall be dissolved, soaked and mixed in a tub with a sufficient quantity of water and the whole well mixed after which it must be strained through a clean cloth. Clean gum Arabic dissolved in hot water or DDL shall then be added in the proportion of 2kg of gum per one cu.m. of lime. Blue shall be added in proportion desired by the Chief Engineer.

13. Each coat shall be laid on with a brush as follows: One coat with stroke of brush from the top downwards, another from the bottom upwards over the first stroke and similarly one stroke from left and another from the right over the first brush mark before it dries. Three coats shall be applied in this manner. Before white washing, the wall shall be well cleaned and brushed.
14. Colour wash shall be prepared by adding the necessary colouring matter such as yellow ochre to the white wash which has been strained. Quantity only sufficient for the day's work shall be prepared each morning. It shall be applied in the same way as white wash. The wash shall be stirred continuously during use. The colour and proportion of the mix shall be as directed by the Chief Engineer.

CHAPTER XI
PAINTING WOOD WORK AND IRON WORK

1. For painting wood, the work shall first be cleaned and all projections of glue or whiting matter shall be carefully removed and all the knots be filled with layers of oil and white lead and rubbed down when dry with sand paper. The surface shall be thoroughly dry before application of priming coat.
2. For wood work, unless otherwise specified a single coat of primer of approved make shall be applied. Surfaces coming in contact with brick work or masonry should be given two coats of coal tar before fixing the frame. It shall be smoothed lightly with fine sand paper. On this smooth surface two coats of paint of approved shade colour shall be applied evenly. The paint shall be of approved make synthetic enamel paint unless otherwise specified. A drying time of 24 hours shall be allowed between, each of coat.
3. For painting iron and steel work all the rust, mill scale, oil grease etc., shall be removed by wire brushing, sand papering or by chipping to obtain a clean and bright metal surface. Any grease, oil and such other stains shall be cleaned off using white spirit or any other suitable solvent. When it has dried, the surface shall be primed thoroughly with a coat of zinc chromite primer and shall be allowed to dry for 24 hours before the painting starts. The paint shall be of approved make synthetic enamel paint unless otherwise specified. A minimum of two coats shall be applied allowing a drying time of 24 hours between first and second coat unless otherwise specified.
4. For galvanized iron work, first the surface shall be treated with approved pre-treatment solution. The metal shall then be washed thoroughly with plenty of clean running water to remove all traces of chemical. Immediately after drying primary coat of zinc chromite shall be applied. It shall then be painted with two coats of approved paints as specified for iron work.
5. The contractor shall be required to use paints for the work in quantities as per covering capacity specified by the manufacturer for the particular paint approved by the department.
6. The rate quoted for painting shall include all the work of preparing the surface as directed, applications of necessary primer painting with adequate number of coats as specified in schedule.

7. FRENCH POLISHING:

Teak wood doors, windows, ventilator shutters, teak faced flush door shutters, teak wood partition boards etc., shall be given three coats of fresh polishing where specified in schedule. The polish shall be prepared as per standard mix approved by the Chief Engineer. All the work to be polished shall be first cleaned and scrapped thoroughly sand papered to a smooth surface and then polished with 3 coats to the entire satisfaction of the Chief Engineer. When ready mixed polish is not used it shall be prepared to the following specifications:

Methylated spirit	1 gal.
Ichapori Lac (shellac) IIb	.
. Camphor	40z.
Bedana	4 oz.
Ruma Mastaki	40z.
Revenchi	40z.
Incense	40z
Chandroos	4 oz.

8. Measurement for panting shall be in square meters. Necessary co-efficient for paint of plain area of uneven surfaces shall be applied as prescribed in I.S.1200 latest edition.

DAMP PROOF TREATMENT ABOVE GROUND LEVEL

9. The concrete or mortar bed on which the damp proofing treatment is to be laid shall be levelled and made free from projection liable to cause damage to the damp proofing treatment. The treatment should cover the full thickness of wall below. The treatment consists of applying 2 coats of hot bitumen or tar at the rate of 1.5 kg/m². The wall shall remain dry so that the first course of bitumen shall adhere without difficulty. A thin layer of sand shall be spread over the bitumen coating.

CHAPTER XII
WATER SUPPLY AND DRAINAGE

1. The trench for laying the pipes shall be so dug that the pipe can be laid to the required alignment and at the required depth. When the pipeline is under a road way or Rail way a minimum cover of 90cm. or as directed by the Chief Engineer shall be given.
2. The specification given for the earth work shall be applicable for the excavation and refilling of trenches, manholes, etc.
3. The pipes before being laid shall be thoroughly cleaned specially the inside of the pipes.
4. Cracked pipes shall altogether be rejected.
5. The socket end of the pipes shall always face up stream of effluent flow.
6. The drains shall run in perfect straight lines between manholes,
7. Trenches shall be of sufficient width to provide a free working space on each side of pipe. A minimum space of 15 cm. on either side of pipe shall be given for the working space.
8. Trenches shall be back filled immediately after the pipe has been laid and the joints fully tested, inspected and passed by the Chief Engineer.
9. Soft materials such as sand, fine gravel or other approved materials shall first be used for back filling and hand pressed under and around the pipes and this shall be moistened with water and well beaten with rammers. For the zone from the centre line of pipe to a level of 30cm. above top of pipe approved soft material shall be used for back filling and thoroughly consolidated as directed. The remainder of the trenches may be filled with hard materials or excavated material as directed.
10. Laying of stone ware pipe shall conform to LS. 4127 latest edition.
11. The whole of the sanitary works and water supply arrangements including all sanitary fittings and water supply fittings and fixtures in all respects shall be carried out in accordance with the relevant Indian Standard Specifications, local municipal regulations and to the entire satisfaction of Chief Engineer or his representative.
12. The drains, manholes, inspection chambers, gullies, etc. and all joints of pipes must be made thoroughly sound and water tight and any portion which may be proved to be leaking at any time during the progress of the work shall be immediately made sound by the contractor at his own cost.
13. All the water supply and sanitary works shall be tested as per relevant Indian Standard Specifications.
14. All pipes will be measured according to the work actually done by the contractor and no allowance will be made for any waste in cutting to the exact lengths required. In measuring lengths of pipes lid deduction shall be made for the length of channels between the inside faces of the walls of manholes.
15. The manholes and inspection chambers shall be constructed as per drawing supplied or as directed by Chief Engineer.
16. The depth shall be measured from the bottom of cover slab to the invert level of the inlet pipe to the manhole or Inspection chamber and according to the depth the payment will be made.
17. The rate quoted by the contractor shall include complete masonry structure, masonry corbel, plastered both inside and outside with cement plaster, bottom concrete and channels with C.L frame and cover, G.L steps, form work etc. all complete including the excavation, c.c. bedding R.c. precast slab if necessary with reinforcement, including pumping out water etc. unless otherwise specified.
18. Manholes covers and frames shall be of suitable quality grey cast iron not inferior to grade 15 of I.S. 210 latest edition.

19. The manholes shall be covered by R.C. slab suitably reinforced and the C.I. frame to be embedded on top if so used.
20. Where necessary, the cover frame shall be bedded on the masonry corbelled over to suit the size of cover frame to be used.
21. The frame shall be fixed properly by sides filled with cement concrete as directed by the Chief Engineer or his representatives.
22. In domestic premises or other places, where the manholes are not subjected to wheeled traffic loads, manholes covers of light duty single seal rectangular or square shall be used, unless otherwise specified.
23. If required, the contractor shall arrange to carry out load test for the manhole cover. When subjected to the loading test as specified in I.S. 1726 -latest edition, the light duty rectangular covers shall with stand a load of 1 tonne, without fracture for a minimum period of 30 secs.
24. All the specification shall conform to I.S. 1726 - latest edition.
25. Before fixing, the covers and frames shall be coated with two coats of approved anti-corrosion paint.

SANITARY PIPES, FITTINGS & FIXTURES

26. Stoneware pipes and fittings shall be of best quality stoneware, salt glazed and shall conform to I.S. 651 latest edition. All the joints shall be made perfectly air and water tight by caulking of tarred gaskets or hemp yam, sealed and neatly finished with cement mortar of proportion 1 :2.
27. PVC PIPES: The PVC pipes for using as water supply/waste water pipes etc. shall be high density polythene pipes of approved make and conforming to the working pressure as specified. The joining of the pipes, fixing the specials etc. shall be as specified by the manufacturer.
28. All cast iron soil pipes and fittings shall be of good quality C.I. cylindrical and of diameter specified. It shall be such that they could be cut drilled or machined. It shall conform to I.S. 1729-latest edition. Variation in diameter shall not be more than 5%.
29. All the concrete pipes used for sewers, water mains, rain water pipes etc. shall conform to I.S. 458 latest edition. All the joints shall be made with C.M. (1 :2) and rubber sealing rings, hemp yam etc. as specified by the manufacturer. Laying and jointing of concrete pipes shall be in accordance with the latest edition of I.S. 783. The rate shall also include jointing properly with C.I. pipes where directed.
30. The rain water gutter shall be fixed at the eaves of sloping roof. They shall be of G.I. sheet steel or Asbestos cement half round and shall have sufficient cross sectional area and slope to ensure collection and removal of water even in the case of the heaviest rainfall without risk of dangerous accumulation. Asbestos cement pipes, gutters and fittings shall be as per specifications of I.S. 1626 - latest editions and sheet metal rain water pipes and gutters shall conform to I.S. 1728 - latest edition. Generally a slope of not less than 1 in 150 shall be given for all the gutters. The rate shall include for necessary brackets made out of 50mm x 6mm flats fixing to trusses, painting etc.
31. Cast iron rain water pipes shall be as per specifications given in I.S. 1230 -latest edition. All C .I. pipes and fittings shall be treated with 2 coats of approved anticorrosive paint before being used. This treatment will be in addition to the shop paint and external painting to be carried out as per specifications.
32. Joints in C.I. pipes where used above ground shall be caulked joints made with a gasket of hemp or spun yam and sealed with white putty and neatly finished with cement mortar and perfectly air and water tight. The fixing of all gutters and down take pipes shall conform to I.S. 2527 -latest edition.
33. The C.I pipes and fittings above ground shall be first cleaned with sand paper , then painted with a coat of solvent of approved quality to remove the black colour of the pipes and there after pipes and fittings shall be painted with a coat of zinc chromite. The remaining two coats shall be of approved ready mixed paint of approved colours as directed by Chief engineer, They shall be in addition to the shop painting already done. The rate is inclusive of all painting.

34. The gap left in external wall after fixing the pipes and fittings shall be properly filled in with cement grouting (1 :3) smoothly finished. The cement grout will not be paid separately.
35. The wastes and soil collected in manholes and gullies shall be carried to the main sewer or septic tank constructed as per specifications and drawing supplied. The effluent from the septic tank is connected to the nearest drain or soak pits as directed.

WATER SUPPLY PIPES AND FITTINGS

36. The G.I. pipes and specials such as bends, sockets and tees should be of tested class 'B' quality unless specified otherwise free from cracks and corrosion. The thread portion of the pipe shall be applied with white lead before fixing.
37. All the G.I. pipes and fittings inside building shall be embedded in the masonry after applying 2 coats of tar and water proofing paper bound over the pipes and the walls shall be made good. G.I. pipes to be embedded in ground shall be similarly treated with 2 coats of tar and water-proofing paper.
38. The specified diameters shall be internal diameters.
39. All fittings of brass, chromium plated or Anodised Aluminium shall be of make approved by the Chief Engineer or his representative, and of the best approved quality.
40. **SANITARY APPLIANCES:** All white glazed porcelain sanitary fixtures such as W.C. pan, wash hand basin, urinal pans etc., shall be of best vitreous china and of make approved by the Chief Engineer or his representative. They shall in all respect conform to I.S. 2556 (Part I) latest edition.
41. **WASH BASINS:** They shall be of vitreous china and shall be provided with all accessories including chromium plated P-trap, a stop cock, wheel valve, lead pipes etc., as detailed in schedule. They shall comply with the requirements laid down in Part IV of I.S. 2556 and to size specified.
42. **WATER CLOSETS:** Indian type water closet pans shall be of vitreous china as specified front inlet type as directed by the Chief Engineer or his representative finished with all the requirements as per I.S. 2556 (Part-II). The items shall include connection to vent pipe and all the accessories such as flushing cistern, traps, lead connection, stop cock, wheel valve, overflow pipe, brackets, foot rests, mosquito proof coupling etc., of approved quality. The overflow pipe shall be taken along the wall upto the floor level.
43. **URINALS:** Urinal pans shall be of white glazed porcelain in free from cracks, indentation and other glazing defects, the type and pattern shall conform to Part VI of 2556 latest edition. The types shall be Bowl type and stall type as specified. The rate quoted for a particular type shall include all accessories including 5 litres automatic flushing cistern per urinal stall, unless otherwise specified.
44. The division plate or R.C. slab partition separating individual urinals in the case of bowl type urinals will be paid for separately.
45. All pipe connections from the cistern to the urinal shall be of chromium plated brass variety fixed to the wall by means of clips.
46. All the joints of pipes and fittings shall be made perfectly air and water tight.
47. The drain pipe provided for wash basin and urinals shall include all accessories such as tees, bends and stops etc. They shall be embedded in the wall or along the edge of wall covered with plaster without any additional cost.
48. **STALL URINALS:** The urinals shall be shanks colonial type or any other approved type of urinal stalls (single stall or range of 3 or more stalls) with lipped base of white glazed fire clay of size 114 x 46 x 40 cm. each with all approved Indian make, chromium plated fittings including marble partitions 25mm thick and of size 1.5 x 0.6m between the urinal stalls.
49. The marble for the partitions shall be of best quality available, machine polished in specified thickness shade and colour. It shall be free from cracks, crevices and ugly veins. It shall present an even, smooth surface and shall be cut truly square.
50. The width of excavation in trenches for laying cast iron cement pipes or S.W. pipe etc. will be measured as specified in CH.No. II CL NO.21.

CHAPTER XIII

ROADWORK

GENERAL: Unless otherwise specified, the width of the soling shall be 30cm more than the width of wearing surface. Chambers provided shall be as below for different surfaces.

1. Concrete surface 1 in 72
2. Black top surface 1 in 60
3. Water bound macadam surface 1 in 48 to 1 in 36.

On curve super elevation over the whole width shall be provided and shall not be less than the camber appropriate to the type of surface as prescribed.

Extra widths on the inside of pavements in curves shall be as follows:

Radius of curves: Upto 200'	201'-500'	501'-1000'	1001'-1500'	1501' & above
Extra width 4'	3'	2'	1'	Nil

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MACADAM SURFACE: The formation viz. the surface of road under the metalling and all the earth work involved for cutting, making embankments using earth brought from outside from the cutting required for the road shall be done as directed by the Chief Engineer.

No mud, slush, or water stuff from walls or springs and no decayed vegetable matter or rotten stuff of any kind shall be allowed to be put into embankments. All such materials taken out of excavation for the road work shall be placed on one side or disposed of as directed by the Chief Engineer.

All embankments shall be raised in regular layers of thickness as fixed by the Chief Engineer and shall be rammed and consolidated.

Unless otherwise ordered in cutting through high ground the excavation shall be made in steps down to the formation level with sides perpendicular or nearly so and the slope formed afterwards.

Earth from cutting when not required to be led into embankments shall be disposed of as directed by the Chief Engineer.

COLLECTION OF METAL: The metal used for road works shall be from quarries approved by the Chief Engineer.

All the road materials shall be thoroughly screened and freed from all earth etc., before stacking. They shall be stacked entirely clear away either upon berms and platforms provided for the purpose. All the road materials shall be examined and measured before it is spread.

SOLING: If specified soling shall be provided to the required thickness, the thickness mentioned shall be after rolling. The stone of size not less than 10cm shall be hand packed to the entire width of formation unless otherwise specified.

It shall be packed to the same camber as the road surface. It shall be rolled while the interstices are filled with stone chips, good gravel or murrum, as directed by the Chief Engineer. The rolling shall be continued until a hard-smooth surface is obtained.

SPREADING AND CONSOLIDATION: The thicknesses of metal to be laid on new road depend upon the nature and the extent of traffic and shall be as specified in the schedule. It shall be laid in layers not exceeding 8 cm in thickness, the lower layer being nearly consolidated with rollers before the next layer is put on. The thickness mentioned shall be the minimum thickness after consolidation.

The metal shall be consolidated by rolling and the rolling shall be continued until the surface is thoroughly hard and smooth. Rolling should be commenced from the edges and carried on towards the center of the road.

Where the road side strips are not to be metalled, wall tempered earth bunds about 20 cm width and to the height required shall be formed on each side of the road to prevent it spreading under consolidation. No extra payment will be made for those confining strips.

All surfacing shall be kept wet for 15 days after consolidation unless otherwise specified all the consolidation shall be carried out by using 5 ton roller if the metal is laterite and by 10 ton roller if the metal is of granite, grayish trap etc. Consolidation shall be considered complete when the sheets of rollers do not make any impression.

The finished surface of the road shall conform to the required levels and shall be without any hollows, humps or rough finish .

ASPHALT TREATED ROAD SURFACES:

BITUMEN AND ASPHALTS: The grade and quality of a binder shall be to suit the particular type of construction as specified in the schedule.

ROAD TAR: It shall be of specifications contained in the latest edition of I.S. 215.

The contractor shall obtain the particular binder from approved manufacturers of their authorized agents and deliver to the site in maker's sealed containers bearing markings or brand, make etc. They shall have to produce vouchers etc., if called upon to do so by the Chief Engineer.

ROLLER: Three wheel rollers shall be used for all types of surfacing for full rolling requirements. Tandem rollers used as finishing rollers. Rollers shall not be so heavy so as to crush the aggregate. For surface treatment and placing of thin layers of coarse aggregate to mixtures, rollers of 5 to 6 tons weights shall be sufficient to produce required compaction.

- a) Surface dressing with tar or bitumen one or two coats. It consists of application of a firm of bitumen on the surface of road.

It shall be laid on a fresh rolled water bound macadam surface, the surface shall be thoroughly cleared of loose metal dust etc., and scrapped thoroughly. Approved asphalt of 80-100 penetrations heated in a boiler to about 375°F and is either sprayed or poured on the surface in uniform layer at the rate of 2kg/m² avoiding fat spots or uncovered metal as directed by the Chief Engineer. Crushed stones for gritting shall consist of clean angular fragments of uniform high quality and shall be free of thin or elongated pieces soft or disintegrated stone, clay or other deleterious matter and graded to 10 to 15mm size .

Spraying shall be carried out parallel to the central line of the road. The edges of the surface to be treated, unless defined, by kerbs, etc., shall be marked by wire twine etc., stretched and pegged in position.

Gritting shall be done while the surface asphalted is still hot and spreading the same every at the rate of 1.5m³/100m². Where necessary it shall be broomed., Immediately after chips are spread rolling shall be done with a roller of such weight that the metal in the base or the gritting shall not be crushed.

The rolling is continued until the chippings are thoroughly embedded in the surface of the binder and the surface presents a firm uniform appearance throughout. The second coat shall be applied immediately after the first in the same manner described for first coat. The road shall be thrown open to traffic soon after final rolling.

Measurements shall be taken in two stages viz. measurements of road aggregate in stacks, measured not in compact stacks prepared on level ground and measurements of the complete work. The former is necessary to ensure that the required quantities of road aggregate have actually been collected and are of the sizes etc., as specified.

- b) Penetration Macadam: Full grouted penetration macadam surface consists of spreading the stones on the road, consolidating them lightly and then applying bitumen over the stones and allowing the bitumen to penetrate down through the interstices to the full depth of stones upto . every stone is covered in bitumen.

The specification covers the construction of a surface course of 8 cm to 5 cm compacted thickness upon a prepared base of suitable thickness and width using a hot bitumen binder

Mineral aggregate shall consist of clean, broken stone free from clay, earth dust or other deleterious matter.

Prior to spreading of aggregate, the base shall be brought to a uniform grade and cross section. It shall be well compacted and swept free of all loose foreign matter. Coarse aggregate of graded sizes 25mm to 40mm for 5cm thick and 40mm to 50mm for 8cm thick base shall be spread in a uniform loose layer. It shall then be rolled to look the stone metal. During rolling, the surface shall be examined and the metal added or removed as necessary to obtain uniformity. The grade and camber shall be checked. The rolled thickness of the base shall be 5cm or 8cm as specified in the schedule.

Paving asphalt 30/40 at a temperature of 350 to 375 degree F shall be applied at the rate specified in the Schedule. The stone metal shall be absolutely dry when the asphalt is applied.

As soon as the asphalt is applied, the intermediate aggregate of specified size metal shall be spread uniformly at the rate specified in the schedule. The binding shall be rolled hard with a drag broom behind the roller to ensure uniform distribution of the metal. Then the surface shall be brushed lightly to clean all the loose foreign material.

The seal coat using paving asphalt 80/100 at a temperature of 325 to 350 degreeF shall now be applied at the rate specified or as directed by the Chief Engineer. It shall be applied by means of suitable sprayer equipment and shall be poured longitudinally along the road.

Fine aggregate of size 6mm shall then be spread uniformly while the asphalt is still hot. The surface shall then be rolled and dragged until thoroughly bonded.

The surface shall be closed to traffic for 24 hours or as directed by the Chief Engineer.

- c) **Pre-mixed asphalt macadam:** It consists of a mixture of graded broken metal cut bank asphalt binder (Paving asphalt of 80/100 penetration mixed with approved asphalt solvent) laid in one course to a thickness of 25mm. The stone is used without heating. The asphalt shall be heated to a temperature of 325 degree F to 350 degree F.

Broken granite metal of sizes 20mm to 6mm graded shall be used for the work.

PREPARATION OF PREMIX: In this process known as "Hot cutback Process" the straight grade of asphalt with the solvent added at site or ready mixed product shall be used as directed by Chief Engineer. If the solvent is added at site, it shall be added to the molten asphalt just before it is poured into the mixer for mixing with the aggregate. For large premixing works a power driven Pugmill mixer shall be used as directed by Chief Engineer. All pot holes and depressions in the base shall be made good before the work is started. If the premix is laid over a black top surface, the potholes etc., shall be patched with a premix of crushed mineral aggregate and not cutbacks asphalt as directed by Chief Engineer. The pot holes and depressions in a water bound macadam surface shall be rectified with metal used for the original surface, it shall then be given a tackcoat with the same binder used for premix. The quantity of asphalt required for tack coat shall be 7.5kg per 10 sq.m. for a black top surface and shall be 10 kg per 10 sq. m. for a water bound surface.

PREMIXING AND LAYING: Chippings shall be coated with molten asphalt at the rate of 64kg/m³ of metal and spread uniformly over the tackcoat at the rate of 3.00m³/100m².

All the premixes shall be laid immediately after premixing the prepared base, shall not be dumped on the surface from wheel barrows. It shall first be placed on a clean metal sheet or platform outside of the area to be surfaced and showelled on to the surface and raked to the desired loose thickness to get the required thickness after consolidation. It shall be carefully done in such a manner that after the first passage of roller over the raked mixture a minimum quantity of back patching would be required. Laying of mixture shall be continuous as possible and the roller shall pass over the unprotected edge of the freshly laid mixture only at the end of the day's work and construction joints shall be formed at such places as directed by Chief Engineer.

During rolling the wheels of the roller shall be cleaned thoroughly and rubbed with an oily cloth or kept slightly moist with water in order to prevent the mixture sticking to the wheels of the roller. Rolling shall be carried out with a power roller of 10T capacity. The grade and chamber shall be checked during rolling and the premix's shall be spread as required.

SEAL COAT: It shall be applied immediately following the laying of above surface. The asphalt shall be applied by means of suitable sprayer equipment at a temperature of 350⁰P (at the rate of 1.0kg/m²). It shall be poured longitudinally along the road. It shall then be covered with stone grits immediately after the application of binder. The quantity of stone grit and binder required shall be as given in the schedule. It shall be rolled with a power roller and the surface shall remain closed to traffic for 24 hours or as directed by Chief Engineer.

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