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ITF

OFFICE OF THE SUPERINTENDING
ENGINEER
WEST CIRCLE, M.E.DIRECTORATE
GOVERNMENT OF WEST BENGAL
R.C.H. PROJECT ASANSOL
AGREEMENT NO. I

NATIONAL COMPETITIVE BIDDING
(CIVIL WORKS COSTING RS. 3 MILLION AND BELOW)

NAME OF WORK	:	Construction of 2 Nos.H.A.U.
PERIOD OF SALE OF BIDDING DOCUMENT	:	FROM 1.12.97 TO 30.12.97
LAST DATE AND TIME FOR RECEIPT OF BIDS	:	DATE 31.12.97 TIME 2.00 P.M. HOURS 14.00
* TIME AND DATE OF OPENING OF BIDS	:	DATE 31.12.97 TIME 2.30 P.M. HOURS 14.30 hrs.
PLACE OF OPENING OF BIDS		Burdwan Office of the Superintending Engineer, West Circle, Patal Bazar, Tinkonia
OFFICER INVITING BIDS		Superintending Engineer, West Circle, M.E.Directorate, Patal Bazar, Tinkonia, Burdwan.

* *Should be the same as for the deadline for receipt of bids or promptly thereafter.*

* Assumed

INVITATION FOR BID

(IFB)

GOVERNMENT OF WEST BENGAL
R.C.H. PROJECT

OFFICE OF THE SUPERINTENDING ENGINEER, WEST CIRCLE, M.E.DTE. PATAL BAZAR, TINKONIA, BURDWAN

INVITATIONS FOR BIDS (IFB)

NATIONAL COMPETITIVE BIDDING

Date: 1.12.97
Bid No.: 1

1. The Government of India has received / a credit from the Interim Trust Fund (ITF) administered by the International Development Association (IDA) in various currencies towards the cost of R.C.H. Project and intends to apply a part of the funds to cover eligible payments under the contracts for construction of works as detailed below. Bidders registered with the Government of W.B. and Bidders registered with other State Governments, Government of India, State and Central Government Undertakings, are eligible to bid for the works. Bidding is also open to all bidders from eligible source countries as established by the Interim Trust Fund and as defined in the *IBRD Guidelines for Procurement* (The countries which are as of date ineligible are listed in Section 9 of the bidding documents). **Bidders are advised to note the minimum qualification criteria specified in Clause 4 of the Instructions to Bidders to qualify for the award of the contract.**

2. The Superintending Engineer, West Circle, M.E.Dte. invites bids for the construction of works detailed in the table. The bidders may submit bids for any or all of the following works, for the package or for any of the slices.

3. Bidding documents (and additional copies) may be purchased from the office of the Suptd. Eng. West Circle, MED from 1.12.97 to 30.12.97 for a non-refundable fee (three sets) as indicated in the form of cash or Demand Draft on any Scheduled bank payable at Burdwan in favour of Suptd. Engr. West Circle, MED interested bidders may obtain further information at the same address. Bidding documents requested by mail will be despatched by registered/speed post on payment of an extra amount of Rs 500/- The Suptd. Engr. West Circle, MED will not be held responsible for the postal delay if any, in the delivery of the documents or non-receipt of the same.

4. Bids must be accompanied by security of the amount specified for the work in the table below, payable at Asansol and drawn in favour of Executive Engr. Asansol Div. M.E. Dte. Bid security will have to be in any one of the forms as specified in the bidding document and shall have to be valid for 45 days beyond the validity of the bid.

5. Bids must be delivered to the Office of the S.E., West Circle, MED on or before 14 hours on 31.12.97 (date) and will be opened on the same day at 14.30 hours, in the presence of the bidders who wish to attend. If the office happens to be closed on the date of receipt of the bid specified, the bids will be received and opened on the next working day at the same time and venue.

6. Other details can be seen in the bidding documents.

TABLE

Package No.	Name of work	Approximate value of work (Rs.)	Bid security (Rs.)	Cost of document (Rs.)	Period of completion
1	2	3	4	5	
1.	Construction of 2 Nos.HAU & HAU Units.	22,82,220/-	46,000/-	200/-	9 months

Seal of office

SECTION 1: INSTRUCTIONS TO BIDDERS (ITB)

Section 1: Instructions to Bidders

Table of Clauses

A. General

1. Scope of Bid

1.1 The S.E.West Circle,MED (referred to as Employer in these documents) invites bids for the construction of works (as defined in these documents and referred to as "the works") detailed in the table given in the Invitation for Bids (IFB). The bidders may submit bids for any or all of the works detailed in the table given in IFB.

1.2 The successful bidder will be expected to complete the works by the intended completion date specified in the Contract data.

2. Source of Funds

2.1 The Government of India has /received a credit from the Interim Trust Fund (ITF) administered by the International Development Association (IDA) in various currencies towards the cost of..... .....R.C.H.....Project and intends to apply a part of the funds to cover eligible payments under the contract for the Works. Payments by the IDA will be made only at the request of the borrower and upon approval of the IDA in accordance with the *Credit Agreement*, and will be subject in all respects to the terms and conditions of that Agreement. Except as the IDA may specifically otherwise agree, no party other than the borrower shall derive any rights from the *Credit Agreement* or have any rights to the credit proceeds.

2.2 The Credit agreement prohibits a withdrawal from the credit account for the purpose of any payment to persons or entities, or for any import of goods, if such payment or import, to the knowledge of the Bank, is prohibited by a decision of the United Nations Security Council, taken under Chapter VII of the Charter of the United Nations.

3. Eligible Bidders

3.1 This *Invitation for Bids* is open to all bidders from the eligible countries as defined under the *IBRD Guidelines for Procurement* and subject to applicable rules of Interim Trust Fund. As of date countries which are ineligible are listed in Section 9 of the bidding documents. Any materials, equipment, and services to be used in the performance of the Contract shall have their origin in the eligible source countries.

3.2 All bidders shall provide in Section 2, Forms of Bid and Qualification Information, a statement that the Bidder is not associated, nor has been associated in the past, directly or indirectly, with the Consultant or any other entity that has prepared the design, specifications, and other documents for the Project or being proposed as Project Manager for the Contract. A firm that has been engaged by the Borrower to provide consulting services for the preparation or supervision of the works, and any of its affiliates, shall not be eligible to bid.

3.3 Government-owned enterprises in the Employer's country may only participate if they are legally and financially autonomous, operate under commercial law and are not a dependent agency of the Employer.

3.4 Bidders shall not be under a declaration of ineligibility for corrupt and fraudulent practices issued by the Bank in accordance with sub-clause 37.1.

4. Qualification of the Bidder

4.1 All bidders shall provide in Section 2, Forms of Bid and Qualification Information, a preliminary description of the proposed work method and schedule, including drawings and charts, as necessary.

4.2 In the event that Pre-qualification of potential bidders has been undertaken, only bids from prequalified bidders will be considered for award for Contract. These qualified bidders should submit with their bids any information updating their original prequalification applications or, alternatively, confirm in their bids that the originally submitted prequalification information remains essentially correct as of date of bid submission. The update or confirmation should be provided in Section 2.

4.3 If the Employer has not undertaken prequalification of potential bidders, all bidders shall include the following information and documents with their bids in Section 2:

(a) copies of original documents defining the constitution or legal statues, place of registration, and principal place of business; written power of attorney of the signatory of the Bid to commit the Bidder;

(b) total monetary value of construction work performed for each of the last five years;

(c) experience in works of a similar nature and size for each of the last five years, and details of works under way or contractually committed; and clients who may be contacted for further information on those contracts;

(d) major items of construction equipment proposed to carry out the Contract;

(e) qualifications and experience of key site management and technical personnel proposed for the Contract;

(f) reports on the financial standing of the Bidder, such as profit and loss statements and auditor's reports for the past five years;

(g) evidence of adequacy of working capital for this contract (access to line (s) of credit and availability of other financial resources);

(h) authority to seek references from the Bidder's bankers;

(i) information regarding any litigation, current or during the last five years, in which the Bidder is involved, the parties concerned, and disputed amount;and

(j) proposals for subcontracting components of the Works amounting to more than 10 percent of the Contract Price.

4.4 Bids from Joint ventures are not acceptable.

4.5 A. **To qualify for award of the contract, each bidder in its name should have in the last five years:**
i.e 1992-93 to 1996-97.

(a) achieved a minimum annual financial turnover (in all classes of civil engineering construction works only) of Rs. 30 lakhs @ in any one year
in the contract);

(b) Satisfactorily completed (not less than 90% of contract value) as a prime contractor of at least one similar work of value not less than Rs. 11.40 lakhs @

(c) The contractor or his identified sub-contractor should possess required valid electrical license for executing the building electrification works and should have executed similar electrical works totalling Rupees 1.10 lakhs @** in any one year.

(d) The Contractor or his identified sub-contractor should possess required valid license for executing the water supply/sanitary engineering works and should have executed similar water supply/sanitary engineering works totalling Rupees 90,000 @ 1997-98 price level in any one year.

(a) at _____ * price level. Financial turnover and cost of completed works of previous years shall be given weightage of 10% per year based on rupee value to bring them to 1997-98 price level.

4.5 B. 4.5 B deleted:

4.5 C. **To qualify for a package of contracts made up of this and other contracts for which bids are invited in the IFB, the bidder must demonstrate having experience and resources sufficient to meet the aggregate of the qualifying criteria for the individual contracts.**

4.6 Sub-contractors' experience and resources shall not be taken into account in determining the bidder's compliance with the qualifying criteria except to the extent stated in para 4.5 (A) above.

4.7 Bidders who meet the minimum qualification criteria will be qualified only if their available bid capacity is more than the total bid value. The available bid capacity will be calculated as under:

Assessed Available Bid capacity = (A*N*2 - B)

where

A = Maximum value of civil engineering works executed in any one year during the last five years (updated to 1997-98 price level) taking into account the completed as well as works in progress.

N = Number of years prescribed for completion of the works for which bids are invited.

B = Value, at 1997-98 price level, of existing commitments and on-going works to be completed during the next 9months (period of completion of the works for which bids are invited)

Note: The statements showing the value of existing commitments and on-going works as well as the stipulated period of completion remaining for each of the works listed should be countersigned by the Engineer in charge, not below the rank of an Executive Engineer.

4.8 Even though the bidders meet the above qualifying criteria, they are subject to be disqualified if they have:

- made misleading or false representations in the forms, statements and attachments submitted in proof of the qualification requirements; and/or

- record of poor performance such as abandoning the works, not properly completing the contract, inordinate delays in completion, litigation history, or financial failures etc.

5. One Bid per Bidder

5.1 Each bidder shall submit only one bid. A bidder who submits or participates in more than one Bid (other than as a subcontractor or in cases of alternatives that have been permitted or requested) will cause all the proposals with the Bidder's participation to be disqualified.

6. Cost of Bidding

6.1 The bidder shall bear all costs associated with the preparation and submission of his Bid, and the Employer will in no case be responsible and liable for those costs.

7. Site visit

7.1 The Bidder, at the Bidder's own responsibility and risk is encouraged to visit and examine the Site of Works and its surroundings and obtain all information that may be necessary for preparing the Bid and entering into a contract for construction of the Works. The costs of visiting the Site shall be at the Bidder's own expense.

B. Bidding Documents

8. Content of Bidding Documents

8.1 The set of bidding documents comprises the documents listed in the table below and addenda issued in accordance with Clause 10:

		Invitation for Bids
Section	1	Instructions to Bidders
	2	Forms of Bid and Qualification Information
	3	Conditions of Contract
	4	Contract Data
	5	Specifications
	6	Drawings
	7	Bill of Quantities
	8	Forms of Securities
	9	Eligibility for the Provision of Goods, Works and Services.

8.2 Of three sets of the bidding documents supplied, two sets should be completed and returned with the bid.

9. Clarification of Bidding Documents

9.1 A prospective bidder requiring any clarification of the bidding documents may notify the Employer in writing or by cable (hereinafter "cable" includes telex and facsimile) at the Employer's address indicated in the invitation to bid. The Employer will respond to any request for clarification which he received earlier than 15 days prior to the deadline for submission of bids. Copies of the Employer's response will be forwarded to all purchasers of the bidding documents, including a description of the enquiry but without identifying its source.

10. Amendment of Bidding Documents

10.1 Before the deadline for submission of bids, the Employer may modify the bidding documents by issuing addenda.

10.2 Any addendum thus issued shall be part of the bidding documents and shall be communicated in writing or by cable to all the purchasers of the bidding documents. Prospective bidders shall acknowledge receipt of each addendum by cable to the Employer.

10.3 To give prospective bidders reasonable time in which to take an addendum into account in preparing their bids, the Employer shall extend as necessary the deadline for submission of bids, in accordance with Sub-Clause 20.2 below.

C. Preparation of Bids

11. Language of the Bid

11.1 All documents relating to the bid shall be in the English language.

12. Documents comprising the Bid

12.1 The bid submitted by the bidder shall comprise the following:

(a) The Bid (in the format indicated in Section 2).
(b) Bid Security;
(c) Priced Bill of Quantities;
(d) Qualification Information Form and Documents;

and any other materials required to be completed and submitted by bidders in accordance with these instructions. The documents listed under Sections 2, 4 and 7 of Sub-Clause 8.1 shall be filled in without exception.

13. Bid Prices

13.1 The contract shall be for the whole works as described in Sub-Clause 1.1, based on the priced Bill of Quantities submitted by the Bidder.

13.2 The bidder shall fill in rates and prices for all items of the Works described in the Bill of Quantities. *Items for which no rate or price is entered by the bidder will not be paid for by the Employer when executed and shall be deemed covered by the other rates and prices in the Bill of Quantities.* Corrections, if any, shall be made by crossing out, initialling, dating and rewriting.

13.3 All duties, taxes, and other levies payable by the contractor under the contract, or for any other cause, shall be included in the rates, prices and total Bid Price submitted by the Bidder.

13.4 The rates and prices quoted by the bidder shall be fixed for the duration of the Contract and shall not be subject to adjustment on any account.

14. Currencies of Bid and Payment

14.1 The unit rates and the prices shall be quoted by the bidder entirely in Indian Rupees.

15. Bid Validity

15.1 Bids shall remain valid for a period not less than ninety days after the deadline date for bid submission specified in Clause 20. A bid valid for a shorter period shall be rejected by the Employer as non-responsive.

15.2 In exceptional circumstances, prior to expiry of the original time limit, the Employer may request that the bidders may extend the period of validity for a specified additional period. The request and the bidders' responses shall be made in writing or by cable. A bidder may refuse the request without forfeiting his bid security. A bidder agreeing to the request will not be required or permitted to modify his bid except as provided in 15.3 hereinafter, but will be required to extend the validity of his bid security for a period of the extension, and in compliance with Clause 16 in all respects.

15.3 In the case of contracts in which the Contract Price is fixed (not subject to price adjustment), in the event that the purchaser requests and the Bidder agrees to an extension of the validity period, the contract price, if the Bidder is selected for award shall be the bid price corrected as follows :

The price shall be increased by the factor of 5% per annum for each week or part of a week that has elapsed from the expiration of the initial bid validity to the date of issue of letter of acceptance to the successful Bidder.

15.4 Bid evaluation will be based on the bid prices without taking into consideration the above correction.

16. Bid Security

16.1 The Bidder shall furnish, as part of his Bid, a Bid security in the amount as shown in column 4 of the table of IFB for this particular work. This bid security shall be in favour of Executive Engineer, Asansol Division, M.E.Dte. and may be in one of the following forms:

- a bank guarantee issued by a nationalised / Scheduled Bank located in India or a Bank located abroad acceptable to the Employer in the form given in Section 8; or
- Certified cheque/ Bank draft/Letter of credit, in favour of Executive Engineer, Asansol Divn., M.E.Dte., payable at Asansol, National Savings Certificate duly pledged in favour of Executive Engineer, Asansol Division, M.E.Dte., Asansol.

16.2 Bank guarantees (and other instruments having fixed validity) issued as surety for the bid shall be valid for 45 days beyond the validity of the bid.

16.3 Any bid not accompanied by an acceptable Bid Security and not secured as indicated in Sub-Clauses 16.1 and 16.2 above shall be rejected by the Employer as non-responsive.

16.4 The Bid Security of unsuccessful bidders will be returned within 28 days of the end of the bid validity period specified in Sub-Clause 15.1.

16.5 The Bid Security of the successful bidder will be discharged when the bidder has signed the Agreement and furnished the required Performance Security.

16.6 The Bid Security may be forfeited

(a) if the Bidder withdraws the Bid after Bid opening during the period of Bid validity;

(b) if the Bidder does not accept the correction of the Bid Price, pursuant to Clause 27; or

(c) in the case of a successful Bidder, if the Bidder fails within the specified time limit to

(i) sign the Agreement; or
(ii) furnish the required Performance Security.

17. Alternative Proposals by Bidders

17.1 Bidders shall submit offers that comply with the requirements of the bidding documents, including the basic technical design as indicated in the drawing and specifications. Alternatives will not be considered.

18. Format and Signing of Bid

18.1 The Bidder shall prepare one original and a copy of the documents comprising the bid as described in Clause 12 of these *Instructions to Bidders*, bound with the volume containing the Form of Bid, and clearly marked "**ORIGINAL**" and "**COPY**" as appropriate. In the event of discrepancy between them, the original shall prevail.

18.2 The original and a copy of the Bid shall be typed or written in indelible ink and shall be signed by a person or persons duly authorized to sign on behalf of the Bidder, pursuant to Sub-Clauses 4.3. All pages of the bid where entries or amendments have been made shall be initialled by the person or persons signing the bid.

18.3 The Bid shall contain no alterations or additions, except those to comply with instructions issued by the Employer, or as necessary to correct errors made by the bidder, in which case such corrections shall be initialled by the person or persons signing the bid.

18.4 The Bidder shall furnish information as described in the Form of Bid on commissions or gratuities, if any, paid or to be paid to agents relating to this Bid, and to contract execution if the Bidder is awarded the contract .

D. Submission of Bids

19. Sealing and Marking of Bids

19.1 The Bidder shall seal the original and a copy of the Bid in separate envelopes, duly marking the envelopes as "**ORIGINAL**" and "**COPY**". These envelopes (called as inner envelopes) shall then be put inside one outer envelope.

19.2 The inner and outer envelopes shall

(a) be addressed to the Employer at the following address:
Superintending Engineer, West Circle, M.E.Dte.
Patal Bazar, Tinkonia, Burdwan.
(insert address of office for bid submission), and

(b) bear the following identification:

- Bid for .....[name of contract]
- Bid Reference No.....[insert number]
- DO NOT OPEN BEFORE.....[time and date for bid opening, per Clause 23]

19.3 In addition to the identification required in Sub-Clause 19.2, the inner envelopes shall indicate the name and address of the bidder to enable the bid to be returned unopened in case it is declared late, pursuant to Clause 21.

19.4 If the outer envelope is not sealed and marked as above, the Employer will assume no responsibility for the misplacement or premature opening of the bid.

20. Deadline for Submission of the Bids

20.1 Bids must be received by the Employer at the address specified above no later than 2 P.M. on 31.12.97 In the event of the specified date for the submission of bids being declared a holiday for the Employer, the Bids will be received upto the appointed time on the next working day.

20.2 The Employer may extend the deadline for submission of bids by issuing an amendment in accordance with Clause 10, in which case all rights and obligations of the Employer and the bidders previously subject to the original deadline will then be subject to the new deadline.

21. Late Bids

21.1 Any Bid received by the Employer after the deadline prescribed in Clause 20 will be returned unopened to the bidder.

22. Modification and Withdrawal of Bids

22.1 Bidders may modify or withdraw their bids by giving notice in writing before the deadline prescribed in Clause 20.

22.2 Each Bidder's modification or withdrawal notice shall be prepared, sealed, marked, and delivered in accordance with Clause 18 & 19, with the outer and inner envelopes additionally marked "MODIFICATION" or "WITHDRAWAL", as appropriate.

22.3 No bid may be modified after the deadline for submission of Bids.

22.4 Withdrawal or modification of a Bid between the deadline for submission of bids and the expiration of the original period of bid Validity specified in Clause 15.1 above or as extended pursuant to Clause 15.2 may result in the forfeiture of the Bid security pursuant to Clause 16.

22.5 Bidders may only offer discounts to, or otherwise modify the prices of their Bids by submitting Bid modifications in accordance with this clause, or included in the original Bid submission.

E. Bid Opening and Evaluation

23. Bid Opening

23.1 The Employer will open all the Bids received (except those received late), including modifications made pursuant to Clause 22, in the presence of the Bidders or their representatives who choose to attend at 14:30 hours on the date and the place specified in Clause 20. In the event of the specified date of Bid opening being declared a holiday for the Employer, the Bids will be opened at the appointed time and location on the next working day.

23.2 Envelopes marked "WITHDRAWAL" shall be opened and read out first. Bids for which an acceptable notice of withdrawal has been submitted pursuant to Clause 22 shall not be opened.

23.3 The Bidders' names, the Bid prices, the total amount of each Bid and of any alternative Bid (if alternatives have been requested or permitted), any discounts, Bid modifications and withdrawals, the presence or absence of Bid security, and such other details as the Employer may consider appropriate, will be announced by the Employer at the opening. Any Bid price, discount, or alternative Bid price which is not read out and recorded at Bid opening will not be taken into account in Bid evaluation.

23.4 The Employer shall prepare minutes of the Bid opening, including the information disclosed to those present in accordance with Sub-Clause 23.3.

24. Process to Be Confidential

24.1 Information relating to the examination, clarification, evaluation, and comparison of Bids and recommendations for the award of a contract shall not be disclosed to Bidders or any other persons not officially concerned with such process until the award to the successful Bidder has been announced. Any

effort by a Bidder to influence the Employer's processing of Bids or award decisions may result in the rejection of his Bid.

25. Clarification of Bids

25.1 To assist in the examination, evaluation, and comparison of Bids, the Employer may, at his discretion, ask any Bidder for clarification of the Bidder's Bid, including breakdowns of unit rates. The request for clarification and the response shall be in writing or by cable, but no change in the price or substance of the Bid shall be sought, offered, or permitted except as required to confirm the correction of arithmetic errors discovered by the Employer in the evaluation of the Bids in accordance with Clause 27.

25.2 Subject to sub-clause 25.1, no Bidder shall contact the Employer on any matter relating to its bid from the time of the bid opening to the time the contract is awarded. If the Bidder wishes to bring additional information to the notice of the Employer, it should do so in writing.

25.3 Any effort by the Bidder to influence the Employer in the Employer's bid evaluation, bid comparison or contract award decisions may result in the rejection of the Bidders' bid.

26. Examination of Bids and Determination of Responsiveness

26.1 Prior to the detailed evaluation of Bids, the Employer will determine whether each Bid (a) meets the eligibility criteria defined in Clause 3; (b) has been properly signed; (c) is accompanied by the required securities and; (d) is substantially responsive to the requirements of the Bidding documents.

26.2 A substantially responsive Bid is one which conforms to all the terms, conditions, and specifications of the Bidding documents, without material deviation or reservation. A material deviation or reservation is one (a) which affects in any substantial way the scope, quality, or performance of the Works; (b) which limits in any substantial way, inconsistent with the Bidding documents, the Employer's rights or the Bidder's obligations under the Contract; or (c) whose rectification would affect unfairly the competitive position of other Bidders presenting substantially responsive Bids.

26.3 If a Bid is not substantially responsive, it will be rejected by the Employer, and may not subsequently be made responsive by correction or withdrawal of the nonconforming deviation or reservation.

27. Correction of Errors

27.1 Bids determined to be substantially responsive will be checked by the Employer for any arithmetic errors. Errors will be corrected by the Employer as follows:

(a) where there is a discrepancy between the rates in figures and in words, the rate in words will govern; and

(b) where there is a discrepancy between the unit rate and the line item total resulting from multiplying the unit rate by the quantity, the unit rate as quoted will govern.

27.2 The amount stated in the Bid will be adjusted by the Employer in accordance with the above procedure for the correction of errors and, with the concurrence of the Bidder, shall be considered as binding upon the Bidder. If the Bidder does not accept the corrected amount the Bid will be rejected, and the Bid security may be forfeited in accordance with Sub-Clause 16.6 (b).

28. Deleted

29. **Evaluation and Comparison of Bids**

29.1 The Employer will evaluate and compare only the Bids determined to be substantially responsive in accordance with Clause 26.

29.2 In evaluating the Bids, the Employer will determine for each Bid the evaluated Bid Price by adjusting the Bid Price as follows:

(a) making any correction for errors pursuant to Clause 27; or

(b) making an appropriate adjustments for any other acceptable variations, deviations; and

(c) making appropriate adjustments to reflect discounts or other price modifications offered in accordance with Sub Clause 22.5.

29.3 The Employer reserves the right to accept or reject any variation, deviation, or alternative offer. Variations, deviations, and alternative offers and other factors which are in excess of the requirements of the Bidding documents or otherwise result in unsolicited benefits for the Employer shall not be taken into account in Bid evaluation.

29.4 The estimated effect of the price adjustment conditions under Clause 47 of the *Conditions of Contract*, during the period of implementation of the Contract, will not be taken into account in Bid evaluation.

29.5 If the Bid of the successful Bidder is seriously unbalanced in relation to the Engineer's estimate of the cost of work to be performed under the contract, the Employer may require the Bidder to produce detailed price analyses for any or all items of the Bill of Quantities, to demonstrate the internal consistency of those prices with the construction methods and schedule proposed. After evaluation of the price analyses, the Employer may require that the amount of the performance security set forth in Clause 34 be increased at the expense of the successful Bidder to a level sufficient to protect the Employer against financial loss in the event of default of the successful Bidder under the Contract.

30. **Deleted**

F. Award of Contract

31. **Award Criteria**

31.1 Subject to Clause 32, the Employer will award the Contract to the Bidder whose Bid has been determined to be substantially responsive to the Bidding documents and who has offered the lowest evaluated Bid Price, provided that such Bidder has been determined to be (a) eligible in accordance with the provisions of Clause 3, and (b) qualified in accordance with the provisions of Clause 4.

32. **Employer's Right to Accept any Bid and to Reject any or all Bids**

32.1 Notwithstanding Clause 31, the Employer reserves the right to accept or reject any Bid, and to cancel the Bidding process and reject all Bids, at any time prior to the award of Contract, without thereby incurring any liability to the affected Bidder or Bidders or any obligation to inform the affected Bidder or Bidders of the grounds for the Employer's action.

33. **Notification of Award and Signing of Agreement**

33.1 The Bidder whose Bid has been accepted will be notified of the award by the Employer prior to expiration of the Bid validity period by cable, telex or facsimile confirmed by registered letter. This letter (hereinafter and in the *Conditions of Contract* called the "Letter of Acceptance") will state the sum that the Employer

will pay the Contractor in consideration of the execution, completion, and maintenance of the Works by the Contractor as prescribed by the Contract (hereinafter and in the Contract called the "Contract Price").

33.2 The notification of award will constitute the formation of the Contract, subject only to the furnishing of a performance security in accordance with the provisions of Clause 34.

33.3 The Agreement will incorporate all agreements between the Employer and the successful Bidder. It will signed by the Employer and sent to the successful Bidder, within 28 days following the notification of award along with the Letter of Acceptance. Within 21 days of receipt, the successful Bidder will sign the Agreement and deliver it to the Employer.

33.4 Upon the furnishing by the successful Bidder of the Performance Security, the Employer will promptly notify the other Bidders that their Bids have been unsuccessful.

34. **Performance Security**

34.1 Within 21 days of receipt of the Letter of Acceptance, the successful Bidder shall deliver to the Employer a Performance Security in any of the forms given below for an amount equivalent to 5% of the Contract price plus additional security for unbalanced Bids in accordance with *Clause 29.5 :*

- a bank guarantee in the form given in Section 8; or
- Certified cheque/Bank draft, in favour of ... . payable at ... Executive Engineer, Asansol Divn. M.E. Dte. Asansol
- National Savings Certificate pledged in favour of Executive Engineer, Asansol Divn. M. E. Dte.

34.2 If the performance security is provided by the successful Bidder in the form of a Bank Guarantee, it shall be issued either (a) at the Bidder's option, by a Nationalized/Scheduled Indian bank or (b) by a foreign bank located in India and acceptable to the Employer .

34.3 Failure of the successful Bidder to comply with the requirements of Sub-Clause 34.1 shall constitute sufficient grounds for cancellation of the award and forfeiture of the Bid Security.

35 **Advance Payment and Security (deleted)**

36. **Adjudicator (deleted)**

37. **Corrupt or Fraudulent Practices**

37.1 The Bank requires that Borrowers (including beneficiaries of Bank loans), as well as Bidders/Suppliers/Contractors under Bank-financed contracts, observe the highest standard of ethics during the procurement and execution of such contracts. In pursuance of this policy, the Bank :

(a) defines, for the purposes of this provision, the terms set forth below as follows :

(i) "corrupt practice" means the offering, giving, receiving or soliciting of any thing of value to influence the action of a public official in the procurement process or in contract execution; and

(ii) "fraudulent practice" means a misrepresentation of facts in order to influence a procurement process or the execution of a contract to the detriment of the Borrower, and includes collusive practice among Bidders (prior to or after bid submission) designed to

establish bid prices at artificial non-competitive levels and to deprive the Borrower of the benefits of free and open competition.

(b) will reject a proposal for award if it determines that the Bidder recommended for award has engaged in corrupt or fraudulent practices in competing for the contract in question;

(c) will declare a firm ineligible, either indefinitely or for a stated period of time, to be awarded a Bank-financed contract if it at any time determines that the firm has engaged in corrupt or fraudulent practices in competing for, or in executing, a Bank-financed contract.

37.2 Furthermore, Bidders shall be aware of the provision stated in sub-clause 23.2 and sub-clause 59.2 of the General Conditions of Contract.

SECTION 2: FORMS OF BID, QUALIFICATION INFORMATION AND LETTER OF ACCEPTANCE

TABLE OF FORMS:

- CONTRACTOR'S BID
- QUALIFICATION INFORMATION
- LETTER OF ACCEPTANCE
- NOTICE TO PROCEED WITH THE WORK
- AGREEMENT FORM

Contractor's Bid

Description of the Works: _____

_____

_____

_____

BID

To : _____ [the Employer]

Address : _____

_____

GENTLEMEN,

We offer to execute the Works described above in accordance with the Conditions of Contract accompanying this Bid for the Contract Price of _____ *[in figures]* (_____)*[in letters]*.[2]

This Bid and your written acceptance of it shall constitute a binding contract between us. We understand that you are not bound to accept the lowest or any Bid you receive.

Commissions or gratuities, if any, paid or to be paid by us to agents relating to this Bid, and to contract execution if we are awarded the contract, are listed below :

Name and address of agent	Amount	Purpose of Commission or gratuity
_____	_____	_____
_____	_____	_____
_____	_____	_____

(if none, state "none")

_____

2 To be filled in by the Employer before issue of the Bidding Documents.

3 To be filled in by the Bidder, together with his particulars and date of submission at the bottom of the Form of Bid.

We hereby confirm that this Bid complies with the Bid Validity and Bid Security required by the Bidding documents.

Yours faithfully,

Authorized Signature:

Name & Title of Signatory: _____

Name of Bidder : _____

Address : _____

Qualification Information

The information to be filled in by the Bidder in the following pages will be used for purposes of postqualification as provided for in Clause 4 of the Instructions to Bidders. This information will not be incorporated in the Contract.

1. **For Individual Bidders**

1.1 Constitution or legal status of Bidder
[Attach copy]

Place of registration: _____

Principal place of business: _____

Power of attorney of signatory of Bid
[Attach copy]

1.2 Total value of Civil Engineering construction work performed in the last five years (in Rs. Million)

1992 - 1993 _____
1993 - 1994 _____
1994 - 1995 _____
1995 - 1996 _____
1996 - 1997 _____

1.3 Work performed as prime contractor (in the same name) on works of a similar nature over the last five years. i.e. 1992-93 to 1996-97

Project Name	Name of Employer*	Description of work	Contract No.	Value of contract (Rs. Million)	Date of issue of work order	Stipulated period of completion	Actual date of completion*	Remarks explaining reasons for delay and work completed

1.4 Information on Bid Capacity (works for which bids have been submitted and works which are yet to be completed) as on the date of this bid.

* *Enclose certificate(s) from Engineer(s)-in-charge.*

(A) Existing commitments and on-going works:

Description of Work	Place & State	Contract No. and Date	Name and address of of the employer	Value of Contract (Rs. million)	Stipulated period of completion (Rs. million)	Value of works* remaining to be completed (Rs. million)	Anticipated date of completion
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)

(B) Works for which bids already submitted:

Description of Work	Place & State	Estimated value of works (Rs. millions)	Stipulated period of completion	Date when decision is expected	Remarks if any
(1)	(2)	(3)	(4)	(5)	(6)

* *Enclose certificate(s) from the Engineer(s)-in-Charge.*

1.5 Proposed subcontracts and firms involved. [Refer ITB Clause 4.3 (j)].

Sections of the works	Value of Sub-contract	Sub-contractor (name and address)	Experience in similar work
*	*	*	*
	*	*	
*	*	*	*
	*	*	
*	*	*	*
	*	*	

1.6 Financial reports for the last five years: balance sheets, profit and loss statements, auditors' reports (in case of companies/corporation), etc. List them below and attach copies.

1.7 Evidence of access to financial resources to meet the qualification requirements: cash in hand, lines of credit, etc. List them below and attach copies of support documents.

1.8. Name, address, and telephone, telex, and fax numbers of the Bidders' bankers who may provide references if contacted by the Employer.

1.9 Information on litigation history in which the Bidder is involved.

Other party(ies)	Employer	Cause of dispute	Amount involved	Remarks showing present status

1.10 Statement of compliance under the requirements of Sub Clause 3.2 of the instructions to Bidders.

Letter of Acceptance
(letterhead paper of the Employer)

_____[date]

To: _____[name and address of the Contractor]

Dear Sirs,

This is to notify you that your Bid dated _____ for execution of the _____ _____ [name of the contract and identification number, as given in the Instructions to Bidders] for the Contract Price of Rupees _____ (_____) [amount in words and figures], as corrected and modified in accordance with the Instructions to Bidders[1] is hereby accepted by our Agency.

You are hereby requested to furnish Performance Security, plus additional security for unbalanced bids in terms of ITB Clause 29.5, in the form detailed in Para 34.1 of ITB for an amount of Rs.———— within 21 days of the receipt of this letter of acceptance valid upto 28 days from the date of expiry of Defects Liability Period i.e. upto ..... and sign the contract, failing which action as stated in Para 34.3 of ITB will be taken.

Yours faithfully,

Authorized Signature

Name and Title of Signatory

Superintending Engineer,West Circle, MED.

Name of Agency

Municipal Engineering Directorate
Deptt. of Municipal Affairs
Govt.of West Bengal

---

1 Delete "corrected and" or "and modified" if only one of these actions applies. Delete "as corrected and modified in accordance with the Instructions to Bidders" if corrections or modifications have not been effected.

Issue of Notice to proceed with the work

(letterhead of the Employer)

2.2.98 (date)

To

_____ (name and address of the Contractor)

_____

_____

Dear Sirs:

Pursuant to your furnishing the requisite security as stipulated in ITB Clause 34.1 and signing of the contract for the construction of 2 Nos. H.T. @ a Bid Price of Rs._____, you are hereby instructed to proceed with the execution of the said works in accordance with the contract documents.

Yours faithfully,

Executive Engineer, Asansol Divn. MED.

(Signature, name and title of signatory authorized to sign on behalf of Employer)

Agreement Form

Agreement

This agreement, made the _____ day of _____ 19____, between Superintending Engineer, West Circle, M.E.Dte., Patal Bazar, Tinkonia, Burdwan [name and address of Employer] (hereinafter called "the Employer") and _____

_____ [name and address of contractor] (hereinafter called "the Contractor" of the other part).

Whereas the Employer is desirous that the Contractor execute the construction of 2 Nos. H.A.U. under R.C.H. project at Asansol - Agreement No.1 _____ [name and identification number of Contract] (hereinafter called "the Works") and the Employer has accepted the Bid by the Contractor for the execution and completion of such Works and the remedying of any defects therein at a cost of Rs.....

NOW THIS AGREEMENT WITNESSETH as follows:

1. In this Agreement, words and expression shall have the same meanings as are respectively assigned to them in the Conditions of Contract hereinafter referred to, and they shall be deemed to form and be read and construed as part of this Agreement.

2. In consideration of the payments to be made by the Employer to the Contractor as hereinafter mentioned, the Contractor hereby covenants with the Employer to execute and complete the Works and remedy any defects therein in conformity in all aspects with the provisions of the Contract.

3. The Employer hereby covenants to pay the Contractor in consideration of the execution and completion of the Works and the remedying the defects wherein the Contract Price or such other sum as may become payable under the provisions of the Contract at the times and in the manner prescribed by the Contract.

4. The following documents shall be deemed to form and be read and construed as part of this Agreement, viz:

   i) Letter of Acceptance;
   ii) Notice to proceed with the works;
   iii) Contractor's Bid;
   iv) Contract Data;
   v) Conditions of contract;
   vi) Specifications;
   vii) Drawings;
   viii) Bill of Quantities; and
   ix) Any other document listed in the Contract Data as forming part of the contract.

In witness whereof the parties thereto have caused this Agreement to be executed the day and year first before written.

The Common Seal of _____

was hereunto affixed in the presence of:

Signed, Sealed and Delivered by the said _____

_____

in the presence of:

Binding Signature of Employer _____

Binding Signature of Contractor _____

SECTION 3: CONDITIONS OF CONTRACT

Conditions of Contract

Table of Contents

Conditions of Contract

A. General

1. Definitions

1.1 Terms which are defined in the Contract Data are not also defined in the Conditions of Contract but keep their defined meanings. Capital initials are used to identify defined terms.

Bill of Quantities means the priced and completed Bill of Quantities forming part of the Bid.

Compensation Events are those defined in Clause 44 hereunder.

The **Completion Date** is the date of completion of the Works as certified by the Engineer in accordance with Sub Clause 55.1.

The **Contract** is the contract between the Employer and the Contractor to execute, complete and maintain the Works. It consists of the documents listed in Clause 2.3 below.

The **Contract Data** defines the documents and other information which comprise the Contract.

The **Contractor** is a person or corporate body whose Bid to carry out the Works has been accepted by the Employer.

The **Contractor's Bid** is the completed Bidding document submitted by the Contractor to the Employer.

The **Contract Price** is the price stated in the Letter of Acceptance and thereafter as adjusted in accordance with the provisions of the Contract.

Days are calendar days; **months** are calendar months.

A **Defect** is any part of the Works not completed in accordance with the Contract.

The **Defects Liability Period** is the period named in the Contract Data and calculated from the Completion Date.

The **Employer** is the party who will employ the Contractor to carry out the Works.

The **Engineer** is the person named in the Contract Data (or any other competent person appointed and notified to the contractor to act in replacement of the Engineer) who is responsible for supervising the Contractor, administering the Contract, certifying payments due to the Contractor, issuing and valuing Variations to the Contract, awarding extensions of time, and valuing the Compensation Events.

Equipment is the Contractor's machinery and vehicles brought temporarily to the Site to construct the Works.

The **Initial Contract Price** is the Contract Price listed in the Employer's Letter of Acceptance.

The **Intended Completion Date** is the date on which it is intended that the Contractor shall complete the Works. The Intended Completion Date is specified in the Contract Data. The Intended Completion Date may be revised only by the Engineer by issuing an extension of time.

Materials are all supplies, including consumables, used by the contractor for incorporation in the Works.

Plant is any integral part of the Works which is to have a mechanical, electrical, electronic or chemical or biological function.

The Site is the area defined as such in the Contract Data.

Site Investigation Reports are those which were included in the Bidding documents and are factual interpretative reports about the surface and sub-surface conditions at the site.

Specification means the Specification of the Works included in the Contract and any modification or addition made or approved by the Engineer.

The Start Date is given in the Contract Data. It is the date when the Contractor shall commence execution of the works. It does not necessarily coincide with any of the Site Possession Dates.

A Subcontractor is a person or corporate body who has a Contract with the Contractor to carry out a part of the work in the Contract which includes work on the Site.

Temporary Works are works designed, constructed, installed, and removed by the Contractor which are needed for construction or installation of the Works.

A Variation is an instruction given by the Engineer which varies the Works.

The Works are what the Contract requires the Contractor to construct, install, and turn over to the Employer, as defined in the Contract Data.

2. Interpretation

2.1 In interpreting these Conditions of Contract, singular also means plural, male also means female or neuter, and the other way around. Headings have no significance. Words have their normal meaning under the language of the Contract unless specifically defined. The Engineer will provide instructions clarifying queries about the Conditions of Contract.

2.2 If sectional completion is specified in the Contract Data, references in the Conditions of Contract to the Works, the Completion Date, and the Intended Completion Date apply to any Section of the Works (other than references to the Completion Date and Intended Completion date for the whole of the Works).

2.3 The documents forming the Contract shall be interpreted in the following order of priority:

(1) Agreement

(2) Letter of Acceptance, notice to proceed with the works

(3) Contractor's Bid

(4) Contract Data

(5) Conditions of Contract

(6) Specifications

(7) Drawings

(8) Bill of quantities and

(9) any other document listed in the Contract Data as forming part of the Contract.

3. Language and Law

3.1 The language of the Contract and the law governing the Contract are stated in the Contract Data.

4. Engineer's Decisions

4.1 Except where otherwise specifically stated, the Engineer will decide contractual matters between the Employer and the Contractor in the role representing the Employer.

5. Delegation

5.1 The Engineer may delegate any of his duties and responsibilities to other people except to the Adjudicator after notifying the Contractor and may cancel any delegation after notifying the Contractor.

6. Communications

6.1 Communications between parties which are referred to in the conditions are effective only when in writing. A notice shall be effective only when it is delivered (in terms of Indian Contract Act).

7. Subcontracting

7.1 The Contractor may subcontract with the approval of the Engineer but may not assign the Contract without the approval of the Employer in writing. Subcontracting does not alter the Contractor's obligations.

8. Other Contractors

8.1 The Contractor shall cooperate and share the Site with other contractors, public authorities, utilities, and the Employer between the dates given in the Schedule of Other Contractors. The Contractor shall as referred to in the Contract Data, also provide facilities and services for them as described in the Schedule. The employer may modify the schedule of other contractors and shall notify the contractor of any such modification.

9. Personnel

9.1 The Contractor shall employ the key personnel named in the Schedule of Key Personnel as referred to in the Contract Data to carry out the functions stated in the Schedule or other personnel approved by the Engineer. The Engineer will approve any proposed replacement of key personnel only if their qualifications, abilities, and relevant experience are substantially equal to or better than those of the personnel listed in the Schedule.

9.2 If the Engineer asks the Contractor to remove a person who is a member of the Contractor's staff or his work force stating the reasons the Contractor shall ensure that the person leaves the Site within seven days and has no further connection with the work in the Contract.

10. Employer's and Contractor's Risks

10.1 The Employer carries the risks which this Contract states are Employer's risks, and the Contractor carries the risks which this Contract states are Contractor's risks.

11. Employer's Risks

11.1 The Employer is responsible for the excepted risks which are (a) in so far as they directly affect the execution of the Works in the Employer's country, the risks of war, hostilities, invasion, act of foreign enemies, rebellion, revolution, insurrection or military or usurped power, civil war, riot commotion or disorder (unless restricted to the Contractor's employees), and contamination from any nuclear fuel or nuclear waste or radioactive toxic explosive, or (b) a cause due solely to the design of the Works, other than the Contractor's design.

12. Contractor's Risks

12.1 All risks of loss of or damage to physical property and of personal injury and death which arise during and in consequence of the performance of the Contract other than the excepted risks are the responsibility of the Contractor.

13. Insurance

13.1 The Contractor shall provide, in the joint names of the Employer and the Contractor, insurance cover from the Start Date to the end of the Defects Liability Period, in the amounts and deductibles stated in the Contract Data for the following events which are due to the Contractor's risks:

(a) loss of or damage to the Works, Plant and Materials;

(b) loss of or damage to Equipment;

(c) loss of or damage of property (except the Works, Plant, Materials and Equipment) in connection with the Contract; and

(d) personal injury or death.

13.2 Policies and certificates for insurance shall be delivered by the Contractor to the Engineer for the Engineer's approval before the Start Date. All such insurance shall provide for compensation to be payable in the types and proportions of currencies required to rectify the loss or damage incurred.

13.3 If the Contractor does not provide any of the policies and certificates required, the Employer may effect the insurance which the Contractor should have provided and recover the premiums the Employe has paid from payments otherwise due to the Contractor or, if no payment is due, the payment of the premiums shall be a debt due.

13.4 Alterations to the terms of an insurance shall not be made without the approval of the Engineer.

13.5 Both parties shall comply with any conditions of the insurance policies.

14. Site Investigation Reports

14.1 The Contractor, in preparing the Bid, shall rely on any site Investigation Reports referred to in the Contract Data, supplemented by any information available to the Bidder.

15. Queries about the Contract Data

15.1 The Engineer will clarify queries on the Contract Data.

16. Contractor to Construct the Works

16.1 The Contractor shall construct and install the Works in accordance with the Specification and Drawings.

17. The Works to Be Completed by the Intended Completion Date

17.1 The Contractor may commence execution of the Works on the Start Date and shall carry out the Works in accordance with the program submitted by the Contractor, as updated with the approval of the Engineer, and complete them by the Intended Completion Date.

18. Approval by the Engineer

18.1 The Contractor shall submit Specifications and Drawings showing the proposed Temporary Works to the Engineer, who is to approve them if they comply with the Specifications and Drawings.

18.2 The Contractor shall be responsible for design of Temporary Works.

18.3 The Engineer's approval shall not alter the Contractor's responsibility for design of the Temporary Works.

18.4 The Contractor shall obtain approval of third parties to the design of the Temporary Works where required.

18.5 All Drawings prepared by the Contractor for the execution of the temporary or permanent Works, are subject to prior approval by the Engineer before their use.

19. Safety

19.1 The Contractor shall be responsible for the safety of all activities on the Site.

20. Discoveries

20.1 Anything of historical or other interest or of significant value unexpectedly discovered on the Site is the property of the Employer. The Contractor is to notify the Engineer of such discoveries and carry out the Engineer's instructions for dealing with them.

21. Possession of the Site

21.1 The Employer shall give possession of all parts of the Site to the Contractor. If possession of a part is not given by the date stated in the Contract Data the Employer is deemed to have delayed the start of the relevant activities and this will be Compensation Event.

22. Access to the Site

22.1 The Contractor shall allow the Engineer and any person authorized by the Engineer access to the Site, to any place where work in connection with the Contract is being carried out or is intended to be carried out and to any place where materials or plant are being manufactured / fabricated / assembled for the works.

23. **Instructions**

23.1 The Contractor shall carry out all instructions of the Engineer which comply with the applicable laws where the Site is located.

23.2 The Contractor shall permit the bank to inspect the Contractor's accounts and records relating to the performance of the Contractor and to have them audited by auditors appointed by the Bank, if so required by the Bank.

24. **Disputes**

24.1 If the Contractor believes that a decision taken by the Engineer was either outside the authority given to the Engineer by the Contract or that the decision was wrongly taken, the decision shall be referred to the Arbitrator within 28 days of the notification of the Engineer's decision.

25. **Procedure for Disputes**

25.1 deleted

25.2 deleted

25.3 The arbitration shall be conducted in accordance with the arbitration procedure stated in the Special Conditions of Contract.

26. **Replacement of Adjudicator - deleted**

B. Time Control

27. **Program**

27.1 Within the time stated in the Contract Data the Contractor shall submit to the Engineer for approval a Program showing the general methods, arrangements, order, and timing for all the activities in the Works along with monthly cash flow forecast.

27.2 An update of the Program shall be a program showing the actual progress achieved on each activity and the effect of the progress achieved on the timing of the remaining work including any changes to the sequence of the activities.

27.3 The Contractor shall submit to the Engineer, for approval, an updated Program at intervals no longer than the period stated in the Contract Data. If the Contractor does not submit an updated Program within this period, the Engineer may withhold the amount stated in the Contract Data from the next payment certificate and continue to withhold this amount until the next payment after the date on which the overdue Program has been submitted.

27.4 The Engineer's approval of the Program shall not alter the Contractor's obligations. The Contractor may revise the Program and submit it to the Engineer again at any time. A revised Program is to show the effect of Variations and Compensation Events.

28. **Extension of the Intended Completion Date**

28.1 The Engineer shall extend the Intended Completion Date if a Compensation Event occurs or a Variation is issued which makes it impossible for Completion to be achieved by the Intended Completion Date without the Contractor taking steps to accelerate the remaining work and which would cause the Contractor to incur additional cost.

28.2 The Engineer shall decide whether and by how much to extend the Intended Completion Date within 21 days of the Contractor asking the Engineer for a decision upon the effect of a Compensation Event or Variation and submitting full supporting information. If the Contractor has failed to give early warning of a delay or has failed to cooperate in dealing with a delay, the delay by this failure shall not be considered in assessing the new Intended Completion Date.

29. Deleted

30. Delays Ordered by the Engineer

30.1 The Engineer may instruct the Contractor to delay the start or progress of any activity within the Works.

31. Management Meetings

31.1 Either the Engineer or the Contractor may require the other to attend a management meeting. The business of a management meeting shall be to review the plans for remaining work and to deal with matters raised in accordance with the early warning procedure.

31.2 The Engineer shall record the business of management meetings and is to provide copies of his record to those attending the meeting and to the Employer. The responsibility of the parties for actions to be taken is to be decided by the Engineer either at the management meeting or after the management meeting and stated in writing to all who attended the meeting.

32. Early Warning

32.1 The Contractor is to warn the Engineer at the earliest opportunity of specific likely future events or circumstances that may adversely affect the quality of the work, increase the Contract Price or delay the execution of works. The Engineer may require the Contractor to provide an estimate of the expected effect of the future event or circumstance on the Contract Price and Completion Date. The estimate is to be provided by the Contractor as soon as reasonably possible.

32.2 The Contractor shall cooperate with the Engineer in making and considering proposals for how the effect of such an event or circumstance can be avoided or reduced by anyone involved in the work and in carrying out any resulting instruction of the Engineer.

C. Quality Control

33. Identifying Defects

33.1 The Engineer shall check the Contractor's work and notify the Contractor of any Defects that are found. Such checking shall not affect the Contractor's responsibilities. The Engineer may instruct the Contractor to search for a Defect and to uncover and test any work that the Engineer considers may have a Defect.

34. Tests

34.1 If the Engineer instructs the Contractor to carry out a test not specified in the Specification to check whether any work has a Defect and the test shows that it does, the Contractor shall pay for the test and any samples. If there is no Defect the test shall be a Compensation Event.

35. Correction of Defects

35.1 The Engineer shall give notice to the Contractor of any Defects before the end of the Defects Liability Period, which begins at Completion and is defined in the Contract Data. The Defects Liability Period shall be extended for as long as Defects remain to be corrected.

35.2 Every time notice of a Defect is given, the Contractor shall correct the notified Defect within the length of time specified by the Engineer's notice.

36. Uncorrected Defects

36.1 If the Contractor has not corrected a Defect within the time specified in the Engineer's notice, the Engineer will assess the cost of having the Defect corrected, and the Contractor will pay this amount.

D. Cost Control

37. Bill of Quantities

37.1 The Bill of Quantities shall contain items for the construction, installation, testing, and commissioning work to be done by the Contractor.

37.2 The Bill of Quantities is used to calculate the Contract Price. The Contractor is paid for the quantity of the work done at the rate in the Bill of Quantities for each item.

38. Changes in the Quantities

38.1 If the final quantity of the work done differs from the quantity in the Bill of Quantities for the particular item by more than 25 percent provided the change exceeds 1% of initial Contract Price, the Engineer shall adjust the rate to allow for the change.

38.2 The Engineer shall not adjust rates from changes in quantities if thereby the Initial Contract Price is exceeded by more than 15 percent, except with the Prior approval of the Employer.

38.3 If requested by the Engineer, the Contractor shall provide the Engineer with a detailed cost breakdown of any rate in the Bill of Quantities.

39. Variations

39.1 All Variations shall be included in updated Programs produced by the Contractor.

40. Payments for Variations

40.1 The Contractor shall provide the Engineer with a quotation for carrying out the Variation when requested to do so by the Engineer. The Engineer shall assess the quotation, which shall be given within seven days of the request or within any longer period stated by the Engineer and before the Variation is ordered.

40.2 If the work in the Variation corresponds with an item description in the Bill of Quantities and if, in the opinion of the Engineer, the quantity of work above the limit stated in Sub Clause 38.1 or the timing of its execution do not cause the cost per unit of quantity to change, the rate in the Bill of Quantities shall be used to calculate the value of the Variation. If the cost per unit of quantity changes, or if the nature or timing of the work in the Variation does not correspond with items in the Bill of Quantities, the quotation by the Contractor shall be in the form of new rates for the relevant items of work.

40.3 If the Contractor's quotation is unreasonable, the Engineer may order the Variation and make a change to the Contract Price which shall be based on Engineer's own forecast of the effects of the Variation on the Contractor's costs.

40.4 If the Engineer decides that the urgency of varying the work would prevent a quotation being given and considered without delaying the work, no quotation shall be given and the Variation shall be treated as a Compensation Event.

40.5 The Contractor shall not be entitled to additional payment for costs which could have been avoided by giving early warning.

41. Cash flow forecasts

41.1 When the Program is updated, the contractor is to provide the Engineer with an updated cash flow forecast.

42. Payment Certificates

42.1 The Contractor shall submit to the Engineer monthly statements of the estimated value of the work completed less the cumulative amount certified previously.

42.2 The Engineer shall check the Contractor's monthly statement within 14 days and certify the amount to be paid to the Contractor.

42.3 The value of work executed shall be determined by the Engineer.

42.4 The value of work executed shall comprise the value of the quantities of the items in the Bill of Quantities completed.

42.5 The value of work executed shall include the valuation of Variations and Compensation Events.

42.6 The Engineer may exclude any item certified in a previous certificate or reduce the proportion of any item previously certified in any certificate in the light of later information.

43. Payments

43.1 Payments shall be adjusted for deductions for advance payments, retention and other recoveries in terms of the contract and deduction at source of taxes as applicable under the law. The Employer shall pay the Contractor the amounts certified by the Engineer within 28 days of the date of each certificate. If the Employer makes a late payment, the Contractor shall be paid interest on the late payment in the next payment. Interest shall be calculated from the date by which the payment should have been made upto the date when the late payment is made at 12% per annum.

43.2 If an amount certified is increased in a later certificate as a result of an award by an Arbitrator, the Contractor shall be paid interest upon the delayed payment as set out in this clause. Interest shall be calculated from the date upon which the increased amount would have been certified in the absence of dispute.

43.3 Items of the Works for which no rate or price has been entered in will not be paid for by the Employer and shall be deemed covered by other rates and prices in the Contract.

44. Compensation Events

44.1 The following are Compensation Events unless they are caused by the Contractor:

(a) The Employer does not give access to a part of the Site by the Site Possession Date stated in the Contract Data.

(b) The Employer modifies the schedule of other contractors in a way which affects the work of the contractor under the contract.

(c) The Engineer orders a delay or does not issue drawings, specifications or instructions required for execution of works on time.

(d) The Engineer instructs the Contractor to uncover or to carry out additional tests upon work which is then found to have no Defects.

(e) The Engineer unreasonably does not approve for a subcontract to be let.

(f) Ground conditions are substantially more adverse than could reasonably have been assumed before issuance of Letter of Acceptance from the information issued to Bidders (including the Site Investigation Reports), from information available publicly and from a visual inspection of the Site.

(g) The Engineer gives an instruction for dealing with an unforeseen condition, caused by the Employer, or additional work required for safety or other reasons.

(h) Other contractors, public authorities, utilities or the Employer does not work within the dates and other constraints stated in the Contract, and they cause delay or extra cost to the Contractor.

(i) The advance payment is delayed.

(j) The effect on the Contractor of any of the Employer's Risks.

(k) The Engineer unreasonably delays issuing a Certificate of Completion.

(l) Other Compensation Events listed in the Contract Data or mentioned in the Contract.

44.2 If a Compensation Event would cause additional cost or would prevent the work being completed before the Intended Completion Date, the Contract Price shall be increased and/or the Intended Completion Date is extended. The Engineer shall decide whether and by how much the Contract Price shall be increased and whether and by how much the Intended Completion Date shall be extended.

44.3 As soon as information demonstrating the effect of each Compensation Event upon the Contractor's forecast cost has been provided by the Contractor, it is to be assessed by the Engineer and the Contract Price shall be adjusted accordingly. If the Contractor's forecast is deemed unreasonable, the Engineer shall adjust the Contract Price based on Engineer's own forecast. The Engineer will assume that the Contractor will react competently and promptly to the event.

44.4 The Contractor shall not be entitled to compensation to the extent that the Employer's interests are adversely affected by the Contractor not having given early warning or not having cooperated with the Engineer.

45. Tax

45.1 The rates quoted by the contractor shall be deemed to be inclusive of the sales and other taxes that the contractor will have to pay for the performance of this contract. The Employer will perform such duties in regard to the deduction of such taxes at source as per applicable law.

46. Currencies

46.1 All payments shall be made in Indian Rupees.

47. Price Adjustment - deleted

48. Retention

48.1 The Employer shall retain from each payment due to the Contractor the proportion stated in the Contract Data until Completion of the whole of the Works.

48.2 On Completion of the whole of the Works half the total amount retained is repaid to the Contractor and half when the Defects Liability Period has passed and the Engineer has certified that all Defects notified by the Engineer to the Contractor before the end of this period have been corrected.

48.3 On completion of the whole works, the Contractor may substitute retention money with an "on demand" Bank guarantee.

49. Liquidated Damages

49.1 The Contractor shall pay liquidated damages to the Employer at the rate per day stated in the Contract Data for each day that the Completion Date is later than the Intended Completion Date (for the whole of the works or the milestones as stated in the Contract Data). The total amount of liquidated damages shall not exceed the amount defined in the Contract Data. The Employer may deduct liquidated damages from payments due to the Contractor. Payment of liquidated damages does not affect the Contractor's liabilities.

49.2 If the Intended Completion Date is extended after liquidated damages have been paid, the Engineer shall correct any overpayment of liquidated damages by the Contractor by adjusting the next payment certificate. The Contractor shall be paid interest on the over payment calculated from the date of payment to the date of repayment at the rates specified in Sub Clause 43.1.

50. Deleted

51. Advance Payment - deleted

52. Securities

52.1 The Performance Security (including additional security for unbalanced bids) shall be provided to the Employer no later than the date specified in the Letter of Acceptance and shall be issued in an amount and form and by a bank or surety acceptable to the Employer, and denominated in Indian Rupees. The Performance Security shall be valid until a date 28 days from the date of expiry of Defects Liability Period and the additional security for unbalanced bids shall be valid until a date 28 days from the date of issue of the certificate of completion.

53. Deleted

54. Cost of Repairs

54.1 Loss or damage to the Works or Materials to be incorporated in the Works between the Start Date and the end of the Defects Correction periods shall be remedied by the Contractor at the Contractor's cost if the loss or damage arises from the Contractor's acts or omissions.

E. Finishing the Contract

55. Completion

55.1 The Contractor shall request the Engineer to issue a Certificate of Completion of the Works and the Engineer will do so upon deciding that the Work is completed.

56. Taking Over

56.1 The Employer shall take over the Site and the Works within seven days of the Engineer issuing a certificate of Completion

57. Final Account

57.1 The Contractor shall supply to the Engineer a detailed account of the total amount that the Contractor considers payable under the Contract before the end of the Defects Liability Period. The Engineer shall issue a Defect Liability Certificate and certify any final payment that is due to the Contractor within 56 days of receiving the Contractor's account if it is correct and complete. If it is not, the Engineer shall issue within 56 days a schedule that states the scope of the corrections or additions that are necessary. If the Final Account is still unsatisfactory after it has been resubmitted, the Engineer shall decide on the amount payable to the Contractor and issue a payment certificate within 56 days of receiving the Contractor's revised account.

58. Operating and Maintenance Manuals

58.1 If "as built" Drawings and/or operating and maintenance manuals are required, the Contractor shall supply them by the dates stated in the Contract Data.

58.2 If the Contractor does not supply the Drawings and/or manuals by the dates stated in the Contract Data, or they do not receive the Engineer's approval, the Engineer shall withhold the amount stated in the Contract Data from payments due to the Contractor.

59. Termination

59.1 The Employer or the Contractor may terminate the Contract if the other party causes a fundamental breach of the Contract.

59.2 Fundamental breaches of Contract include, but shall not be limited to the following:

(a) the Contractor stops work for 28 days when no stoppage of work is shown on the current Program and the stoppage has not been authorized by the Engineer;

(b) the Engineer instructs the Contractor to delay the progress of the Works and the instruction is not withdrawn within 28 days;

(c) the Employer or the Contractor is made bankrupt or goes into liquidation other than for a reconstruction or amalgamation;

(d) a payment certified by the Engineer is not paid by the Employer to the Contractor within 56 days of the date of the Engineer's certificate;

(e) the Engineer gives Notice that failure to correct a particular Defect is a fundamental breach of Contract and the Contractor fails to correct it within a reasonable period of time determined by the Engineer;

(f) the Contractor does not maintain a security which is required;

(g) the Contractor has delayed the completion of works by the number of days for which the maximum amount of liquidated damages can be paid as defined in the Contract data; and

(h) if the Contractor, in the judgment of the Employer has engaged in corrupt or fraudulent practices in competing for or in the executing the Conract.

For the purpose of this paragraph : "corrupt practice" means the offering, giving, receiving or soliciting of any thing of value to influence the action of a public official in the procurement process or in contract execution. "Fraudulent practice" means a misrepresentation of facts in order to influence a procurement process or the execution of a contract to the detriment of the Borrower, and includes collusive practice among Bidders (prior to or after bid submission) designed to establish bid prices at artificial non-competitive levels and to deprive the Borrowr of the benefits of free and open competition."

59.3 When either party to the Contract gives notice of a breach of contract to the Engineer for a cause other than those listed under Sub Clause 59.2 above, the Engineer shall decide whether the breach is fundamental or not.

59.4 Notwithstanding the above, the Employer may terminate the Contract for convenience.

59.5 If the Contract is terminated the Contractor shall stop work immediately, make the Site safe and secure and leave the Site as soon as reasonably possible.

60. Payment upon Termination

60.1 If the Contract is terminated because of a fundamental breach of Contract by the Contractor, the Engineer shall issue a certificate for the value of the work done less advance payments received up to the date of the issue of the certificate, less other recoveries due in terms of the contract, less taxes due to be deducted at source as per applicable law and less the percentage to apply to the work not completed as indicated in the Contract Data. Additional Liquidated Damages shall not apply . If the total amount due to the Employer exceeds any payment due to the Contractor the difference shall be a debt payable to the Employer.

60.2 If the Contract is terminated at the Employer's convenience or because of a fundamental breach of Contract by the Employer, the Engineer shall issue a certificate for the value of the work done, the reasonable cost of removal of Equipment, repatriation of the Contractor's personnel employed solely on the Works, and the Contractor's costs of protecting and securing the Works and less advance payments received up to the date of the certificate, less other recoveries due in terms of the contract and less taxes due to be deducted at source as per applicable law.

61. Property

61.1 All materials on the Site, Plant, Equipment, Temporary Works and Works are deemed to be the property of the Employer, if the Contract is terminated because of a Contractor's default.

62. Release from Performance

62.1 If the Contract is frustrated by the outbreak of war or by any other event entirely outside the control of either the Employer or the Contractor the Engineer shall certify that the Contract has been frustrated. The Contractor shall make the Site safe and stop work as quickly as possible after receiving this certificate and shall be paid for all work carried out before receiving it and for any work carried out afterwards to which commitment was made.

63. Suspension of World Bank Loan or Credit

63.1 In the event that the World Bank suspends the Loan or Credit to the Employer, from which part of the payments to the Contractor are being made:

(a) The Employer is obligated to notify the Contractor of such suspension within 7 days of having received the World Bank's suspension notice.

(b) If the Contractor has not received sums due to it upon the expiration of the 28 days for payment provided for in Sub-Clause 43.1, the Contractor may immediately issue a 14-day termination notice.

F. Special Conditions of Contract

1. **LABOUR :**

The Contractor shall, unless otherwise provided in the Contract, make his own arrangements for the engagement of all staff and labour, local or other, and for their payment, housing, feeding and transport.

The Contractor shall, if required by the Engineer, deliver to the Engineer a return in detail, in such form and at such intervals as the Engineer may prescribe, showing the staff and the numbers of the several classes of labour from time to time employed by the Contractor on the Site and such information respecting Contractor's Equipment as the Engineer may require.

2. **COMPLIANCE WITH LABOUR REGULATIONS :**

During continuance of the contract, the Contractor and his sub contractors shall abode at all times by all existing labour enactments and rules made thereunder, regulations, notifications and bye laws of the State or Central Government or local authority and any other labour law (including rules), regulations, bye laws that may be passed or notification that may be issued under any labour law in future either by the State or the Central Government or the local authority. Salient features of some of the major labour laws that are applicable to construction industry are given below. The Contractor shall keep the Employer indemnified in case any action is taken against the Employer by the competent authority on account of contravention of any of the provisions of any Act or rules made thereunder, regulations or notifications including amendments. If the Employer is caused to pay or reimburse, such amounts as may be necessary to cause or observe, or for non-observance of the provisions stipulated in the notifications/bye laws/Acts/Rules/regulations including amendments, if any, on the part of the Contractor, the Engineer/Employer shall have the right to deduct any money due to the Contractor including his amount of performance security. The Employer/Engineer shall also have right to recover from the Contractor any sum required or estimated to be required for making good the loss or damage suffered by the Employer.

The employees of the Contractor and the Sub-Contractor in no case shall br treated as the employees of the Employer at any point of time.

SALIENT FEATURES OF SOME MAJOR LABOUR LAWS APPLICABLE TO ESTABLISHMENTS ENGAGED IN BUILDING AND OTHER CONSTRUCTION WORK.

a) Workmen Compensation Act 1923 :- The Act provides for compensation in case of injury by accident arising out of and during the course of employment.

b) Payment of Gratuity Act 1972 :- Gratuity is payable to an employee under the Act on satisfaction of certain conditions on separation if an employee has completed 5 years service or more or on death the rate of 15 days wages for every completed year of service. The Act is applicable to all establishments employing 10 or more employees.

c) Employees P.F. and Miscellaneous provision Act 1952 : The Act Provides for monthly contributions by the employer plus workers @ 10% or 8.33%. The benefits payable under the Act are :

(i) Pension or family pension on retirement or death as the case may be.

(ii) Deposit linked insurance on the death in harness of the worker.

(iii) payment of P.F. accumulation on retirement/death etc.

d) Maternity Benefit Act 1951 :- The Act provides for leave and some other benefits to women employees in case of confinement or miscarriage etc.

e) Contract Labour (Regulation & Abolition) Act 1970:- The Act provides for certain welfare measures to be provided by the Contractor to contract labour and in case the Contractor fails to provide, the same are required to be provided, by the Principal Employer by Law. The principal Employer is required to take Certificate of Registration and the Contractor is required to take license from the designated Officer. The Act is applicable to the establishments or Contractor of Principal Employer if they employ 20 or more contract labour.

f) Minimum Wages Act 1948 :- The Employer is supposed to pay not less than the Minimum Wages fixed by appropriate Government as per provisions of the Act if the employment is a scheduled employment. Construction of Buildings, Roads, Runways are scheduled employment.

g) Payment of Wages Act 1936 :- It lays down as to by what date the wages are to be paid, when it will be paid and what deductions can be made from the wages of the workers.

h) Equal Remuneration Act 1979 :- The Act provides for payment of equal wages for work of equal nature to Male and Female workers and for not making discrimination against Female employees in the matters of transfers, training and promotions etc.

i) Payment of Bonus Act 1965 :- The Act is applicable to all establishments employing 20 or more employees. The Act provides for payments of annual bonus subject to a minimum of 8.33% of wages and maximum of 20% of wages to employees drawing Rs.3500/- per month or less. The bonus to be paid to employees getting Rs.2500/- per month or above upto Rs.3500/- per month shall be worked out by taking wages as Rs.2500/- per month only. The Act does not apply to certain establishments. The newly set-up establishments are exempted for five years in certain circumstances. Some of the State Governments have reduced the employment size from 20 to 10 for the purpose of applicability of the Act.

j) Industrial Disputes Act 1947 :- The Act lays down the machinery and procedure for resolution of Industrial disputes, in what situations a strike or lock-out becomes illegal and what are the requirements for laying off or retrenching the employees or closing down the establishment.

k) Industrial Employment (Standing Orders) Act 1946 :- It is applicable to all establishments employing 100 or more workmen (employment size reduced by some of the States and Central Government to 50). The Act provides for laying down rules governing the conditions of employment by the Employer on matters provided in the Act and get the same certified by the designated Authority.

l) Trade Unions Act 1926 :- The Act lays down the procedure per registration of trade unions of workmen and employers. The Trade Unions registered under the Act have been given certain immunities from civil and criminal liabilities.

m) Child Labour (Prohibition & Regulation) Act 1986 :- The Act prohibits employment of children below 14 years of age in certain occupations and processes and provides for regulations of employment of children in all other occupations and processes. Employment of Child Labour is prohibited in Building and Construction Industry.

n) Inter-State Migrant workmen's (Regulation of Employment & Conditions of Service) Act 1979:- The Act is applicable to an establishment which employs 5 or more inter-state migrant workmen through an intermediary (who has recruited workmen in one state for employment in the establishment situated in another state). The Inter-State migrant workmen, in an establishment to which this Act becomes applicable, are required to be provided certain facilities such as housing, medical aid, travelling expenses from home upto the establishment and back etc.

o) The Building and Other Construction workers (Regulation of Employment and Conditions of Service) Act 1996 and the Cess Act of 1996 :- All the establishments who carry on any building or other construction work and employs 10 or more workers are covered under this Act. All such establishments are required to pay cess at the rate not exceeding 2% of the cost of construction as may be modified by the Government. The Employer of the establishment is required to provide safety measures at the Building or construction work and other welfare measures, such as canteens, first-aid facilities, Ambulance, Housing

accommodations for workers near the work place etc. The Employer to whom the Act applies has to obtain a registration certificate from the Registering Officer appointed by the Government.

p) Factories Act 1948 :- The Act lays down the procedure for approval at plans before setting up a factory, health and safety provisions, welfare provisions, working hours, annual earned leave and rendering information regarding accidents or dangerous occurances to designated authorities. It is applicable to premises employing 10 persons or more with aid of power or 20 or more persons without the aid of power engaged in manufacturing process.

3. ARBITRATION (GCC Clause 25.3)

The procedure for arbitration will be as follows:

25.3 (a) In case of Dispute or difference arising between the Employer and a domestic contractor relating to any matter arising out of or connected with this agreement, such disputes or difference shall be settled in accordance with the Arbitration and Conciliation Act, 1996. The arbitral tribunal shall consist of 3 arbitrators one each to be appointed by the Employer and the Contractor. The third Arbitrator shall be chosen by the two Arbitrators so appointed by the Parties and shall act a presiding arbitrator. In case of failure of the two arbitrators appointed by the parties to reach upon a consensus within a period of 30 days from the appointment of the arbitrator appointed subsequently, the Presiding Arbitrator shall be appointed by the President of the Institution of Engineers (India).

(b) In the case of dispute with a Foreign contractor the dispute shall be settled in accordance with provisions of UNCITRAL (United Nations Commission on International Trade Law) Arbitration Rules. The Arbitral Tribunal shall consist of three Arbitrators one each to be appointed by the Employer and the Contractor. The third Arbitrator shall be chosen by the two Arbitrators so appointed by the Parties, and shall act a presiding arbitrator. In case of failure of the two arbitrators appointed by the parties to reach upon a consensus within a period of 30 days from the appointment of the arbitrator appointed subsequently, the Presiding arbitrator shall be appointed by the President of the Institution of Engineers (India)

(c) If one of the parties fails to appoint its arbitrator in pursuance of sub-clause (a) and (b) above within 30 days after receipt of the notice of the appointment of its arbitrator by the other party, then the Presiding arbitrator shall be nominated by President of the Institution of Engineers (India) both in cases of the Foreign Contractor as well as Indian Contractor, shall appoint the arbitrator. A certified copy of the order of the President of the Institution of Engineers (India) making such an appointment shall be furnished to each of the parties.

(d) Arbitration proceedings shall be held at Calcutta, India, and the language of the arbitration proceedings and that of all documents and communications between the parties shall be English.

(e) The decision of the majority of arbitrators shall be final and binding upon both parties. The cost and expenses of Arbitration proceedings will be paid as determined by the arbitral tribunal. However, the expenses incurred by each party in connection with the preparation, presentation, etc. of its proceedings as also the fees and expenses paid to the arbitrator appointed by such party or on its behalf shall be borne by each party itself.

(f) In the event value of the contract is upto Rs.50 millions, the disputes or differences arising shall be referred to the Sole Arbitrator. The Sole Arbitrator should be appointed by agreement between the parties, failing such agreement by the appointing authority, i.e. the

(g) Performance under the contract shall continue during the arbitration proceedings and payments due to the contractor by the owners shall not be withheld, unless they are the subject matter of the arbitration proceedings.

SECTION 4: CONTRACT DATA

Contract Data

Items marked "N/A" do not apply in this Contract.

The following documents are also part of the Contract:	Clause Reference
· The Schedule of Operating and Maintenance Manuals	[58]
· The Schedule of Other Contractors	[8]
· The Schedule of Key Personnel	[9]
The Borrower is Government of India/ Deptt.of Mpl.Affairs,Govt. of West Bengal [name of Borrower and statement of relationship with the Employer, if different from the Borrower].	[1.1]
The Bank and / or World Bank refers to the International Development Association, which administers the Interim Trust Fund.	[1.1]

The above insertions should correspond to the information provided in the Invitation for Bids.

The Employer is :

Name: Superintending Engineer,West Circle,M.E. Dte.Deptt.of Mpl.Affairs,Govt.of West Bengal. (1.1)

Address: Patal Bazar,Tinkonia,Burdwan.

Name of authorized Representative: Nil

The Engineer is

Name: Executive Engineer,Asansol Divn.M.E.DTE.Deptt.of Mpl.Affairs Govt.of West Bengal

Address: PHE Housing Complex,Vivenanda Pally,S.B.Gorai Road,Near Baraf Kal] Asansol I,Dt.Burdwan

Name of Authorized Representative: Assistant Engineer

The name and identification number of the Contract is Construction of 2 Nos.HAU under RCH Project at Asansol Agreement No.1

[insert name and number as indicated in the Invitation for Bids (or Prequalification, if any]. [1.1]

The Works consist of Constn.of building,walls,pathways,sanitary plumbing & Electrical.Works.
[brief summary, including relationship to other contracts under the Project].

The start date shall be immediately after issue of notice to proceed with the work. (1.1)

The Intended Completion Date for the whole of the Works is nine months i.e. [17, 28]

The following documents also form part of the Contract: [2.3]

nil

The Contractor shall submit a revised Program for the Works within 45 days of delivery of the Letter of Acceptance. [27]

The Site Possession Date is: days from the date of signing the contract agreement. [21]

The Site is located at Asansol [1]
and is defined in drawings nos. ME/SE(W)/RCH(ASN)-1/97

The Defects Liability Period is 180 days. [35]

The minimum insurance cover for physical property, injury and [13]
and death is Rs. 0.15 (millions) per occurrence with the number of occurrences limited to four. After each occurrence, contractor will pay additional premium necessary to make insurance valid for four occurrences always.

The following events shall also be Compensation Events: [44]

1. Nil
2.
3.
4.

The period between Program updates shall be 30 days. [27]

The amount to be withheld for late submission of an updated Program shall be Rs. 30,000 [27]

The language of the Contract documents is English [3]

The law which applies to the Contract is the law of India [3]

The currency of the Contract is Indian Rupees. [46]

The proportion of payments retained (retention money) shall be 6% from each bill subject to a maximum of 5% of contract value [48]

The liquidated damages for the whole of the works are Rs. 1140/= (*amount*) per day (49)

The maximum amount of liquidated damages for the whole of the works is ten percent of final contract price. [49]

The Securities shall be for the following minimum amounts equivalent as a percentage of the Contract Price: [52]

Performance Security for 5 percent of contract value plus Rs..... as additional security in terms of ITB Clause 29.5.

The standard form(s) of Performance Security acceptable to the Employer shall be an unconditional Bank Guarantee of the type as presented in Section 8 of the Bidding Documents. [52]

* The date by which operating and maintenance manuals are required is within 28 days of issue of certificate of completion of whole or section of the work, as the case may be. [58]

* The date by which "as-built" drawings are required is within 28 days of issue of certificate of completion of whole or section of the work, as the case may be. [58]

The amount to be withheld for failing to supply "as built" drawings and/or operating and maintenance manuals *by the date required is Rupees 45,000/=. [58]

The following events shall also be fundamental breach of the contract : [59.2]

1. The contractor has contravened Sub-clause 7.1 and Clause 9.
2. _____
3. _____
4. _____

The percentage to apply to the value of the work not completed representing the Employer's additional cost for completing the Works shall be 20 percent. [60]

* *Strike out whichever is inapplicable*

SECTION 5: SPECIFICATIONS

GENERAL CONDITIONS

1. This Schedule of Rates is divided into two sections and each section into sub-sections. In all cases of contracts in respect of Buildingworks the entire Schedule will be operative. Though the Schedule is divided for convenience into sections and subsections it is to be taken as a whole. An item under one section will apply equally to work falling under the category of another section unless a similar item appears in the later section. The same principle applies to items under different sub-sections.

2. The 'Engineer-in-Charge' shall mean the Executive Engineer of the Division concerned. The Subdivisional Officer concerned is authorised to carry out, on behalf of the 'Engineer-in-Charge', general supervision, issue day to day instructions and approval of materials and workmanship. In case of dispute, the decision of the Engineer-in-Charge shall be final and binding.

3. Except when specifically mentioned in the description of the item itself, the rate for any item of work will apply equally to all floors, in any position and up to any height. In respect of concrete work etc. where the rate is on the basis of volume, the item shall apply to all cases irrespective of the thickness unless a specific item appears in the Schedule for the particular type of work.

   The work up to a particular floor level means all work up to the roof of that floor. All works in basement shall be treated as work in ground floor for payment.

4. Renewal works include dismantling and taking out old work and mending good damages after renewal.

   In items where renewals are not involved, 5% reduction in rate in renewal items shall be made. For renewal works, where there is no specific provision in the Schedule, the rates may be arrived at by adding 5% on the rate of original work items.

5. White washing, painting etc. include preparation of surface (including plugging old nailholes etc.) prior to the treatment and removal of all marks or stains from walls, floor, glass panes, chowkats etc. For repair works, this also includes shifting and/or covering furniture etc.

6. All works shall be carried out with due regard to the convenience of the occupants, if any, and the arrangement and programme of work must be adjusted accordingly. In case of works within Jails, Hospitals, etc. the Rules and Regulations of Authorities concerned must be strictly obeyed. The rates given in this Schedule are to be deemed to be inclusive of all such factors and contingencies.

7. All materials, tools and plants besides those to be supplied by Govt. are to be arranged for the work. All labours (skilled and unskilled) including their housing, sanitation, procurement of food staff, medical aid etc. are to be arranged for by the contractor. Cost of transport of labour, materials, and all items aforesaid, shall have to be borne by the contractor.

8. Arrangement of water for mixing concrete, mortar, soaking bricks and other materials, construction of platforms and vats including cost thereof are to be borne by the contractor.

9. Rates of all items are inclusive of labour, material charges and costs (including Sales Tax, Turn Over Tax, Royalty, Income Tax, Octroi and Toll Tax, Ferry Charges etc.) as may have to be incurred by the contractor for getting the respective items of works executed to proper and complete finish.

   Unless specifically mentioned otherwise in the description of the item itself, no extra charges will be paid for scaffolding (including stage scaffolding), centering, shuttering, curing etc. and the rates are to be deemed to be inclusive of the same and of the cost of helping materials necessary for the satisfactory completion of the work.

10. Power roller may be lent out if available by the Department to the contractor on payment of hire charges etc. as per stipulations in the printed tender form. The contractor is to make his own arrangements for other tools and plants. If possible, the following tools and plants may, however, be lent out to the contractor at his own cost and expense. The contractor is to carry the same to the site of work from the point where the delivery may be given and on completion of work return the same at the place as may directed by the Engineer-in-Charge. The hire charges shall

be payable for the full period from the date of issue to the date of return. Any damages while in the custody of the contractor shall be repaired at his cost.

(a)	Concrete mixer	
	(i) Capacity (0.2 to 0.28 cu.m.)	Rs. 20.00 per day
	(ii) Capacity (0.08 to 0.14 cu.m.)	Rs. 10.00 per day
(b)	Hand roller	Rs. 2.00 per day
(c)	Hire charges of Road roller of 8 Tonnes or above excluding fuel and wages of drivers etc. @ Rs. 150/- per day of eight working hours.	
(d)	Charges for drivers	Rs. 15.00 per day
(e)	Charges for cleaner	Rs. 11.00 per day
(f)	Charges for chowkider	Rs. 11.00 per day

N.B. : The hire charges of roller etc. are as per G.O. No. 1298-A dt. 31.3.79.

If the service of the departmental mechanic or any staff be utilised for running of or repairs to tools, and plants, the pay and allowances and incidental charges (if any) shall be recovered from the contractor. All stores, fuel etc. used for running the tools and plants lent out by the Deptt. must be to the approval of the Engineer-in-Charge.

11. All materials brought to site must be to the approval of the Engineer-in-Charge. Rejected materials must be removed by the contractor from the site within 24 hours of the issue of orders to that effect. In case of non-compliance with such orders, the Engineer-in-Charge shall have the authority to cause such removal at the cost and expenses of contractor and the contractor shall not be entitled to any loss or damage on that account.

12. Departmental materials shall be issued to the contractor to the extent of requirements as assessed and in small instalments as decided by the Engineer-in-Charge. Issue of departmental materials may be of two categories :

(A) Materials for which value is to be recovered from the contractor.

(B) Materials which are issued direct to work (in respect of items the rates of which do not include the cost of these materials).

For materials of category (A) the value of materials issued to the contractor on usual hand receipt shall be recovered from the bills of the contractor in one instalment or in successive instalments as may be decided by the Engineer-in-Charge.

For materials under category (B) the contractor will act as custodian of the Deptt. and he shall take charge of the material against appropriate receipts signed by him. The contractor shall remain responsible for the proper storage and safe custody of such materials. The rates of relevant items of work shall be deemed to be inclusive of reasonable consideration for such duties and responsibilities as the custodian.

All materials, whatever be the category thereof, shall be properly stored by the contractor in suitable godowns near the site of work. Under no circumstances whatsoever shall any materials be removed from the site of work without prior written permission from the Engineer-in-charge. The contractor shall be responsible for any damage or loss of such materials unless he can satisfy the Engineer-in-Charge that the reasons for such damage or loss are due to circumstances beyond his control. The contractor shall also have to satisfy the Engineer-in-Charge regarding the proper utilisation of such materials.

The value of any materials which cannot be satisfactorily accounted for, shall be recovered from the contractor's bill or other dues as specified in P.W.D. Deptt.'s Order No. 2809-(3)A dt. 27.4.71 enclosed in West Bengal Form No. 2911.

Any materials under category (A) which may be surplus on completion of the wok, may at the sole discretion of the Superintending Engineer be taken back provided the same be of non-perishable nature and has not been damaged in any way. Surplus materials under category (B) shall be returned to the Engineer-in-Charge in good condition.

13. Subject to the conditions as aforesaid, the following materials under category (A) shall be issued to the contractor at issue rates noted against each. The materials shall be issued at the Departmental godown or godowns and for this purpose a stack-yard shall also be deemed as godown as may be specified in the contract stipulations for any

particular work. The contractor will have to carry the materials at his own cost and his quoted rate will be deemed to be inclusive of all such costs including costs for loading, unloading and stacking.

(i) Cement — at Rs. ~~2400.00~~ 2600 (Rupees two thousand and ~~four~~ six hunred only) per metric ton (1 metric ton = 0.70 cu.m.) only, including the cost of the containers.

(ii) Mild steel materials of all descriptions other than G.C.I. sheets, Mild steel (round section) and Tor steel to be actually consumed in the finished work (but not for manufactured steel articles such as grills, collapsible gate etc.) at Rs. 12500.00 (Rupees twelve thousand and five hundred only) per metric ton. Controlled items only shall be used and in sections and sizes as available in stock.

Tor steel will be issued @ Rs. ~~14500.00~~ 16000 (Rupees ~~fourteen~~ sixteen thousand ~~and five hundred~~ only) per metric ton.

Mild steel (round section) will be issued at Rs. ~~14400.00~~ 15900 (Rupees ~~fourteen~~ fifteen thousand and ~~four~~ nine hundred only) per metric ton.

Cut pieces of steel materials left surplus on completion of work shall not be taken back if the same be considered as unsuitable for utilisation in other works.

(iii) Bitumen (Bulk or packed) @ Rs. 4500.00 (Rupees four thousand and five hundred only) per metric ton.

(iv) Empty bitumen drum @ Rs. 60.00 each.

If in the interest of the work materials other than those mentioned above be issued under category (A), the issue rate of such materials shall be based on the then market rate or the stock issue rate whichever is higher. Such issue rate shall be decided by the Engineer-in-charge and his decision shall be binding.

14. Meterials obtained by dismantling government structures or parts thereof shall remain the property of Govt. The contractor shall sort out and stack the serviceable materials within the premises as per direction. He shall also dispose off the unserviceable rubbish etc. as per instruction of the Engineer-in-Charge or his representative. The contractor shall remain the custodian of such dismantled materials till the charge of the same is taken over by the Engineer-in-Charge or his representative. Consideration for the assumption of such responsibilities shall be deemed to have been included in the rates for the relevant items of work.

15. The site must be cleared by the contractor of rubbish etc. from time to time as these accumulate during the work and on completion the whole site must be left in a clean and tidy condition, to the satisfaction of the Engineer-in-Charge.

16. Number of full bricks salvaged in dismantling all types of masonry must correspond to atleast 20% of the volume dismantled.

GENERAL SPECIFICATIONS
(INCLUDING MODES OF MEASUREMENT)

(A) MATERIALS

GENERAL : All materials to be used in works shall conform to Indian Standards Specification as published by I.S.I. from time to time (and in the absence thereof as approved by the Engineer-in-Charge).

A-1 Bricks :

All bricks shall be of approved quality of standard specifications, made of good brick earth, uniform deep red, cherry or copper colour, thoroughly burnt in kiln (machine made) without being vitrified, regular in shape and size, sound, hard, homogeneous in texture, true to shape and of standard dimensions and shall be free from cracks, chips, flaws, stones or humps of any kind and shall not show appreciable signs of effloresence either dry or subsequent to soaking in water. The size of bricks shall be $9^3/_4$" X $4^3/_4$" X $2^3/_4$" (conventinal), 190 X 90 X 90 mm (modular). The bricks shall emit a clear ringing sound on being struck and have a minimum crushing strength of 105 kg./sq. cm. All the bricks which absorb water more than 20% of their own dry weight after 24 hours immersion in cold water shall be rejected.

A-2 Coarse Aggregates for Cement Concrete Works :

Stone chips or stone ballast for cement concrete (plain or reinforced) shall be hard, of uniform and fine texture, free from faults or planes of weakness and free from weathered faces. The ballast or chips must be free from loam, clay or any surface coating, free from organic matter or other impurities and screened, free of dust. Stone of black and hard variety as is generally available from quarries in Pakur or Chandil areas will be normally used. Stone aggregates from other sources may also be used provided the same is found suitable in the opinion of the Engineer-in-Charge. The opinion of Engineer-in-Charge must be recorded in writing. The ballast or chips shall be obtained by breaking from large blocks and must be more or less cubical in shape.

Size of Coarse Aggregates : For any of the following nominal sizes of graded coarse aggregates, grading shall be in conformity with the requirements laid down in the Indian Standards Specification IS : 383-1963 as shown below in Table 1.

Table I

I.S. Sieve Designation	Percentage passing for graded aggregate of nominal size			
	40 mm	20 mm	16 mm	12.5 mm
1	2	3	4	5
80 mm.	100			
63 mm.				
40 mm.	95-100	100		
20 mm.	30-70	95-100	100	100
16 mm.			90-100	
12.5 mm.				90-100
10 mm.	10-35	25-55	30-70	40-85
4.75 mm.	0-5	0-10	0-10	0-10
2.36 mm.				

When coarse aggregates brought to the site is ungraded, single size coarse aggregates of different nominal sizes, conforming to the requirements vide table II given below, shall be mixed at site with the other ingredients of concrete either directly in the mixture or on the platform in the proportion indicated in Table III below :

Table II

I.S. Sieve Designation	Percentage passing for single sized aggregates of nominal size					
	63 mm	40 mm	20 mm	16 mm	12.5 mm	10mm
1	2	3	4	5	6	7
80 mm.	100					
63 mm.	85-100	100				
40 mm.	0-30	85-100	100			
20 mm.	0-5	0-20	85-100	100		
16 mm.				85-100		
12.5 mm.					85-100	100
10 mm.		0-5	0-20	0-30	0-45	85-100
4.75 mm.			0-5	0-5	0-10	0-20
2.36 mm.						0-5

Table III

Sl. No.	Cement concrete mix	Nominal size of aggregate	Parts of aggregate of size 50 mm.	Parts of aggregate of size 40 mm.	Parts of aggregate of size 20 mm.	Parts of aggregate of size 12.5 mm.	Parts of aggregate of size 10 mm.
1	2	3	4	5	6	7	8
1.	C.C. 1 : 6 : 12	63 mm	9		3		
2.	C.C. 1 : 6 : 12	40 mm		9	3		
3.	C.C. 1 : 5 : 10	63 mm	$7\frac{1}{2}$		$2\frac{1}{2}$		
4.	C.C. 1 : 5 : 10	40 mm		$7\frac{1}{2}$	$2\frac{1}{2}$		
5.	C.C. 1 : 4 : 8	63 mm	6		2		
6.	C.C. 1 : 4 : 8	40 mm		6	2		
7.	C.C. 1 : 3 : 6	63 mm	$4\frac{1}{2}$		$1\frac{1}{2}$		
8.	C.C. 1 : 3 : 6	40 mm		$4\frac{1}{2}$	$1\frac{1}{2}$		
9.	C.C. 1 : 3 : 6	20 mm			$4\frac{1}{2}$		$1\frac{1}{2}$
10.	C.C. 1 : 2 : 4	40 mm		$2\frac{1}{2}$	1		$\frac{1}{2}$
11.	C.C. 1 : 2 : 4	20 mm			3		1
12.	C.C. 1 : 2 : 4	12.5 mm				3	1
13.	C.C. 1 : $1\frac{1}{2}$: 3	20 mm			2		1

Notes : The proportions indicated in table III above are by volume. These proportions may be varied somewhat by Engineer-in-charge after making sieve analysis of the aggregates brought to the site, when considered necessary for obtaining better density and strength of concrete, void/ratio in the tune 0-25.

All-in-aggregates : If combined aggregates are available, they need not be separated into fine and coarse, but necessary adjustment may be made in the grading by the addition of single sized aggregates. The grading of the all-in-aggregate when analysed as described in IS : 2386 (Part I) shall be in accordance with Table IV.

Table IV

I.S. Sieve Designation	Percentage passing for all-in-aggregate	
	40 mm. Nominal size	20 mm. Nominal size
80 mm	100	
40 mm	95-100	100
20 mm	45-75	95-100
4.75 mm	25-45	30-50
600 micron	8-30	15-35
150 micron	0-6	0-6

(ii) Gravel, for use as coarse aggregates in cement concrete work, must be hard, absolutely free from surface coating and on being broken, the fractured surface must indicate a uniform and fine texture free from laminations or planes of weakness. It shall be thoroughly washed and free from any foreign elements.

(iii) Jhama chips for cement concrete work shall be obtained by breaking good quality Jhama bats, must not be spongy or with any coating of foreign materials and should be homogeneous in texture. The chips shall be more or less cubical in shape.

All coarse aggregates for concrete works must be well graded. These shall be screened for removal of dust and if so necessary in the opinion of the Engineer-in-charge, shall be washed at the cost and expense of the contractor.

A-3. Coarse Aggregate for Lime concrete Works :

(i) Brick aggregates for lime concrete in foundation or flooring shall consist of approved, clean, hard, and well-burnt Jhama khoa. The khoa must be well graded and unless otherwise specified shall pass through 32 mm ring.

(ii) Brick aggregates for Lime Terracing work on roof shall consist of khoa broken from 1st class brick bats and unless otherwise specified shall pass through 25 mm ring and be suitably graded.

No jhama khoa should be used in lime terracing work.

A-4. Sand : —All sand shall be clean sharp and free from clay, loam, organic or any other foreign matter, shall be obtained from approved source. The contractor shall get the sample of sand to be used in different kinds of work approved by the Engineer-in-charge before using the same in work. Sand which in the opinion of the Engineer-in-charge or his representative is dirty, must be washed to his satisfaction at the cost and expenses of the contractor.

(i) Sand for all cement concrete work must be coarse. The sand shall pass through a mesh, 4.75 mm. square measured in the clear. Sand shall not be used for concrete works if contains more than 10% of fine grains passing through a 76 mesh seive as used for cement test, nor should the fineness modulus be less than 2.00 unless specific permission is obtained from the Engineer-in-charge.

(ii) Medium sand may be used for cement mortar, for masonry plaster etc. Fineness modulus shall be between 2 to 1.8.

(iii) Sand filling in plinth or foundation where specified may be done with fine sand or Silver sand.

A-5. Surki :

Surki shall be made from well burnt 1st class brick bats, ground to pass through a mesh 2 mm. each way, and shall be perfectly clean and free from any foreign matter.

A-6. Lime :

All lime shall be freshly burnt and slaked and screened before use. The slaking should be done at site of work. Lime for works including roof terracing shall be bisra, satna or other approved stone lime.

The specification covers lime as used in construction of buildings and other structures as described below (refer P.W.D. standard specifications, chapter II and I.S. : 712-1973).

(a) Quick-lime shall mean a calcined material, the major part of which is calcium oxide in natural association with a relatively small amount of magnesium oxide and capable of slaking with water.

(b) Fat lime shall mean the lime which has high calcium oxide content (between 95 and 100 per cent) and is dependent for setting and hardening on the absorption of carbon dioxide from the atmosphere. This is defined as class-C in I.S. : 712-1973 which is used for finishing coat in plastering, white washing etc. and with addition of pozzolanic material (surki) for masonry mortar.

(c) Hydraulic lime shall mean the lime which contains small quantities of silica and alumina and/or iron oxide which are in chemical combination with some of the calcium oxide content, giving a putty or mortar that has the property of setting and hardening under water.

(d) Hydrated lime shall mean a dry powder resulting from treatment of quick-lime with water enough to satisfy its chemical afinity for water under the conditions of hydration.

Classification of Lime :

Class A : Eminently hydraulic lime (containing 25% to 30% of clay) used for foundations and other hydraulic structures, shall be supplied as hydrated lime only and should be used particularly in any masonry work below G.L. It should be noted here that no masonry work below G. L. should be taken up with the use of any other lime, other than specified hydraulic lime. In case of doubt if any in respect of hydraulic lime being used in work below G. L., it is preferable not to use lime mortar at all below G. L.

Class C : Fat lime used mainly for lime punning, white washing and with suitable admixture, such as surki or any other pozzolanic material to produce artificial hydraulic mortar.

A-7. Cement :

No cement excepting those supplied by the Department shall be used in work or brought to site by contractor. Cement bags must be stored in a water-tight shed having wooden floor or platforms raised at least 50 mm. from ground as approved by the Engineer-in-charge. Cement which is partially set or which is lumpy or caked is to be treated as damaged and shall be removed from the site immediately.

A-8. Steel :

All steel shall be clean and free from loose mill scales, dust, loose rust and coats of paints, oil or other coatings. Any scale or loose rust shall be removed before use, even though the same may have been supplied by the Department without any claim for extra charge for the same. No steel excepting those supplied by the Department shall be used in work or brought to site by the contractor.

A-9. Timber :

All timber shall be of best quality well-seasoned and/or well-treated for preservation and protection against decay etc. It shall be uniform in substance, straight in fibre free from large or dead knots, sap, flaws, sun-cracks, shakes or blemishes of any kind. Any insect damage or splits across the grain shall not be permissible. The colour of the timber shall be uniform throughout, firm and shining with a silky lustre when planed and shall not emit dull sound when struck.

A-10. Glass :

All glasses shall be of the specified type, colour visibility and sound and shall be free from cracks, flaws, spick bubbles and blemishes and shall not weigh less than 7.4 kg./sq. m. unless otherwise specified.

A-11. Timber Doors, Windows etc. and their Fittings :

(i) Door and window works shall be carried out as per detailed drawings or as directed by the Engineer-in-Charge. Specified timber shall be used, and it shall be sawn in the direction of the grains and be straight and square.

(ii) Fittings shall be of iron, brass, aluminium or as specified. These shall be well made, reasonably smooth and free from sharp edges, corners, flaws and other defects. Screw holes shall be counter sunk to suit the head of specified wood screws. Iron fittings shall be finished bright or black enamelled or copper oxidised. Brass fittings shall be finished bright (brass), oxidised, or chromium plated (Electroplated) and aluminium fittings shall be finished bright or anodised, or as specified. Fittings shall be got approved by the Engineer-in-Charge before fixing. In case of renewal works, the new fittings shall, as far as possible, match with the existing ones. Screws shall be driven home with screw driver and not hammered in.

A-12. Paint etc. :

All paints shall be delivered in strong containers, marked with the colour of the paint, brand, volume of paint content in litres and of the best quality of approved make and brand as approved by the Engineer-in-Charge. Under no circumstances shall the paint be diluted with Linseed oil or otherwise. Any paint or enamel although of approved brand, which so hardens in the container that it cannot be readily broken up with a stirrer to a smooth uniform painting consistency, shall be rejected. Any paint or enamel too thick for proper brush application shall be rejected.

(B) EXECUTION

General : All Works shall be carried out in proper workman-like manner. Items of works not covered by the following, shall be carried out as per best practice according to the directions of the Engineer-in-Charge and to his satisfaction. Unless otherwise specified in this section or in the description of item, the cost of all stages of works mentioned hereunder shall be deemed to have been included in the rates of items provided in the Schedule.

B-1 *(a)* Excavtions of Foundation and Filling up Trenches :

(i) Foundation when excavated to the level shown in the drawing will be shown to the Engineer-in-charge and if on account of bad ground or for any reason whatsoever he decides to go deeper with the foundation, the contractor shall excavate further to the depths required by the Engineer-in-charge. In no case shall the foundation soling or concrete be laid prior to receiving orders to that effect from the Engineer-in-charge or his authorised representative.

(ii) Excavating shall include throwing the excavated earth at least one metre or half the depth of excavation, whichever is more, clear of the edge.

(iii) The excavated areas around the foundation of structures are to be filled up properly to the required levels with earth obtained from excavation or other materials as directed, well rammed with water and consolidated in layers not exceeding 150 mm. at a time. The quantity for this item of work will be measured on the basis of quantity of excavation paid for less the volume occupied by the structure in foundation.

(b) (i) **Shoring :** For loose earth and when the depth of excavation exceeds 3 metres poling boards (vertical members) of 50 to 75 mm. in thickness and 175 to 225 mm. in width preferably of sal-wood to be placed close together and to be driven about 300 mm. in ground below the bottom of the trench with intermediate sal-bullah piling of dia not less than 100 mm. at the rate of 900 to 1000 mm. centre to centre to be placed in between the vertical surface of trench and the poling boards and double struts of sal- bullah of not less than 100 m. in dia between two wallings (horizontal member) of 250 mm. in width and 75 mm. in thickness held horizontally between them.

(ii) For medium clay and when the depth of excavation exceeds 2 metres but not exceeds 3 metres single struts will be provided and sal-bullah piling may not be placed. Other requiremnts are to be satisfied as *(i)* above.

(iii) For stiff clay or dry clay and when the excavation is within 2 metres, vertical poling boards will be placed at the rate of 600 to 1000 mm. apart with or wthout walling prices; but single or double strutting willbe provided. Other requirements are to be satisfied as per *(i)* above.

B-2 Lime Terracing :

Lime terracing on roof shall be composed of brick aggregate of 25 mm. (nominal) size unless otherwise specified, surki and bisra or satna lime in the specified proportion.

Lime concrete shall be laid (and not thrown) in a single layer and spread and rammed, with wooden rammers of weight not exceeding 2 kg. to the specified average thickness, slopes and levels. The concrete shall be used when it is quite fresh, concrete left over from the previous days work shall in no circumstances be used.

During this preliminary ramming the surface shall be tested and kept perfectly true and even by means of a trowel, straight edge and spirit level. The concrete shall then be further consolidated by two rows of labourers sitting close and beating the concrete in unison with wooden thappies (weight 1 to 2 kg.) across the entire width of the roof and thus slowly traversing the length of the roof. Special care shall be taken to consolidate the concrete properly at its junction with the parapet wall. This beating shall be continued for three to four days or more until the mortar is almost set and the wooden thappies rebound from the surface readily when struck on it, causing a ringing sound to emit.

During the operation of mixing, "Kunji" water is to be sprinkled and allowed to soak well in. Lime water must be continually sprinkled on the terracing to keep it wet whilst being beaten. The mortar which comes to the surface of the terracing during the beating, shall be rendered smooth and finished off with lime rubbing and afterwards with oil. Concrete shall be kept wet after each day's work by speading straw, and watering very frequently, so as to ensure thorough setting of the concrete.

Mouths of rain water pipes shall be properly finished as per direction. The slope of the finished terrace shall not be less than 1 in 48, unless a flatter slope is desired by the Engineer-in-charge. The roof surface shall slope from all sides towards the outlets. The minimum thickness of concrete at junction with parapet shall be 75 mm. and shall be rounded. The concrete should be leak-proof and free from cracks.

Payment will be made on the basis of average finished thickness after consolidation.

B-3 Cement concrete Works (Plain or Reinforced) :

(i) **Shuttering and staging :** Wherever necessary, shuttering and staging must be provided. Unless otherwise stated no payment will be made for such shuttering or staging and the cost thereof will be deemed to have been covered by the rate for relevant finished item of work. Where payment for shuttering has been specified, the rate shall be deemed to cover the cost of the necessary staging as well. Payment if any, for shttering will be on the basis of surface area of shuttering in actual contact with concrete.

Shuttering may be of approved dressed timber true to line, not less than 25 mm. thick. Surface to be incontact with concrete are to be planed smooth except where otherwise stated. As an alternative, sufficiently rigid steel shuttering may be used. In every case, joints of the shuttering are to be such as to prevent the loss of liquid from concrete. In timber shuttering the joints must be perfectly closed and the entire shuttering surface shall be covered with polythene sheets of approved quality. In case of steel shuttering also the joints are tobe similarly lined.

All shuttering and framing must adequately be stayed and braced to the satisfaction of the Engineer-in-charge for properly supporting the concrete during the period of hardening. It shall be so constructed that it may be removed without shock or vibration to the concrete.

Before the concrete is placed, the shuttering shall, if considered necessary, be coated with an approved preparation for preventing the adhesion of the concrete to the moulds, and it is to be of such a nature and so applied that the surface of the finished concrete is not stained. Care shall also be taken that such approved preparation shall be kept out of contact with the reinforcement.

In no circumstances shall forms be struck until the concrete reaches a strength of at least twice the stress of which the concrete may be subjected at the time of striking.

Interior of all moulds and boxes must be thoroughly washed out with a hosepipe or otherwise so as to be perfectly clean and free from all extraneous matter prior to the deposition of concrete.

All form works shall be removed without shock or vibration. Before the form work is stripped, the concrete surface shall be exposed where necessary in order to ascertain that the concrete has hardened sufficiently. In normal weather and with ordinary cement, vertical or side shuttering may be removed after three days and the bottom shuttering of horizontal members after fourteen days in case of slabs and twenty one days in case of beams and cantilevers etc. from the date of placing the last portion of the concrete in the structure. The above period are the minimum and may be extended if found necessary. Before stripping the shuttering of structural members the contractor shall take previous permission of the Engineer-in-charge or his reppresentative.

No plugs, bolts, ties, hold fasts or any other appliances whatsoever for the purpose of supporting the shuttering are to be fixed in the structure or placed in such a way that damage might result to the work in removing the same when the shuttering is struck.

(ii) **Scaffolding :** The scaffolding must be strong and rigid stiffened with necessary cross bracers and always decked and boarded on the sills with close boarded ceiling and swings to prevent any injury to persons or materials. The contactor shall have to allow other traders to make reasonable use of his scaffolding as and when directed by the Engineer-in-charge.

If for the interest of the work the contractors have to erect scaffolding in other's properties including local bodies or corporation, the arrangement for the same including the cost of licensing fees etc. shall have to be borne by the contractor and the department should be kept free from any liability on this account.

(iii) **Mixing, placing and compacting :** The proportion specified is by volume in dry compacted condition of the different constituents.

Boxes of suitable size shall be used for measuring sand and aggregate. Unit of measurement for cement shall be a bag of cement weighing 50 kg. and this shall be taken as 0.035 cubic metre. While measuring the aggregate, shaking, ramming or hammering shall not be done. The proportioning of sand shall be on the basis of its dry volume and in case of damp sand, allowances for bulkage be made. The aggregate in each batch of concrete are to be so proportioned as to contain full bags of cement.

Normally all structural concrete shall be mixed in mixture machine of appropriate proportion, shall have to be vibrated with suitable vibrator. Mixing shall be continued until there is a uniform distribution of the materials and the mass is uniform in colour and consistency, but in no case shall the mixing be done for less than two minutes. The rates appearing in the Schedule of Rates against such items are inclusive of hire and operational charges of such appliances. For particular job the Engineer-in-charge may allow hand mixing and of hand tapping of concrete. In case of hand mixing concrete, extra cement up to 10% over the standard requirement of cement for machine mix of particular mix shall have to be porvided by the contractor at his own cost.

As the bulking of sand may vary from day to day and at different parts of the day on account of varying moisture content, frequent tests for bulking shall be carried out with the sand to be used and the amount of bulking allowed for in the field mix so as to keep the actual proportion constant throughout.

Only such quantities as are required for immediate use are to be mixed at any one time. Sufficient water is to be added to obtain proper workability so that the mixture may flow readily round at the reinforcement and into every part of the moulds. The workability shall be measured by the amount of slump.

The quantity of water to be used for each mix of 50 kg. cement to give the required consistency shall not be more than 34 litres for 1 : 3 : 6 mix., 32 litres for 1 : 2 : 4 mix., 30 litres for 1 : 1½ : 3 mix. and 27 litres for 1 : 1 : 2 mix. In the case of vibrated concrete, the limit specified may be suitably reduced to avoid segregation.

The total water content in each batch of concrete shall always be kept constant as the amount previously determined by experiments. The quantity of water to be actually added may, therefore, vary depending on the moisture content in the aggregates. In actual job if the quantities of the ingredients remain constant, the amount of slump may be taken as a good guide indicating the total water content in the mixture. The consistency and consequently the water content of the concrete shall therefore be kept constant and checked from time to time as work proceeds, by means of standard slump tests. The slump tests shall be carried out with concrete immediately after it has been mixed and before any initial set has commenced, the sample being taken preferably at the point where the concrete is being delivered for placing in the moulds.

The mould shall be filled about one-fourth of its height with concrete which shall then be tamped, using 25 strokes of a 16 mm. diameter steel rod, 60 c.m. long and bullet-pointed at the lower end. The filling shall be completed in successive layers similar to the first and the top struck off so that the mould is exactly filled.

The mould shall then be removed by raising vertically immediately after filling. Themoulded concrete shall then be allowed to subside and the height of the specimen measured after coming to rest.

The consistency shall be recorded in terms of millimetres of the subsidence of the specimen during the test, which is known as slump.

The following slumps shall be adopted for different works.

Sl. No.	TYPE OF WORK	SLUMPS	
		When vibrators are used	When vibrators are not used
1.	Mass concrete in foundations footings, retaining walls and pavements	10 to 25 mm.	50 to 75 mm.
2.	Mass concrete in R.C.C. foundation, footings and retaining walls	10 to 25 mm.	80 mm.
3.	Beams, slabs and columns simply reinforced	25 to 40 mm.	100 to 125 mm.
4.	Thin R.C.C. section or section with congested steel	40 to 50 mm.	125 to 150 mm.

I.S : 456-1978 allows use of nominal mix of concrete upto grade M20 and may be allowed in works at the discretion of Engineer-in-Charge and will be guided by the provision of IS : 456-1978. For grade of concrete above M20 design mix has to be adopted. For determination of mix proportion for design mix concrete, the target strength should be higher than the specified characteristic strength to ensure that characteristic strength is attained at 28 days. According to Explanatory Hand Book on I.S : 456-1978 (S.P. 24-1983) :

Target strength = Characteristic strength + 1.65 x standard deviation.

Standard deviation for different grades of concrete in absence of any test may be taken as per IS : 456-1978 as follows :-

GRADE OF CONCRETE	ASSUMED STANDARD DEVIATION N/MM²
M 10	2.3
M 15	3.5
M 20	4.6
M 25	5.3
M 30	6.0

Once the target strength of cube moulds with specific mix design is obtained in the laboratory, it may be inferred that the corresponding characteristic strength of concrete, prepared with the materials used in the test mould (s) cured under identical condition as that of the test specimen, shall be obtained at site at 28 days.

The Explanatory Hand Book on I.S : 456-1978 (S.P. 24-1983) provides an approximate formula for expressing the strength of concrete at age 't' (in days) : $ft = \frac{t}{a + bt} \times f28$ where f28 is the strength at 28 days, ft = strength of concrete at any age 't' (in days), a = 4.7 and b = 0.833.

ACCEPTANCE CRITERIA :

The concrete shall be deemed to comply with the strength requirements if :

a) every sample has a test strength not less than the characteristic value; or

b) the strength of one or more samples though less than the characteristic value, is in each case not less than the greater of :

1) the characteristic strength minus 1.35 times the standard deviation; and

2) 0.80 times the cahracteristic strength; and the average strength of all the samples is not less than the characteristic strength plus

$$\left[1.65 - \frac{1.65}{\sqrt{\text{number of samples}}}\right]$$ times the standard deviation.

The concrete shall be deemed not to comply with the strength requirements if :

c) the strength of any sample is less than the greater of :

1) the characteristic strength minus 1.35 times the standard deviation; and

2) 0.80 times the characteristic strength; or

d) the average strength of all the samples is less than the characteristic strength plus

$$\left[1.65 - \frac{3}{\sqrt{\text{number of samples}}}\right]$$ times the standard deviation.

Concrete which does not meet the strength requirements as specified in (a) and (b) above but has a strength greater than that required by (c) and (d) may, at the discretion of the designer, be accepted as being structurally adequate without further testing.

If the concrete is deemed not to comply persuant to (c) or (d) above the structural adequancy of the parts affected shall be investigated and any consequential action as needed shall be taken.

Concrete of each grade shall be assessed separately.

Concrete shall be assessed daily for compliance.

Concrete is liable to be rejected if (i) it is porous or honeycombed; (ii) its placing has been interrupted without providing a proper construction joint; (iii) the reinforcement has been displaced beyond the tolerances specified; or (iv) construction tolerances have not been met. However, the hardened concrete may be accepted after carrying out suitable remedial measures to the satisfaction of the Engineer-in-Charge.

Frequency of sampling

Sampling Procedure - A random sampling procedure shall be adopted to ensure that each concrete batch shall have a reasonable chance of being tested; that is, the sampling should be spread over the entire period of concreting and cover all mixing units.

Frequency - The minimum frequency of sampling of concrete of each grade shall be in accordance with the following;

Quantity of Concrete in the Work, m^3	Number of Samples
1 - 5	1
6 - 15	2
16 - 30	3
31 - 50	4
51 and above	4 plus one additional sample for each additional 50 m^3 or part thereof

TEST SPECIMEN – Three test specimens shall be made from each sample for testing at 28 days. Additional cubes may be required for various purposes such as to determine the strength of concrete at 7 days or at the time of striking the formwork, or to determine the duration of curing, or to check the testing error. Additional cubes may also be required for testing cubes cured by accelerated methods as described in IS : 9013-1978. The specimen shall be tested as described in IS : 516-1959.

TEST STRENGTH OF SAMPLE – The test strength of the sample shall be the average of the strength of three specimens. The individual variation should not be more than ±15 percent of the average.

Concrete shall be handled from the place of mixing to the place of final deposit as rapidly as practicable by methods which will prevent the segregation or loss of the ingredients. It shall be deposited as nearly as practicable in the final position to avoid re-handling or flowing. Unless specially permitted by the Engineer-in-charge, concrete shall not be dropped freely from a hight of more than 2 metres.

Before placing the concrete, the moulds shall be cleaned of shavings, pieces of wood or other rubbish. When placing the concrete the finer material must be carefully worked against the moulds so that the faces of concrete shall be left perfectly smooth and free from honey-combing upon withdrawal of the moulds. Any defect in this respect must be dealt with by the contractor as directed by the Engineer-in-charge without any extra charges therefor.

Depositing concrete under water shall not be allowed without specific permission from the Engineer-in-charge. The method of concreting to be adopted in such cases shall have to be previously approved by him.

During placing and also immediately after deposition, the concrete shall be thoroughly compacted by ramming, spearing etc. until it has been made to penetrate and fill all the spaces between and around the steel rods, around embedded fixtures, and into the corners of formwork in such a manner as to ensure a solid mass entirely free from voids. If so directed by the Engineer-in-charge, in addition to usual ramming, spearing etc., sufficient number and suitable type of vibrators may have to be used on important jobs to enable working with a comparatively low water-cement ratio and ensure the maximum possible degree of compaction and homegeneity. It is imperative that the work should be done quickly as well as effciently and adequate number of hands must therefore be employed to ensure this.

Concrete shall be placed and compacted in its final position before setting has commenced and shall not subsequently be disturbed.

Concreting shall be carried out continuously up to construction joints, the position and arrangement of which shall be predetermined by the Engineer-in-charge or his representative. Any rest, pauses, such as for meal, shall also be subject to his approval. All concreting work should be so programmed as not to necessitate work at night. If for any reasons this becomes imperative, the contractor shall obtain previous permission of the Engineer-in-charge or his representative and make proper lighting arrangements to his satisfaction.

(iv) **Protection and curing:** The contractor shall adequately protect freshly laid concrete, about 1 to 2 hours after its laying, from too rapid drying due to sunshine, drying winds etc. and also from rains or surface water and shocks. About 24 hours after laying of concrete, the surface shall be cured by flooding with water of minimum 25 mm. depth or by covering with wet absorbent materials. The curing shall be done for a minimum priod of 10 days. Over the foundation concrete the masonry work may be started after 48 hours of its laying, but the curing of cement concrete shall be continued along with the masonry work for a minimum period of 10 days.

In case of cement concrete used as sub-grade for flooring, the flooring may be commenced within 48 hours of the laying of sub-grade. In case it is not possible to do so due to exigencies of work, the sub-grade shall be roughened with a steel wire brush without disturbing the concrete, wetted and neat cement slurry at the rate of 175 kg.of cement per square metre applied to the base before laying floor, and full rate of APS/mosaic flooring will be paid with the specific orders of the Engineer-in-charge. The curing to be continued along with the top layer of flooring for a minimum period of 10 days.

(v) **Construction joints :.** All joints in slabs and other horizontal members are to be formed by inserting vertical boards against which the concrete deposited can be properly rammed. The positions where such joints may be made will be indicted by the Engineer-in-charge or his representative.

In the case of horizontal joint any excess mortar or laitance shall be removed from the surface after the concrete is deposited and before it has set.

When the work has to be commenced on a surface which has hardened, such surface shall be well roughened and all laitance removed; the surface shall then be swept clean, throughly wetted and covered with a thin layer of mortar composed of equal volumes of cement and sand. Such works shall be deemed to be covered by the rates for concrete.

(vi) For major R.C.C. works, (where concrete is specified by strength) the mix should not be leaner than 1:2:4 so as to give ultimate crushing strength not less than 20N/mm² at 28 days cured under field condition. The mix for the concrete is to be so adopted and the slump is to be so allowed as to give specified strength and proper workability at the existing site conditions. Contractor shall remain fully responsible for producing concrete of specified strength in the actual job and therefore cast at his own cost test specimens of 15 cm. cube as already specified during work and cure the same in similar way as for laid concrete for being tested for strength. Each set of test specimen shall be taken to cover the quantity of concrete laid on the job during the period from the time of taking the previous set of specimens and the quantity will be estimated by the Engineer-in-charge from records maintained by him.

The interior surface of the mould and base plate shall be lightly oiled before the concrete is placed in the mould.

(a) When the job concrete is compacted by ordinary methods, the test specimen shall be moulded by placing the fresh concrete in the mould in three layers, each approximately one-third of the volume of the mould. In placing each scoopful of concrete, the scoop shall be moved around the top edge of the mould as the concrete there slides from it in order to ensure a uniform distribution of concrete wihtin the mould. Each layer shall be rodded, 25 times with a 16 mm. rod, 60 cm. in length, bullet pointed at the lower end. The strokes shall be distributed in a uniform manner over the cross-section of the mould and shall penetrate into the underlying layer. The bottom layer shall be rodded, throughout its depth. After the top layer has been rodded, the surface of the concrete shall be struck off with a trowel and covered with a glass plate at least 6.5 mm. thick or a machined metal plate. The whole process of moulding shall be carried out in such a manner as to preclude the alteration of the water-cement ratio of the concrete, by loss of water either by leakage from the bottom or overflow from the top of the mould.

(b) When the job concrete is placed by vibration and consistency of the concrete is such that the test-specimens cannot be properly moulded by hand rodding as described under *(a)* above, the specimens shall be vibrated to give a compaction corresponding to that of the job concrete. The fresh concrete shall be placed in the mould in two layer, each approximately half the volume of the mould. In placing each scoopfull of concrete, the scoop shall be moved around the top edge of the mould as the concrete there slides from it, in order to ensure a symmetrical distribution of concrete within the mould. Either internal or external vibrator may be used. The vibration of each layer shall not be continued longer than is necessary to secure the required density. Internal vibrators shall be of appropriate size and shall penetrate only the layer to be compacted. In compacting the first layer, the vibrtors shall not be allowed to rest on the bottom of the mould. In placing the concrete for the top layer, the mould shall be filled to the extent that there will be no mortar loss during vibration. After vibrating the second layer, enough concrete shall be added to bring the level above the top of the mould. The surface of the concrete shall then be struck off with a trowel and covered with a glass or steel plate as specified under *(a)* above. The whole process of moulding shall be carried out in such a manner as to preclude the alteration of water-cement ratio of the concrete by loss of water either by leakage from the bottom or overflow from the top of the mould.

After curing, the specimen properly wrapped shall be made over to the Engineer-in-charge or his representative who will arrange to have them tested at 28 days from the date of casting. If there be any delay for any reason whatsoever the result of the test shall nevertheless be valid and will be applicable as per rules in each

case for all test specimens whatsoever. The contractor shall be responsible for proper packing of the specimens at his own cost, for safe and convenient transport of the same from the site to the testing laboratory. The cost of testing the test moulds and other charges including cost of carriage of the test moulds from the work site to the particular laboratory (both ways) and other incidental charges in this connection will have to be borne by the contractor.

In case of concrete showing, on the result of the cube tests, strength less than that specified in *(a)* and *(b)* of the Acceptance Criteria but has a strength greater than *(c)* & *(d)* of the said Acceptance Critaria concrete may, at the discretion of the Engineer-in-Charge, be accepted as being structurally adequate without further testing.

If the concrete is deemed not to comply persuant to *(c)* & *(d)* of the Acceptance Criteria, the structural adequacy of the parts affected may be investigated as per provision of Clause 16.3 and/or Clause 16.5 of I.S. 456-1978 i.e. core test and/or load test, as the case may be before rejection on the application of the Contractor with the undertaking to bear the cost of such tests.

If the strength of the concrete is such that it satisfies provisions made in sub-clause 16.3.3 and/or sub-clause 16.5.3 of I.S. 456-1978, concrete in that member represented by such tests shall be considered acceptable but the Engineer-in-Charge shall have the full power to fix the rate of deduction @ 100/- per cubic metre.

In case the test results do not satisfy the relevant requirement of the preceeding paragraph, the Volume of concrete so defecient shall bedeemed to be un-acceptable and shall be removed from the structure and replaced by fresh concrete of specified strength and the contractor shall, in that case, have to carry out the instruction of the Engineer-in-Charge irrespective of the amount of loss, inconvenience and difficulties involved.

The contractor shall remain liable to act/to carry out instructions under the provision of this clause, notwithstanding issuing by the Engineer-in-Charge of any certificate or the passing of any bills or accounts.

B-4. 1st-Class Brickworks :

Cement mortar shall be prepard by mixing sand and cement in specified proportion. Sand shall be measured on the basis of its dry volume. In case of damp sand, its quantity shall be increased suitably to allow for bulkage.

Brickwork shall be laid in English bond. The brick shall be laid by larrying method. A layer of mortar shall be spread on full width for suitable length of the lower courses. Each brick shall first be laid so as to project over the one below, both at the end and at the side, then pressed into the mortar and shoved into final position so as to embed the brick and to fill its inside face fully with mortar. Cut bricks shall not be used except where necessay.

The walls shall be taken up truly plumb with plumb bob. The thickness of brick courses shall be kept uniform and for this purpose, wooden straight edge with graduations giving thickness of each brick course including joint shall be used. All courses shall be laid truly horizontal and all vertical joints shall be truly vertical. Vertical joints in alternate course shall come directly one over the other. A set of tools comprising wooden straight edge, masons spirit level, square, half metre rule, line and pins, string and plumb shall be kept for every 3 masons for frequent checking during progress of work. Faces of walls found not in plumb shall be dismantled.

Both the faces of walls of thickness greater than 25 cm. (10") shall be kept inproper plane. All the connected brickwork shall be carried up nearly at one level and no portion of the work shall be left more than 1 m. below the rest of the work. Where this is not possible, the work shall be racked according to bond (and not left foothed) at an angle not steeper than 45°.

Bricks shall be so laid that all joints are quite full of mortar. The thickness of joints shall not exceed 10 mm. (2/5"). Bricks shall be laid with frogs upward except in the top course where frog shall be placed downward. The face joints shall be racked to a minimum depth of 15 mm. (3/5") by racking tools daily during the progress of work when the mortar is still green, so as to provide proper key for plaster or pointing to be done. Where plastering or pointing is not required to be done, the joints shall be struck flush and finished at the time of laying.

The face of brickwork shall be cleaned the very day that brickwork is laid daily and all mortar droppings removed.

Green work shall be protected from rain by suitable covering. The brickwork shall be kept wet for a period of at least 7 days. The top of masonry work shall be left flooded at the close of the day.

Scaffolding shall be sound and strong and holes left in masonry work for supporting the scaffolding shall be filled and made good, before plastring.

B-5. Damp Proof Course :

This shall be laid to specified thickness over walls for the full thickness of the super structure walls. The surface shall be levelled and prepared before laying the cement concrete. Edges of damp proof course shall be straight, even and vertical. Side shuttering shall consist of wooden form and shall be strong and properly fixed so that it does not get disturbed during compaction and the mortar does not leak through. The concrete mix shall be of workable consistency and shall be tamped thoroughly to make a dense mass. When the sides are removed, the surface should come out smooth without any honey-combing. The damp proof course shall be laid continuous and the surface shall be double chequered. Damp proof course shall be cured for at least seven days, after which it shall be allowed to dry. Water proofing materials of approved quality shall be added to the concrete mixture in accordance with the manufacturer's specifications starring the quantity of water proofing material in litres or kg. per 50 kg. of cement and will be paid for separately. Similarly, polymer based paint used under Damp proof course as per manufacturer's specifiction shall also be paid separately.

B-6. Cement Plaster :

The proportion of mortar for exterior or interior plaster shall be as specified in the items of work.

The plaster shall be of thickness as specified and the surfce shall be similarly cured as for cement concrete . The moulding shall be carried out as shown in the drawing and shall be separately measured in overall length unless otherwise specified in the items. Interior corners and edges of openings if so directed by the Engineer-in-chage shall be rounded off or chamfered with the same mortar for which no extra payment will be allowed. All cement concrete surface should be chipped off properly before taking up the plastering work.

B-7. Artificial Stone Floorings :

The artificial stone flooring shall be laid in panels of shape and size as directed. The casting of the panels will be so programmed as to prevent bonding on the freshly laid panel with adjacent panels.

Unless otherwise specified, the underlay shall be with graded stone chips 12 mm. down the thickness of topping shall be of 10 mm. thick and colouring pigment as may be required shall only be added with the topping. The topping and the underlay shall not be laid in one operation. After laying the 'Underlay' the surface shall be left out to dry. The topping shall be laid only after the underlay has sufficiently dried and initially set and after thoroughly brushing with hand wire brush and sweeping clean and after application of slurry. The topping shall be finished with an English trowel and a piece of clean dry linen. During all the stages, the required level shall be carefully observed and maintaind. Suitable grading, where required shall be provided in the flooring for water drainage as directed by the Engineer-in-charge.

The corner between floor and wall shall be round off as directed by the Engineer-in-charge for which no separate payment shall be made. All cement concrete surfaces should be chipped off properly before taking up the flooring work.

B-8. Rain Water Pipes :

The rain water pipes shall be of the materials and of the size as specified. All rain water pipes shall have suitable grating as directed at the inlet openings at roof and shall be fitted and fixed in proper position with necessary offsets, clamps, shoe, Y-junctions and other accessories as required and as directed by the Engineer-in-charge. The pipes are to be fixed to walls in cement mortar (1:4) with necessary clamps and nails, suitable teak wood blocks being fixed on the walls to receive the nails. Y-junction shall be used at the top of the pipe and the vertical leg thereof shall be provided with a cowl. All joints are to be properly packed. In case the hole is made much larger than the size of the pipe, cement concrete (1:2:4) shall be used to fill the annular space. The pipes with fittings etc. are to be painted with 2 coats of paint.

B-9. White Washing, Colour Washing :

Preparation of surface : All surfaces for white washing, colour washing, painting, shall be thoroughly brushed free from mortar droppings and foreign matter and prepared to the satisfaction of Engineer-in-charge, before application of the treatment.

Before white washing all the nails etc. have to be removed from the walls and all nails or other holes, small depressions or damages in plaster or wall surface shall be filled or repaired to original condition with lime paste.

Old surfaces spoiled by smoke and greasy soots shall be sprinkled with surki and water and rubbed with brick bats or steel wire brushes or steel scrapers. The surface shall then be broomed to remove all dust and shall be washed with clean water.

Preparation of white wash : The white washing is to be done with 5 parts of stone lime and one part of shell lime with necessary gum (2 kg. per cu.m. of lime) using indigo as necessary and to be mixed as per standard practice.

Prepartion of colour wash : Colour washing shall have a primer of white wash and shall be of shade as approved by the Engineer-in-charge. Sufficient quantity of colour wash enough for complete job shall be prepared in one operation to avoid any difference in shade.

Procedure and preparation of the surface shall be same as in white washing.

Application of white wash and colour wash: The operation for each coat shall consist of four consecutive stroks of the brush, one horizontally from right to left and the next from left to right and the thirdstroke bottom upward and the fourth from top downward before the previous stroke dries. Each coat shall be allowed to dry before the next coat applied. No portion of the surface shall be left out initially to be patched up later on. The brush shall be dipped in white wash or colour wash, pressed lightly against the wall of the container and then applied by lightly pressing against the surface with full swing of hand.

The white wash on ceiling should be done prior to that on walls.

Protective Measures: Surfaces of doors, windows, floors, articles of furniture, beams, burghas etc. and such other parts of the building not to be white or colour wahsed shall be protected from being splashed upon. Such surfaces shall be cleaned of white or colour wash splashes, if any.

B-10. Dry Distempering:

Dry distemper of approved brand and manufacture shall be used. The shade shall be got approved from the Engineer-in-charge before application of the distemper. The dry distemper shall be stirred slowly in clean water using 6 decilitres (0-6 litre) of water per kg. of distemper or as specified by the makers. Warm water shall preferably be used. It shall be allowed to stand for at least 3 minutes (or if practicable over night) before use. The mixture shall be well stirred before and during use to maintain an even consistency. Distemper shall not be mixed in larger quanitty than is actually required for one day's work.

Before new work is distempered, the surface shall be thoroughly brushed free from mortar droppings and other foreign matter and sand papered smooth. *New plaster surfaces shall be allowed to dry for at least twomonths, before applying distemper.* In the case of old work, all loose pieces and scales shall be removed by sand papering. The surface shall be cleaned of all grease, dirt etc. Pitting in plaster shall be made good with plaster of parish mixed with dry distempere of the colour to be used. The surface shall then be rubbed down again with a fine grade sand paper and made smooth. A coat of the distemper shall be applied over the patches. The surface shall be allowed to dry thoroughly before the regular coat of distermper is applied. The priming coat of whiting shall be applied and no white washing coat shall be beused as a priming coat for distemper.

Whiting (ground white chalk) shall be dissolved in sufficient quantity of warm water and thoroughly stirred to form a thin slurry which shall then be screened through a clean coarse cloth. Two kg. of gum and 0.4 kg. of copper sulphate dissolved separately in hot water shall be added for every cu.m. of the sluurry which shall then be diluted with water to the consistency of milk so as to make a wash ready for use.

The treated surface shall be allowed to dry before distemper coat is given. In the case of new work, the treatment shall consist of a priming coat of whiting followed by the application of two or more coats of distemper till the surface shows an even colour. For old work the surface is to be prepared as described above and one or more coats of distemper shall be applied till the suface attains an even colour. The application of each coat shall be as follows:– The entire surface shall be coated with the mixture uniformly, with proper distemper brushes (ordinary white wash brushes shall not be allowed) in horizontal strokes followed immediately by vertical ones which together shall constitute one coat. The subsequent coats shall be applied only after the previous coat has dried. The finished surface shall be even and uniform and shall show no brush marks. Enough distemper shall be mixed to finish one room at a time. The application of a coat in each room shall be finished in one operation and no work shall be started in any room, which cannot be completed the same day. After each day's work, the brushes shall be washed in hot water and hung down to dry. Old brushes which are dirty or caked with distemper shall not be used.

B-11. Painting:

All surfaces for painting shall be properly sand papered and cleaned and where necessary good quality putty shall be used to hide all holes, cracks, open joits etc. The rate for painting includes, such work.

Paint shall be applied with approved brushes and surfaces shall be sand papered after every coat. All work when completed shall present a smooth, clean solid and uniform surface, to the satisfaction of the Engineer-in-charge.

(a) **Primer:** All surfaces for painting, if they are new, should have a coat of priming before application of the paint. Old surfaces where existing paints have been completely worn out owing to long use should also receive a coat of priming before application of fresh painting.

(i) **Wood Primer:** Wood primer of approved brand and manufacture is to be applied on the wooden surface which should be free form moisture and loose particles.

(ii) **Steel Primer:** For steel surface red oxide primer, zinc chromate primer of approved brand and manufacture and as per direction of the Engineer-in-charge is to be applied on the surface. The surface should be made free of grease, rust, moisture and loose particles.

(iii) **Cement Primer Coat (Alkali Resisting Primer):** Cement primer coat is to be used as base coat on wall finish of cement, lime or lime cement plaster or on asbestos cement surface before application of any wall coating e.g. oil bound distemper, oil based paints, synthetic enamel, plastic emulsion etc, on them. The cement primer is composed of a medium and pigment which are resistant to the alkalies present in the cement, lime or lime cement in wall finish and provides a barrier for the protection of subsequent coats of oil bound distemper or paints. Priming coat shall be preferably applied by brushing and not by spraying. Hurried priming shall be avoided particularly on absorbent surface. New plaster patches in old work before applying oil bound distemper paints etc. should also be treated with cement primer. The surface shall be thoroughly cleaned of dust, all white or colour wash by washing and scrubbing. The surface shall then be allowed to dry for at least 48 hours. It shall then be sand papered to give a smooth and even surface. Any unevenness shall be made good by applying putty, made of plaster of paris mixed with water onthe entire surface including filling up the undulation and then sand papering the same after it is dry. The cement primer shall be applied with a brush on the clean dry and smooth surface. Horizontal strokes shall be given first, vertical strokes shall be applied immediately afterwards. This entire operation will constitute one coat. The surface shall be finished as uniformly as possible leaving no brush marks. It shall be allowed to dry for atleast 48 hours before oil bound distemper or paint is applied.

(b) **Synthetic Enamel Paint:** Synthetic enamel paint of approved brand and manufacture and of the required shade shall be used for the top coat and an undercoat of shade to match the top coat as recommended by the manufacturer shall be used. Undercoat of the specified paints of shade suited to the shade of the top coat shall be applied and allowed to dry overnight. It shall be rubbed next day with the fine grade of wet abrasive paper to ensure a smooth and even surface free from brush marks and all loose particles dusted off. Top coats of specified paint of the desired shade shall be applied after the undercoat is thoroughly dry. Additional finishing coats shall be applied if found necessary to ensure properly uniform glossy surface.

(c) **Aluminium Paint:** Aluminium paint of approved brand and manufacture shall be used. The paint comes in compact dual containers with the paste and the medium separately. The two shall be mixed together to proper consistency before use. Each coat shall be allowed to dry for 24 hours and lightly rubbed down with fine grade sand paper and dusted before the next coat is applied. The finished surface shall present an even and uniform appearance. As aluminium paint is likely to settle in the container, care shall be taken to frequently stir the paint during use. Also the paint shall be applied and laid off quickly, as surface is otherwise not easily finished.

(d) **Plastic (Acrylic) Emulsion Paint:** Plastic (acrylic) emulsion paints are not suitable for application on external surface and surfaces which are liable to heavy condensation and are to be used generally on internal surfaces. For plastered surfaces a cement priming coat is required before application of plastic emulsion. Plastic emulsion paint of approved brand and manufacture and of the required shade shall be used. The paint will be applied in the usual manner with brush or roller. The paint dries by evaporation of the water content and as soon as the water has evaporated the film gets hard and the next coat can be applied. The time for drying varies from one hour on absorbent surfaces to 2 to 3 hours on non-absorbent surfaces. The *thinning of emulsion is to be done with water and not with turpentine.* Thinning with water will be particularly required for the undercoat which is applied on the absorbent surface. The quantity of thinner to be added shall be as per manufacture's instructions. The surface on finishing shall present a flat, velvety, smooth finish. If necessary more coats will be applied till the surface presents a uniform appearance.

Precautions: (i) Old brushes if they are to be used with emulsion paints should be completely dried of turpentine or oil paints by washing in warm soap water. Brushes should be quickly washed in water, immediately after use and kept immersed in water during break periods to prevent the paint from hardening on the brush.

(ii) In the preparation of walls for plastic emulsion painting, an oil base putty shall be used in filling cracks, holes etc.

(iii) Splashes in floors etc. shall be cleaned out without delay as they will be difficult to remove after hardening.

(iv) Washing of surfaces treated with emulsion paints shall not be done within 3 to 4 weeks of application.

(e) **Varnishing:** Varnish for the undercoat shall be a flatting varnish of the same manufacture as the top coats. New wood work to be varnished shall be finished smooth with a carpenter's plane. Knots shall be cut to a slight depth. Cracks and holes shall be cleaned of dust. The knots, cracks etc. shall then be filled in with wood putty. The varnish shall be applied liberally with a full brush and spread evenly with short light strokes to avoid frothing. If the work is vertical the varnish shall be crossed and recrossed and then laid off, the later being finished on the upstroke so that varnish, as it sets, flows down and eliminates brush marks. The above process will constitute one coat. If the surface is horizontal, varnish shall be worked in every direction with light quick strokes and finihsed in one definite direction so that it will set without showing brush marks. Rubbing down and fatting the surface shall be done after each coat except the final coat with fine sand paper. The work shall be allowed to dry away from draughts and damp air. The finished surface shall then present a uniform appearance and fine glossy surface free from streaks, blisters etc. Any varnish left over in the small container shall not be poured back into the stock tin, as it will render the latter unit unfit for use. Special fine haired varnishing brushes shall be used and not ordinary paint brushes. Brushes shall be well worn and perfectly clean.

(f) **Oiling with Raw Linseed Oil:** Raw linseed oil shall be lightly viscous but clear and of a yellowish colour with light brown tinge. Its specific gravity at a temperature of 30°C shall be between 0.923 and 0.928. The oil shall be mellow and sweet to the taste with very little smell. The oil shall be of sufficiently matured quality. Oil turbid or thick, with acid and bitter taste and rancid odour and which remains sticky for a considerable time shall be rejected. The oil shall be of approved brand and manufacturer. The wood work shall be cleaned of all smoke and grease by sand papering or by washing with lime and water. The surface shall then be washed with soap and water and completely dried. The oil shall be applied freely with brushes (not rags) and spread evenly and smooth until no more oil is absorbed. Each subsequent coat shall be applied after the previous coat is thoroughly dried and in any case not before 24 hours of application of the first coat. Work after completion shall not be patchy and sticky to the touch and shall present a uniform appearance.

(g) **Wax Polishing:** Wax polishing shall be done with material of approved brand and manufacture. Preparation of surfaces will be same as for vanishing. The polish shall be applied evenly with a clean soft pad of cotton cloth in such a way that the surface is completely and fully covered. The surface is then rubbed continuously for half an hour. When the surface is quite dry, a second coat shall be applied inthe same manner and rubbed continuously for one hour or until the surface is dry. The final coat shall then be applied and rubbed for two hours (more if necessary) until the surface has assumed a unfirom gloss and is dry, showing no sign of stickyness. The final polish depends largely on the amount of rubbing which should be continuous and with unfirom pressure with frequent changes in the direction.

(h) **French Polishing:** Pure shellac varying from pale orange to lemon yellow colour, free from resin or dirt shall be dissolved in methylated spirit at the rate of 150 gm. of shellac to 1 litre of spirit. Suitable pigment shall be added to get required shade. The surface shall be cleaned. All unevenness shall be rubbed down smooth with sand paper and well dusted. Knots if visible shall be covered with a preparation of red lead and glue size laid on while hot. Holes and indentations on the surface shall be stopped with glaziers putty. The surface shall then be given a coat of wood filler made by mixing whiting (ground chalk) in methylated spirit at the rate of 1.4 kg. of whiting per litre of spirit. The surface shall again be rubbed down perfectly smooth with glass paper and wiped clean. A pad of woolen cloth covered by a fine cloth shall be used to apply the polish. The pad shall be moistened with the polish and rubbed hard on the wood in a series of overlapping circles applying the mixture sparingly but uniformly over the entire area of an even level surface. A trace of linseed oil on the face of the pad facilitates this operation. The surface shall be allowed to dry and the remaining coats applied in the same way. To finish off, the pad shall be covered with a fresh piece of clean fine cotton cloth, slightly damped with methylated spirit and rubbed lightly and quickly with circular motions. The finished surface shall have a uniform texture and high gloss.

(i) **Flat Wall Painting:** The priming coat shall consist of "Distempering Primer or Cement Primer". The flat wall paint shall be of approved brand and manufacture and of required shade. The surface shall be prepared as described in sub-head "Cement Primer Coat". Flat wall paint shall normally be applied on walls 12 months after their completion (in case of new work), in which case Distemper Primer will be sufficient. If the walls are to be painted earlier the primer coat shall consist of cement primer.

When the surface is dry, painting with the wall paint in uniform and even layers will be done to the required number of coats. Each coat shall be allowed to dry overnight and lightly rubbed with very fine grade of sand paper and loose particles brushed off before the next coat is applied. If after the final coat of wall paints the surface obtained is not upto the mark, further one or more coat as required shall be given to obtain a smooth and even finish at the cost of contractor. If primer or wall paint gets thickened it shall be thinned suitably with the thinner as recommended by manufacturer.

B-12. Terrazzo Flooring (Cast in situ) : I. S. 2114--1962

(a) *(i)* The aggregates used in terrazzo topping shall be marble aggregates of required colour. Marble powder used in terrazzo topping shall pass through I.S. Sieve 30.

(ii) Aggregates for terrazzo under layer as well as the base concrete shall conform to the requirements of ordinary cement concrete.

(b) Cement used for floor finish work shall be ordinary cement or white cement of approved quality.

(c) Pigments incorporated in terrazzo shall be of approved make & brand and of permanent colour.

(d) The dividing strips may be of copper, brass, aluminium, plastic, glass or similar materials. Metallic dividing strips shall have a protective coating of bitumen. The thickness of strip shall not be less than 1.5 mm. and width not less than 20 mm.

(e) *(i)* The base concrete shall be lean cement concrete of mix 1 : 5 : 10 or lime concrete and thickness shall be not lesss than 100 mm.

(ii) The cushioning layer shall preferably be lime concrete and thickness shall be not less than 75 mm.

(iii) The under layer shall be of cement concrete of 1 : 2 : 4, size of coarse aggregates not exceeding 10 mm. The thickness of terrazzo topping shall be not less than the following, depending upon the grades and size of chips used.

Grade No.	Size of chips	Minimum thickness of topping
00	1 to 2 mm.	6 mm.
0	2 to 4 mm.	
1	4 to 7 mm.	9 mm.
2	7 to 10 mm.	12 mm

(f) The mix for tarrazzo topping shall consist of cement with or without pigments, marble powder, marble aggregates and water. The proportions of cement and marble powder shall be 3 parts of cement and one part of powder by WEIGHT. For every part of cement marble powder mix, the proportion of aggregates by VOLUME shall be as follows depending upon the size and grade of marble aggregates :

Size of aggregates	Proportion of aggregates to binder mix
For grades 00.0 and 1	1¾ parts
2	1¼ parts

(g) The proportions of cement shall be inclusive of any pigments added to cement. The proportions in which pigments are mixed with ordinary cement or white cement to obtain different colour to the binder, shall be as specified in the following Table :

Colour	Pigment to be used	Proportion of pigment	Proportion of ordinary portland cement	Proportion of white cement
Red	Red oxide of iron	1	15 to 20	NIL
Black	Carbon black	1	25 to 40	"
Pink	Red oxide	1	NIL	100 to 400
Cream	Yellow oxide of iron	1	"	100 to 400
Yellow	Yellow oxide of iron	1	"	25 to 75
Light Green	Green Chromium oxide	1	"	50 to 150
French Grey		NIL	1 to 2	1

(h) *(i)* Terrazzo topping shall be laid while the under layer is still plastic, but is hardened sufficiently, normally between 18 and 24 hrs. After the laying of the under layer, terrazzo topping may be laid. A cement slurry, preferably of the same colour as the topping shall be brushed on the surface immediately before laying is commenced. The terrazzo topping shall be compacted thoroughly by tamping or rolling and trowelled smooth. Excessive trowelling or rolling in early stages shall be avoided. The compaction shall ensure that air is cleared from the mix.

(ii) The surface shall be left dry for air curing for a duration of 12 to 18 hrs. and then be cured by allowing water to stand in pools over it for a period of not less than 4 days.

(i) Grinding and polishing may be done either by hand or by machine. The first and second grinding shall be done with carborundum stone of Grit size 60 and 80 respectively. After each grinding, the surface shall be washed clean and grouted with neat cement grout of the same colour (without marble powder) of cream like consistency and then shall be allowed to dry for 24 hours and wet cured for 4 days. The third grinding shall be done with carborundum stone of Grit size 120 to 150 and the surface shall then be washed clean and allowed to dry for 11 hours and wet cured for 4 days. The fourth grinding shall be done with carborundum stone of Grit size 320 to 400 and the surface shall then be washed clean and rubbed hard with felt and slightly moistened oxalic acid powder (5 grams of oxalic acid powder per sq. m. of floor area shall be adequate) and finally the surface shall be washed clean with dilute oxalic acid solution and dried.

B-13. Door, Window Frames and Shutters :

All doors, window frames must have plaster rabbet 12mm x 12 mm. and rabbet for receiving shutter at least 12 mm. deep. Wood work shall not be painted, oiled or otherwise treated before it has been approved by the Engineer-in-charge. All portion of timber abutting against or embedded in masonary or concrete shall be painted with boiling coal-tar, before being placed in position. In place of coal-tar, use of approved wood primer shall be permitted. In case of door frames without sills, the vertical members shall be buried in floor 40 mm. deep. Where sills are provided these sills shall be sunk in the floor to 40 mm. depth and shall rest on damp-proof course. Sills shall be provided, where so directed. The door frames without sills while being placed in position, shall be provided with temporary wooden bracing or dry bricks well wedged between the styles at the sill level. These shall be retained to keep the frames from warping during construction. The frames shall also be protected from damages during construction. The shutters shall be so fixed that while closing, the left hand leaf of the shutters is closed first and the right hand leaf of shutter overlaps on the left hand leaf. The overlapping shall be minimum 20 mm. Solid wood panels shall be made out of one or more pieces of timber of not less than 125 mm. in width. In order to avoid warping, splitting and cracking, normally piece not exceeding 200 mm. in width should be used. When made from more than one piece, the pieces shall be joined with a continuous tongued and grooved joint, glued together and reinforced with metal dowels. The grains of the solid panel shall run along the longer dimension of the panel. The corners and edges of panels shall be finished as shown in drawings and these shall be feather tongued into styles and rails. Sash bars shall have mitred joints with the styles. In measuring the width and thickness of styles and rails, a tolerance can be allowed upto 1 mm. Styles and rails shall be properly and accurately mortised and tenoned. Rails which are more than 180 mm. in width shall have two tenons. Styles and end rails of shutters shall be made out of one piece only. Lock and intermediate rails exceeding 200mm in width may be made out of one or more pieces of timber, but the width of each piece shall not be less than 75 mm. Where more than one piece of timber is used, they shall be joined with a continuous tongued and grooved joint glued together and reinforced with metal dowels at regular intervals not exceeding 200 mm. or pinned with not less than three 40 mm. rust proof pins of the lost head type. Jointed pieces of timber shall belong to the same pieces. The tenons shall pass clear through styles. When assembling a leaf, styles shall be left projecting as a horn. The styles and rails shall have 12 mm. groove in panelled portion for the panel to fit in. The joinerywork shall be assembled and passed by the Engineer-in-charge and then the joints shall be pressed and secured by bamboo pins of about 6 mm. diameter. The horns of styles shall be sawn off.

Glass panes shall be fixed by wooden beading having mitred joints. A thin layer of putty shall be applied between glass panes and sash bars and also between glass panes and the beading. Fixing of glass panes with simple putty and beads shall not be permitted. Putty shall be prepared by mixing one part of white lead with three parts of finely powdered chalk and then adding boiled linseed oil to the mixture to form in a stiff paste.

B-14. Door, Window Clamps or Holdfasts :

(a) Unless otherwise specified the clamps shall be fixed to other side of the frame with screws. For the purpose of receiving clamps a recess of at least 12 mm. deep of suitable size shall be cut into the frame. After fixing the frame true to plumb with the clamps, the exposed face of the clamps shall be covered by a thin wooden covering fixed with screws.

(b) The side of the door, window frames which remains in contact with masonry shall invariably be painted with a protective coat of paint.

B-15. Schedule of Fittings :

(i) Fittings shall be of iron, aluminium or as specified. These shall be well made, reasonably smooth and free from edges, corners, flaws and other defects. Screw holes shall be counter sunk to suit the head of specified wood screws. All hinge pins shall be of steel and their riveted heads shall be well formed.

Iron fittings shall be finished bright or black enamelled or copper oxidised. Brass fittings shall be finished bright (brass), oxidised or chromium-plated (electro-plated) and aluminium fitings shall be finished bright or anodised or as specified. Fittings shall be got approved by the Engineer-in-charge before fixing.

(ii) Screws used for fittings shall be of the same metal and finish as the fittings. However anodised brass screws or chromium brass screws shall be used for fixing aluminium fitings.

(iii) Fittings shall be fixed in proper position as shown in the drawings or as directed by the Engineer-in-charge. These shall be truly vertical or horizontal as the case may be. Screws shall be driven home with screw driver and not hammered in. Recesses shall be cut the exact size and depth for the counter-sinking of hinge.

B-16. Stone Masonry Block Walling :

(i) Considering ease in handling and other requirements the nominal length and height of the block is kept 300 mm. and 150 mm. respectively with the widths as 200, 150 and 100 mm. respectively. The actual block dimensions are short by 10 mm. to accommodate mortar joint thickness. These blocks weigh from 9 to 18 kg. each. The stone masonry blocks are made from large size stone pieces bound together with lean cement concrete mix 1 : 5 : 8 (cement, sand, stone aggregate 10 mm. down). The stone piece sizes vary from 50 to 260 mm. To impart good workability and bond, the sand should be well graded and should have fine particles (15 to 20%) passing I. S. sieve no. 300 micron and 5 to 15% passing I. S. sieve no 150 micron. In area, where fly ash is available, this may be used as substitute for the fine particles of sand, provided good workability and plasticity in such lean concrete is achieved to the desired extent and in such case of using of fly ash, lesser cost of production of masonry stone block may be achieved at.

(ii) Stone Masonry blocks are prepared in the following stages : *(a)* Stone pieces are arranged in mould *(b)* concrete (1 : 5 : 8) is filled around stone pieces in 1st layer *(c)* Second layer of stone pieces is laid then *(d)* Concrete is (1 : 5 : 8) filled up to top.

Demoulding of such blocks follows soon afte 3 to 7 minutes of its casting. The moulded blocks are cured by frequent sprinkling of water over the stacks for 2 weeks and are air cured for another 2 weeks before laying them in wall.

For quality control, two blocks out of every 500 blocks be tested for compressive strength after providing proper capping as per test procedure laid down in I. S. - 2185 of 1967. From (1 : 5 : 8) lean concrete stone masonry block (290 mm x 190 mm.) and thickness 140 mm. is desired. Average ultimate crushing load for such block in tons is to be 38 and its average compressive strength thus stands at 69 kg/sq. cm. (*see* design requirement table, drawing sheet No. 1).

(iii) The blocks are used both for load bearing and non-load bearing walls. Permissible stresses in the masonry is taken from the I. S. Code 1905 of 69 "Structural safety of buildings-masonry walls".

As cutting of these blocks is not recommended all length of walls, openings, spaces between openings etc. shall be in multiple of 100 mm. and all height shall be multiple of course height i.e. 150 mm. As load bearing wall construction, these blocks can be used upto 3 to 4 storeyed construction. The wall thickness is decided based on the strength of the blocks and the load coming over it. The blocks should be dry at the time of laying in the masonry. If the climate is not dry, the blocks may be wetted on the surface only in order to reduce the suctioning of water from the mortar. For breaking of vertical joints in alternate courses, smaller length blocks (depending upon the wall length) are used. The masonry bends for various wall thicknesses at corners and junctions are shown in the drawing sheet No. 1 & 2. The external surface is finished with desirable pointing; the internal face may or may not be plastered.

B-17 Thin Precast R.C.C. Lintel in brick walls :

The composite action of this lintel with brick work above it is governed by a number of parameters. The design of composite lintel is somewhat complicated and not easily amenable to calculations. For ready use design chart for thin precast lintels in brick walls of normal residential building is given in the attached drawing sheet No. 3. It is applicable only when the load on the composite lintel is a uniformly distributed one. The brick work over lintel shall be not less than 450 mm. in height and shall be constructed in a mortar not leaner than 1 : 6 cement : sand mortar or 1 : 1 : 6 cement : lime : sand mortar. Thin lintels shall not be used in brick walls made in mortar. It shall be noted that there is no composite action in continuous lintels at intermediate supports, where the top portion of the lintel is in tension.

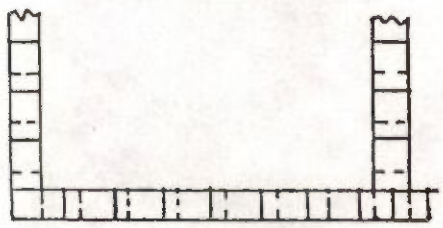
The thickness of the lintel shall be the thickness of the brick i.e., 70 mm. in case of traditional bricks and 90 mm. in case of modular bricks and the width shall be the width of the wall. The lintel shall preferably have a bearing of 230/200 mm. on either support. Details of a thin precast lintel in a single brick thick wall over an opening of span 1200 mm. and details of a thin precast lintel with chujja are shown in the table in drawing sheet No. 3.

SHEET NO-1. P.W.D. SCHEDULE- '92-93

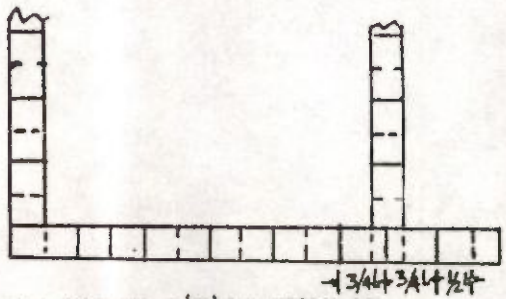
PRECAST STONE MASONRY BLOCK WALLING.

COMPRESSIVE STRENGTH OF PRECAST STONE MASONRY BLOCKS WITH DIFFERENT CONCRETE MIX PROPORTIONS AND LARGE SIZE STONE PIECES.

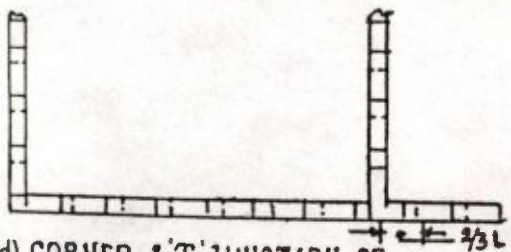
SL No	CONCRETE MIX PROPORTION BY VOLUME CEMENT : SAND : C AGGREGATE.	BLOCK BASE DIMENSIONS L x B (cm)	BLOCK HEIGHT H (cm)	H/B	AVERAGE ULTIMATE CRUSHING LOAD (TONS)	AVERAGE COMPRESSIVE STRENGTH (Kg/cm^2)
1	1:2:4	29 x 19	14	0·74	100	182
2	1:3:6	29 x 19	14	0·74	63	114
3	1:4:8	29 x 19	14	0·74	43	78
4	1:5:8	29 x 19	14	0·74	38	69
5	1:5:10	29 x 19	14	0·74	25·6	65
6	1:6:12	29 x 19	14	0·74	27·2	50



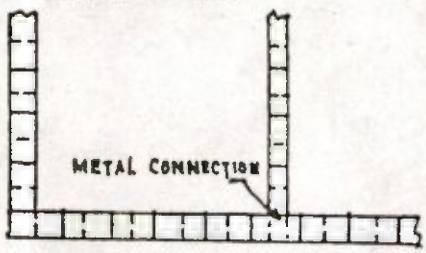
(a) CORNER & 'T' JUNCTION OF 20 x 20 CM WALL



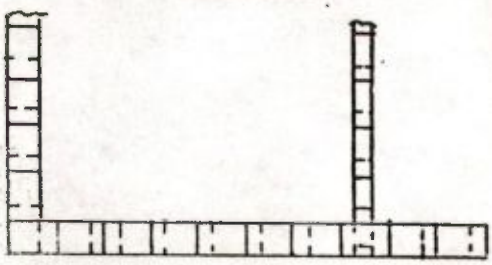
(b) CORNER & 'T' JUNCTION OF 15 x 15 CM WALL



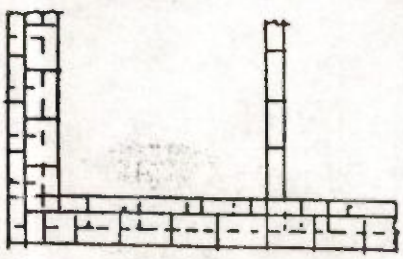
(d) CORNER & 'T' JUNCTION OF 10 x 10 cm WALL



(c) CORNER & 'T' JUNCTION OF 20 x 10 CM WALL



(e) CORNER & 'T' JUNCTION OF 20 x 10 CM WALL



(f) CORNER OF 30x30 CM WALL JUNCTION OF 30x30 CM WALL

DETAILS OF MASONRY BOND

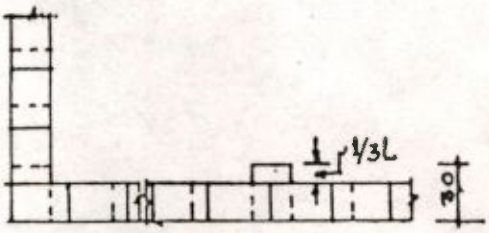


FIG. 1 30 Cm. PILLASTER WITH 20 Cm. WALL.

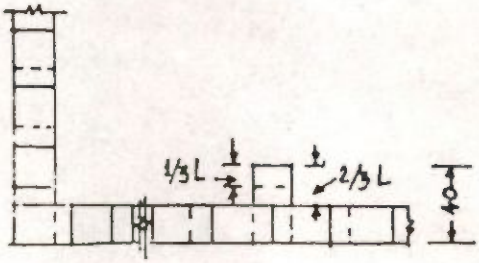


FIG-2 40 Cm PILLASTER WITH 20 Cm WALL

THE BONDING AT CORNERS AND DOOR/WINDOW OPENINGS WITH SPECIAL BLOCKS FOR PROVIDING VERTICAL REINFORCEMENT; FROM SEISMIC CONSIDERATIONS ARE SHOWN IN FIG-3.

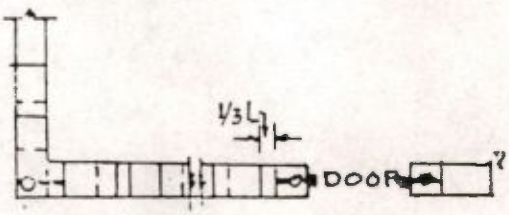
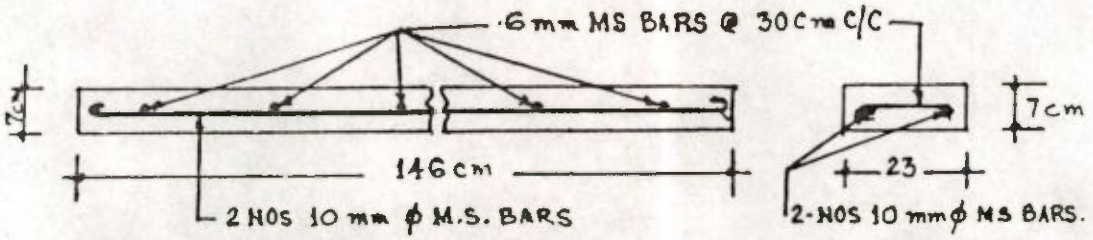


FIG. 3 - BONDING AT CORNER & DOOR OPENING FOR VERTICAL REINFORCEMENT.

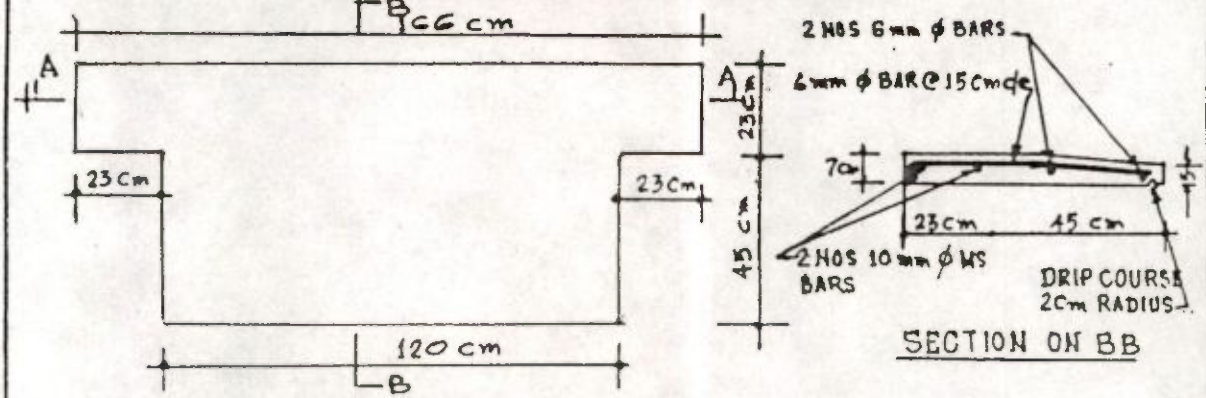
SHEET NO-3. P.W.D. SCHEDULE - 92-93

THIN PRECAST R.C.C. LINTELS IN BRICK WALLS

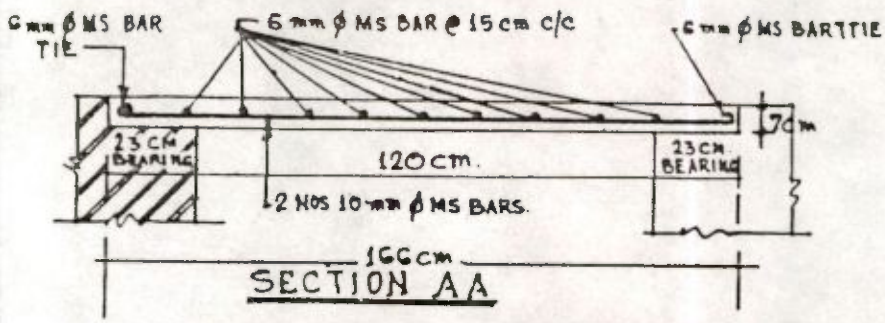


LONGITUDINAL SECTION CROSS SECTION

DETAILS OF A THIN PRECAST LINTEL



PLAN SECTION ON BB



SECTION AA

DETAILS OF A THIN PRECAST LINTEL WITH CHAJJA

DESIGN CHART FOR THIN PRECAST R.C.C. LINTELS

MAXIMUM CLEAR SPAN OF OPENING (m)	WIDTH OF LINTEL (cm)	MAXIMUM CRUSHING STRENGTH OF BREAKS IN WALL (KG/m²)	MAIN REINFORCEMENT
120	20/23	40	2x10 mm ϕ
120	10/11·5	40	2x10 mm ϕ
120	30/35	40	3x10 mm ϕ
150	20/23	70	2x10 mm ϕ
150	10/11·5	70	2x10 mm ϕ
150	30/35	70	3x10 mm ϕ
180	20/23	100	2x12 mm ϕ
180	10/11·5	100	2x12 mm ϕ
180	30/35	100	3x12 mm ϕ

(C). MODES OF MEASUREMENTS

General : Unless specifically mentioned otherwise, the following modes of measurements shall be adopted.

1. Brick Walls :

(a) **With Modular Bricks** (190 X 90 X 90 mm) :

The thickness of brick wall made of Modular Bricks with one brick laid flat (with long side parallel to the length of the wall) shall be measured as 100 mm. One brick thick walls (with the length of the brick parallel to the thickness of the wall) shall be measured as 200 mm, one and half brick as 300, two brick walls measured as 400 mm and so on.

(b) **With Conventional Bricks** ($9^3/_4$" X $4^3/_4$" X $2^3/_4$" or 248 X 120 X 70 mm.) :

The thickness of brick wall made with one brick laid on ege (with the long side parallel to the length of the wall) shall be measured as 75 mm. Similarly, a wall made with one brick laid flat (with the long side parallel to the length of wall) shall be measured as 125 mm. One brick thick walls (with the legth of brick parallel to the thickness of the wall) shall be measured as 250 mm., one and half brick walls (i.e. one brick along the length and one brick along the width) shall be measured as 375 mm., two brick walls measured as 500 mm. and so on.

(c) The width of lintels etc. covering the entire thickness of brick wall shall also be measured as equal to corresponding wall thickness.

(d) Net measurement of all wall will be taken afer deduction of all openings etc. This applies to 125/100 mm. thick and 75 m. thick walls also. Parapets (upto 1060 mm. height) will be measured along with the brick work of the floor just below the roof and will be paid for at the same rate.

(e) No extra will be paid for curved or chamferred work even though it may necessitate cutting of bricks. For small curves or chamfers the Engineer-in-charge may, at his discretion allow measurement on the square (i.e. without deduction for the quantity removed for forming the small curve or chamfer).

2. Concrete Plain or Reinforced :

Finished net measurement will be taken after deduction of large holes, rebates etc. but without deduction for the volume of reinforcement, if any, in the concrete.

3. Reinforcement :

The measurement will be on the basis of calculated weight of reinforcement only (i.e. without considering the weight of tying wires) actually consumed in the finished work as per drawing and design or as per direction of the Engineer-in-charge. If the length of any rod be more than that shown in the drawing but has been allowed to be used, the length will be taken as the length shown in the drawing. Hooks and laps as per standard practice will be measured and paid for.

4. Plaster, Lime punning, Plaster of Paris rendering :

For measurements of plaster (exterior or interior) deduction is to be made for door, window or opening of similar dimension and allowance is to be made for jambs, sills and soffits. Payment will be made on the basis of surface measurement of wall deducting one-third the measurement of such opening and without any separate measurement for jambs and soffits. In case of large openings, however, as in the case of verandahs with columns, payment will be on actual measurements.

5. White Wshing and Colour Washing :

(i) Payment will be made on the basis of surface measurement without any deduction for door, window or opening of similar dimensions and without any separate measurement for jambs, sills and soffits of such openings.

(ii) For cement paint and wall painting to walls or concrete jallies or similar other works method of measurements shall be the same as in plaster.

C-6. Painting :

(a) Measurement for painting work in doors and windows, grills, gratings, collapsible gates, corrugated roofing etc. shall be on the following basis. In all such cases the "Area" shall be measured flat (and not girthed). For doors and windows, no separate payment shall be made for the frames (chowkats), the "Area" in such cases represents the area of the wall openings covered by the frames (including exposed surface of the frames). For grills, gratings etc. the area represents the area of the opening covered by outer frames.

(b) The "Area" measured as above shall be multiplied by the factors given below, and the work of painting shall be paid on the quantities thus arrived at.

	Nature of surface painted	Multiplying factor for painting one side only	Multiplying factor for Painting both sides
(i)	Timber door, windows etc.		
	Fully glazed or with glass substitute	$^{2}/_{3}$	$1^{1}/_{3}$
	Fully panelled or flush or battened	1	2
	Fully venetian or fixed louverd	$1^{1}/_{2}$	3
	$^{2}/_{3}$rd panelled, $^{1}/_{3}$rd glazed	$^{7}/_{8}$	$1^{3}/_{4}$
	$^{1}/_{3}$rd panelled, $^{2}/_{3}$rd glazed	$^{3}/_{4}$	$1^{1}/_{2}$
	$^{1}/_{3}$rd panelled, $^{2}/_{3}$rd venetian (or fixed louverd)	$1^{1}/_{3}$	$2^{2}/_{3}$
	$^{1}/_{3}$rd glazed, $^{2}/_{3}$rd venetian (or fixed louverd)	$1^{1}/_{4}$	$2^{1}/_{2}$
	Netted (without painting to the net)	$^{1}/_{4}$	$^{1}/_{2}$
	Netted (with painting to the net as well)	$^{5}/_{8}$	$1^{1}/_{4}$
	Corrugated (i.e. with leaves of C.I. sheet)	$1^{1}/_{4}$	$2^{1}/_{2}$
(ii)	Corrugated iron sheet roof or wall	$1^{1}/_{6}$	$2^{1}/_{3}$
(iii)	Corrugated asbestos sheet roof or wall	$1^{1}/_{5}$	$2^{2}/_{5}$
(iv)	Trafford asbestos sheet roof or wall	$1^{1}/_{10}$	$2^{1}/_{5}$
(v)	Cast iron or wooden railing (complete)	—	$1^{1}/_{2}$
(vi)	Grills, grating (welded mesh)	—	1
(vii)	Heavy type grating or grated doors as in jails etc.	—	$1^{1}/_{2}$
(viii)	Collapsible gate	—	$1^{1}/_{2}$
(ix)	Steel roll-top shutters (including top casting)	$1^{1}/_{4}$	$2^{1}/_{2}$
(x)	Steel windows	$^{1}/_{3}$	$^{2}/_{3}$

C-7. Metal, Chips, Boulders, Bats, Sand, Surki, Lime, Coal, Carried Earth etc. :

(a) Unless specifically mentioned otherwise in the description of the item itself, measurements for suply and/or carriage shall be taken in stacks and that as soon after the stacks are made as possible. The height and the shape and size of the stacks shall be as per direction of the Engineer-in-charge but in no case shall the height of the stacks be less than the minimum as indicated hereinafter.

Allowance for sinkage and/or shrinkage shall be made as indicated hereinafter. The net quantity shall be arrived at after deducting this allowance from the measurement of fresh stacks and payment for supply/or carriage shall be made on the net quantity thus derived. "Quantity" of any material shall always indicate such net quantity, unless specifically mentioned otherwise.

(b) If for any special reasons, as per provisions in any particular contract, final measurements have to be taken in wagons (before unloading at destination) no deduction for sinkage and/or shrinkage shall be made.

For carried earth supplied by the contractor the earth is to be first stacked at site for measurement and the earth utilised in the work after such stacks have been measured up. The items of earthwork with such carried

earth include the cost of such operation. The net quantity, for the purpose of payment, shall be derived after deducting allowance for sinkage and/or shrinkage as specified below. In special circumstances, the Engineer-in-charge may, at his sole discretion, take borrow-pit measurement for such carried earth, in which case no allowance for sinkage and/or shrinkage is to be deducted.

Where earth is to be carried from any excavation, the measurement of carriage of excavated earth will be taken on the basis of earth excavated.

(c) For conversion of brick materials from one form to another 314 Nos. of bricks (conventional size) will be taken to produce 1 cu. m. of bats and 1.1. cu. m of bats to produce 1 cu. m. of khoa or metal.

Unless specifically mentioned otherwise in any particular contract, 1025 kg. of steam coal shall be taken as equivalent to 1 cu. m. (when measured in very old and settled stacks or in wagons at destination or after deducting sinkage and/or shrinkage allowance when measured in fresh stacks). Similarly, 1107 kg. of slack coal shall be taken as equivalent to 1 cu. m.

(d) For consolidation of stone or jhama metal and similar works involving utilisation of materials already measured in stacks, the quantity of materials actually consumed in such works will be taken to be same as the recorded quantities (after due allowance for sinkage and/or shrinkage, where applicable) of the stack or stacks actually utilised in such works.

(e) Schedule showing minimum height of stacks and the allowance to be deducted for sinkage and/or shrinkage when measured in fresh stacks.

MATERIALS	Minimum height of stacks	Allowance to be deducted for sinkage and/or shrinkage
Stone metal ballast, chips, shingles or gravel	32.5 cm	$^{1}/_{13}$
Stone boulders 15 cm. or above size	35 cm	$^{1}/_{7}$
Stone boulders below 15 cm. size	45 cm	$^{1}/_{9}$
Jhama bats or brick bats	53 cm	$^{1}/_{7}$
Jhama metal, khoa or chips	34 cm	$^{1}/_{9}$
Sand	61 cm	$^{1}/_{9}$
Surki	61 cm	$^{1}/_{4}$
Lime	61 cm	$^{1}/_{4}$
Moorum	33.5 cm	$^{1}/_{13}$
Carried earth	34 cm	$^{1}/_{9}$
Rubbish (building or kiln)	34 cm	$^{1}/_{9}$
Steam coal or slack coal	61 cm	$^{1}/_{6}$
Cinder	43 cm	$^{1}/_{9}$

C-8. **Carriage :**

All items involving carriage, loading unloading & stacking shall be in accordance with the provisions of the Schedule of Rates of Public Works (Roads) Department applicable at the material time within the jurisdiction of the circle.

Govt. order No. 2809(3)A dt. 27th April, 1971

ADDITIONAL CONDITIONS OF CONTRACT FOR DEPARTMENTAL MATERIALS

(a) The value of materials supplied by the Department for use on the work shown in the schedule on page II of the contract form (West Bengal Form No. 2911) in respect of items of work for which the contractor's rates are inclusive of the cost of such materials will be debited to him in his accounts at the rates specified in the schedule.

(b) Regarding materials in respect of items of work for which the contractor's rates are not inclusive of the cost of such materials, the contractor shall only act as custodian on behalf of the Govt. and the value of such materials will not be charged to him except under sub-clause *(f)* and *(g)* hereof.

(c) When the contract provides for use of certain specified materials to be supplied by the Deptt. the contractor shall not obtain such materials from other sources unless authorised in writing by the Engineer-in-charge of the works.

(d) Materials supplied for a praticular work or a part thereof shall not be used elsewhere except with the written permission of the said Engineer-in-charge.

(e) Materials shall be supplied to the contractor in such instalments as may be decided by the said Engineer-in-charge.

(f) The contractor shall be held responsible for any misuse, loss or damage of the materials issued or handed over to him by the Engineer-in-charge. In default, the cost of such materials shall be recovered from the contractor according to the terms of the provisions made in sub-clause *(g)* and *(h)* hereof.

(g) In the following cases, the materials issued or handed over to the contractor shall be deemed to have been misused by him

(i) Materials lost or damaged due to negligence on the part of the contractor and/or defective storage by him.
(ii) Materials used in excess of the requirements as shown in consumption chart attached herewith.
(iii) Materials used without permission of the Engineer-in-charge in temporary works (e.g. coffer dams, embankments, shoring etc.) or in the construction of contractor's godown, site office, labour hutments etc.

The value of materials misused as above (in which case th decision of the Engineer-in-charge shall be final) shall be recovered at 50 per cent in excess of the highest of the following three rates;

(i) Issue rate as specified in the contract
(ii) Deptt. stock rate at the time of recovery of value
(iii) Market rate at the time of recovery of value

(h) In cases of loss or damage of materials issued or handed over to the contractor other than under the circumstances mentioned in sub-clause (g) the materials so lost or damaged shall be replaced by the Engineer-in-charge at the cost of the contractor and the certificate of the Engineer-in-charge as to the cost of replacement shall be final and binding on the contractor.

(i) Where so specified and in any case in respect of cement, steel and bituminous materials supplied by the Deptt. a stock register shall be maintained by the contractor and the daily receipts, issues and balance of such materials shall be shown therein. This register shall be produced by the contractor to the Engineer-in-charge or his representative whenever required for verification of stock.

(j) Whenever asked for by the Engineer-in-charge during the progress of work and also with the final bill, the contractor shall submit to the former a statement showing :

(i) The total quantity of materials received by the contractor from the Deptt;
(ii) Consumption thereof item by item in the work; and
(iii) The balance in hand.

(k) Whenever by computing the consumption of materials of any description in any item or group of items of work requiring use of such materials.

(i) It is found that the contractor has used less materials than are required by the specification and/or are shown in consumption chart attached herewith, the value of the quantity of materials less used shall be recovered from the contractor at 5 (five) per cent in excess of the issue rate of such materials. In such an event the contactor shall not be entitled to claim or receive the materials, the cost of which, has been thus recovered; or
(ii) If it is found that contractor has used any materials in excess of the requirement the value of the material used in excess shall be recovered from the contractor as provided in subclause (g) hereof;
(iii) Provided that recovery of materials used less or in excess as indicated in paragraphs (i) and (ii) of the sub-clause shall be subjected to the decision of the Engineer-in-charge who may allow variation according to para 1 of consumption chart.

(D) MISCELLANEOUS

Extra rate for difficult/Riverine Areas

D-1. The following extra rates will be allowed on the whole schedule of rates except the items & sections mentioned below.

SECTION I — (A) Earth work (Item 1 to 5)
(B) Dismantling etc. (Item 1 to 13)
(C) Brick work, concrete [Item 2, 11(a), 16, 26, 28, 29, 42, 43 & 48]
(D) Flooring (Item 19)
(E) Roofing (Item 9 to 12, 27, 43, 49, & 51)
(F) Structural Steel works (Item 3, 5, 6, 37 to 39)
(G) Carpenter's works (Item 6, 52, 82, 83, 130, 132 & 133)
(I) Plastering, Pointing etc. (Items 6 to 8)
(J) White wash etc. (Item 1, 2 and 15)
(K) Painting etc. (Items 1 to 4)
(L) Glaziers works (Item 7)
(M) Drains etc. (Item 2, 11, 18 to 20)
(N) Thatch etc. (Item 1, 23, 25, 26 & 30)
(O) Fencing (Item 4, 5, 6, 8 to 13)
(P) Misc. (Item 10 to 12 & 26)
(Q) Soling etc. (Item 2, 4 to 9, 12 & 13)
(R) Assorted item (Item 9)

SECTION II — Labour & materials

			Extra Rate
Extras :	*(a)*	In riverine areas connected by river route and/or ferry crossing under :	
	(i)	Hasnabad & Bhangore P.S.	@ 15%
	(ii)	Haroa, Canning, Kultali & Kakdwip P.S.	@ 15%
	(iii)	Gosaba, Basanti, Namkhana, Sandeshkhali, Hingalganj & Minakhan P.S.	@ 22.5%
	(iv)	Patharpratima & Sagar P.S.	@ 30%
	(b)	In all other areas under Kakdwip PWD Sub-Dvn. falling in *(a)* above.	@ 10%

D-2. Extra rate in respect of all works will be allowed on the whole schedule of rates for works within the perimeter of Jail where works are permitted within restricted hours only. @ 10%

CHART FOR CONSUMPTION OF MATERIALS

Consumption of different materials of construction in the corresponding contract items of work shall be computed on the basis of the quantities shown in this table subject to a variation of plus/minus five per cent except in case of steel materials in respect of which the variation shall be ± 10%. Where, however, the circumstances of work so require the Engineer-in-charge shall be competent to allow (for recorded reasons) for a greater variation.

N.B.—The statement is based on the following assumptions :

(i) That dry sand with necessary allowance for bulking is used and *(ii)* tht the size of bricks used shall be 248 x 120 x 70 mm or $9^3/_4$" x $4^3/_4$" x $2^3/_4$" for conventional bricks and (190 x 90 x 90 mm) for modular bricks.

Sl. No.	Description of items		Unit	Name of Materials required	Quantity of Materials required
1.	12 mm. cement plaster	2 : 1	% sq. m.	1. Cement 2. Sand	0.64 cu. m. 1.28 cu. m.
2.	- do -	3 : 1	"	1. Cement 2. Sand	0.457 cu. m. 1.37 cu. m.
3.	- do -	4 : 1	"	1. Cement 2. Sand	0.366 cu. m. 1.46 cu. m.
4.	- do -	5 : 1	"	1. Cement 2. Sand	0.292 cu. m. 1.46 cu. m.
5.	- do -	6 : 1	"	1. Cement 2. Sand	0.244 cu. m. 1.46 cu. m.
6.	6 mm cement plaster	2 : 1	"	1. Cement 2. Sand	0.35 cu. m. 0.70 cu. m.
7.	- do -	3 : 1	"	1. Cement 2. Sand	0.258 cu. m. 0.759 cu. m.
8.	- do -	4 : 1	"	1. Cement 2. Sand	0.198 cu. m. 0.792 cu. m.
9.	19 mm. cement plaster	3 : 1	"	1. Cement 2. Sand	0.64 cu. m. 1.92 cu. m.
10.	- do -	4 : 1	"	1. Cement 2. Sand	0.518 cu. m. 2.07 cu. m.
11.	- do -	6 : 1	"	1. Cement 2. Sand	0.366 cu. m. 2.196 cu. m.
12.	25 mm. cement plaster	3 : 1	"	1. Cement 2. Sand	0.884 cu. m. 2.65 cu. m.
13.	- do -	4 : 1	"	1. Cement 2. Sand	0.71 cu. m. 2.84 cu. m.
14.	- do -	6 : 1	"	1. Cement 2. Sand	0.472 cu. m. 2.84 cu. m.
15.	Cement fush pointing	3 : 1	"	1. Cement 2. Sand	0.122 cu. m. 0.366 cu. m.
16.	Cement flush pointing	4 : 1	"	1. Cement 2. Sand	0.092 cu. m. 0.366 cu. m.

Chart for Consumption of Materials — *(Contd.)*

Sl. No.	Description of items	Unit	Name of Materials required	Quantity of Materials required
42.	37 mm. -do- with stone chips	(4 : 2 :1) % sq. m.	1.Stone chips (-do-)	3.35 cu. m.
			2. Sand	1.675 cu. m.
			3. Cement	1.14 cu. m.
43.	37 mm. -do- with Jhama chips	(4 : 2 :1) "	1. Jhama chips (-do-)	3.43 cu. m.
			2. Sand	1.72 cu. m.
			3. Cement	1.17 cu. m.
44.	7.5 cm. lime terracing in roof with brick khoa, surki, lime (7:2:2) including finishing.	sq. m.	1. Brick ~~Jhama~~ khoa	0.075 cu. m.
			2. Surki	0.021 cu. m.
			3. Lime	0.021 cu. m.
45.	10 cm. lime terracing in roof with brick khoa, surki, lime (7:2:2) including finishing.	"	1. Brick ~~Jhama~~ khoa	0.10 cu. m.
			2. Surki	0.029 cu. m.
			3. Lime	0.029 cu. m.
46.	12.5 cm. -do- -do-	"	1. Brick ~~Jhama~~ khoa	0.125 cu. m.
			2. Surki	0.036 cu. m.
			3. Lime	0.036 cu. m.
47.	15 cm. -do- -do-	"	1. Brick ~~Jhama~~ khoa	0.15 cu. m.
			2. Surki	0.043 cu. m.
			3. Lime	0.043 cu. m.
48.	5 cm. thick R. C. slab with stone chips (4:2:1) and with 0.8% reinforcement	% sq. m.	1. Stone chips (6.0 to 19 mm)	4.47 cu. m.
			2. Sand	2.23 cu. m.
			3. Cement	1.12 cu. m.
			4. Steel	322.60 kg.
			5. Shuttering	100 sq. m.
49.	7.5 cm. thick R. C. slab with stone chips (4:2:1) and with 0.8% reinforcement	"	1. Stone chips (-do-)	6.7 cu. m.
			2. Sand	3.35 cu. m.
			3. Cement	1.675 cu. m.
			4. Steel	482.62 kg.
			5. Shuttering	100 sq. m.
50.	10 cm. thick R. C. slab with stone chips (4:2:1) and with 0.8% reinforcement	"	1. Stone chips (-do-)	8.93 cu. m.
			2. Sand	4.47 cu. m.
			3. Cement	2.23 cu. m.
			4. Steel	683.54 kg.
			5. Shuttering	100 sq. m.
51.	12.5 cm. thick R. C. slab with stone chips (4:2:1) and with 0.8% reinforcement	"	1. Stone chips (6.0 to 19 mm.)	11.18 cu. m.
			2. Sand	5.59 cu. m.
			3. Cement	2.80 cu. m.
			4. Steel	787.44 kg.
			5. Shuttering	100 sq. m.

Chart for Consumption of Materials — *(Contd.)*

Sl. No.	Description of items	Unit	Name of Materials required	Quantity of Materials required
52.	15 cm. -do- -do- -do-	(4 : 2 : 1) % sq. m.	1. Stone chips (-do-)	13.4 cu. m.
			2. Sand	6.7 cu. m.
			3. Cement	3.35 cu. m.
			4. Steel	955.08 kg.
			5. Shuttering	100 sq. m.
53.	Single brick flat soling (conventional size)	sq. m.	Bricks	32 Nos.
54.	Brick on edge soling (conventional size)	"	Bricks	54 Nos.
55.	7.5 cm. wide brick-on-end edging	% m.	Bricks	820 Nos.
56.	7.5 cm. brick-on-edge edging	"	Bricks	410 Nos.

CONVERSION TABLE

(A) Lineal :

1 inch = 25.400millimetres
1 millimetre = 0.0394 inches
1 metre = 3.281 ft. = 1.094 yards
1 foot = 0.3050 metre
1 mile = 1.6090 kilometres
1 centimetre = 0.3940 inch
1 metre = 39.3701 inches
1 kilometre = 1093.61 yards = 0.621 mile

(B) Area :

1 sq. inch = 6.451 sq. cm.
1 sq. cm. = 0.155 sq. ich
1 sq. metre = 10.764 sq. ft.
1 sq. ft. = 0.0929 sq. metre
1 acre = 0.405 hectare
1 sq. mile = 2.590 sq. kilometre

(C) Capacity & Volume :

1 imp. gallon = 4.546 litres
1 litre = 0.22 gallons
1 cu. inch = 16.387 $cm.^3$
1 cm^3 = 0.061 cu. inch
1 cu. ft. = 0.0283 $m.^3$
1 m^3 = 35.315 cu. ft.

(D) Weight :

1 ton = 1.016 tonnes
1 tonne = 0.9840 tons
1 ton = 2240 lbs. = 1016 kgs.
1 tonne = 1000 kg. = 2204.622 lbs.
1 lb. = 0.454 kilograms
1 hundred weight = 50.8 kilograms
= 0.508 quintal
1 kilogram = 2.2050 lb.s
1 quintal = 1.968 cwt.

(E) Linear Density :

1 lb./ft. = 1,488 kg./m.
1 kg./m. = 0.672 lb./ft.

(F) Density :

1 $lb//ft.^3$ = 16.019 $kg./m.^3$
1 $kg./m.^3$ = 0.624 $lb./ft.^3$
1 $lbs./in.^3$ = 27.680 $gm./cm.^3$
1 $gm./cm.^3$ = 0.0361 $lb./inch^3$

(G) Temperture :

(Relation between Fahrenheit Centrigrade Scale)

$°F = (°F - 32) \times {}^5/_9 °C$

$°C = (°C \times {}^9/_5 + 32)°F$

SECTION I —BUILDING WORKS

1. Building — (A) Earth Work

Sl. No.	Description of Items	Unit	Rate	Remarks
			9596.	
			Rs. P.	15-1-97
1.	**Earth work in excavation of foundation** trenhes or drains, in all sorts of soil (including mixed soil but excluding laterite or sand stone) including removing, spreading or stacking the spoils within a lead of 75 m. as directed. The item includes necessary trimming the sides of trenches, levelling, dressing and ramming the bottom, bailing out water etc. as required complete.			
	(a) Depth of excavation not exceeding 1,500 mm.	% cu. m.	1380.00 1794·00	2065
	(b) Depth of excavation for additional depth beyond 1,500 mm. and upto 3,000 mm. but not requiring shoring	% cu. m.	1500.00 1950·00	2246
	(c) Depth of excavation for additional depth beyond 3000 mm. upto 4000 mm excluding cost of shoring as necessary.	% cu. m.	1950.00 2535·00	2915
2.	**Earth work in filling in foundation trenches or plinth** with good earth, in layers not exceeding 150 mm. including watering and ramming etc. layer by layer complete.			
	(a) With earth obtained from excavation of foundation.	% cu. m.	790.00 1027·00	1184
	(b) With earth obtained by fresh excavation (including cost of excavation upto 1,800 mm. depth) from land arranged by the Deptt. within a lead of 100 m.	% cu. m.	1485.00 1931·00	2221
	(c) *(i)* With carried earth arranged by the contractor within a radius of 3 km. including cost of carried earth.	% cu. m.	5685.00 7391·00	8504
	(ii) With carried earth arranged by the contractor within a radius exceeding 3 km but not exceeding 5 km. including the cost of carried earth.	% cu. m.	6035.00 7846·00	9025
	(iii) With carried earth arranged by the contractor within a radius exceeding 5 km. but not exceeding 10 km. including cost of carried earth.	% cu. m.	6735.00 8756·00	10070
	(Payment to be made on the basis of measurement of finished quantity of work.)			
3.	**Filling in foundation or plinth** by silver sand/flyash in layers not exceeding 150 mm. as directed and consolidating same by thorough saturation with water ramming complete, including the cost of supply of sand/flyash.			
	(a) With flyash.	% cu. m.	5193.00 5712·00	6285
	(b) With silver sand.	% cu. m.	12450.00 13695·00	17124
	(Payment to be made on measurement of finished quantity).			

GENERAL CONDITIONS (Contd.)

ii) Haroa, Canning, Kultali, Namkhana & Kakdwip P.S....15% Extra

iii) Gosaba, Basanti, Minakhan Sandeskhali & Hingalganj P.S. 15% Extra

iv) Pathar Pratima & Sagar P.S. 20% Extra

b) In all other areas under Kakdwip P.W.D. Sub-divn. not falling in 12 (a) above ... ... 7.5% Extra

13. Items of works like H.C.I. pipe works with lead caulked joints, Aluminium and stainless steel sinks, Anglo Indian and Orissa Pattern water closets etc. shall be executed only with the prior approval of the Superintending Engineer concerned.

14. In case of any ambiguity or dispute in any matter arising out of this schedule, Superintending Engineer's decision will be final.

G. K. Mukherjee
Superintending Engineer (P.W.D.)
Presidency Circle (I)

D. N. Banerjee
Superintending Engineer (P.W.D.)
Presidency Circle (II)

A. K. Misra
Superintending Engineer (P.W.D.)
Eastern Circle

N. C. Karforma
Superintending Engineer (P.W.D.)
Southern Circle

P. K. Saha
Superintending Engineer (P.W.D.)
Metropolitan Sports Circle

GENERAL CONDITIONS

1 If in connection with Sanitary & Plumbing Works etc., any item or items of work relating to Building Works, Road Works and Carriage crop up, the contractor shall if so directed have to execute such items. In respect of such items the Schedule of Rates for Building Works, Road Works and Carriage for the current year including general conditions, general specifications etc. operative in the area will be applicable and the contractual percentage will be applicable in respect of such works as well.

2. If not specifically indicated in the items themselves, the rates appearing in this schedule are inclusive of cost of all supply, carriage, handling, fitting, fixing sales tax, royalty, income tax, octroi, toll taxes ferry charges, turn over taxes etc. and all other incidental works involved in any floor, at any level including all necessary jointing materials, scaffolding to any height, hire charges of tools and plants, and all helping materials.

3. All cutting holes, chases, trenches etc. at any place necessary in connection with works as per items in this schedule and subsequent mending damages as per original specification and as directed are included in the rates and shall not be paid extra unless otherwise expressly specified.

4. The issue of Departmental materials, if any required for the work will be at the rates and under the terms and conditions as stipulated in the General Conditions and General Specifications embodied in the Schedule of Rates for Building Works, Road Works and Carriage for the current year operative in the area. In brief cement will be issued at Rs. 2400/- (Rupees two thousand four hundred) per M/T, Mild Steel at Rs. 14400/- (Rupees fourteen thousand four hundred) per M/T and Tor Steel at Rs. 14500/- (Rupees fourteen thousand five hundred) per M/T from the Deptt. godown/stacking yeard as referred to in the said schedule if not specified otherwise.

5. The contractor shall be responsible for the safe custody and proper maintenance in original condition of all sanitary and plumbing works till all works are completed and formally handed over to the Department.

6. Renewal Works include dismantling and taking out old work and mending good damage after renewal.

The rate for any item of original nature not provided in this Schedule may be deduced for the rate of similar item of renewal work by multiplying by a factor 100/105 and conversely the rate of any item of renewal nature not provided in this schedule may be deduced from the rate of similar item of original nature by multiplying by a factor 105/100.

7. Where renewals are involved, indigenous materials shall be used without exception even if this means changing the type. In very very important building viz. operation theaters, chemical laboratories etc., prior approval of the Engineer-in-charge for using non-indigenous materials is to be obtained. In such cases, due care and scrutinies to the type etc. should be exercised before acceptance and payment.

8. Before application of rate, quantities of all items with metric unit must be calculated with correction to 2 places of decimal when the rate is upto Rs. 100.00 and 3 places of decimal when the rate is above Rs. 100.00.

9. If not mentioned otherwise in the items themselves, all materials including fittings shall conform to standard laid down by the I.S.I. and bear I.S.I. mark where such standardisation has been made. All other materials must be of best quality conforming to the standard laid down by the I.S.I. and being approved by the Engineer-in-charge. Under very special circumstances materials standardised by I.S.I. with I.S.I. mark but not bearing I.S.I. mark may be accepted with prior approval of Engineer-in-charge.

10. Unless otherwise specifically mentioned in the items of this Schedule, all G. I. Pipes are to be normally of TATA make, all sanitary wares should be of Parry ware, Hindusthan Sanitary wares, Neycer, C.E.R.A. (1st Quality) or should bear I.S.I. certification marks.

11. For works within the perimeter of Jail where works are permitted with the restricted hours only, extra rate @ 5% in respect of all items of this schedule will be allowed.

12. Extra rates for difficult/reverine areas in respect of all items of this schedule will be allowed as follows :

a) In reverine areas connected by river route and/or ferry crossing under :

i) Hasnabad, Bhangore P.S....10% Extra

GENERAL SPECIFICATION

(Including Mode of Measurements)

A. EXECUTION :

General — All works shall be carried out in proper workman like manner. Items of works not covered by the following shall be carried out as per best practice according to the direction of the Engineer-in-charge and to his satisfaction. Unless otherwise specified in this Section or in the description of item the cost of all stages of works mentioned hereunder shall be deemed to have been included in the rates of items provided in the Schedule.

1. G. I. Tank

Before acceptance of any G I. tank, proper scrutiny as to the thickness of the sheets should be made. Due check should also be made on each face of the tank by punching holes to be subsequently mended and hermetically sealed by the contractor without any extra charge being paid on this account by the Department. Thickness of M. S. sheet is excluding of galvanizing.

2. Flushing Cistern :

Flushing Cisterns of I.P.W.C. & E.P.W.C. will be 10 litre pull and let go or low down cistern types as specified. Flush pipes for urinals shall be made of G.I. pipes or Polythene pipes with fittings or lead pipes as may be directed by the Engineer-in-charge. Flushing cistern of urinals shall be of approved type. All flush pipes and cisterns shall have to be painted with 2 coats of paint of approved shade and brand over a coat of approved primer. The inlets of sanitary fittings and equipments shall have to be connected with the adjacent distribution line (water supply) with requisite lengths and size of P.V.C connection pipe is to be provided with necessary unions at both ends within the quoted rates of respective items. Cost of these P.V.C. connection pipes will be paid separately.

3. Fittings for G. I. pipes :

All G. I. fittings will be of approved make. For installation of G. I. pipe line all fittings and specials as may be necessary shall have to be fitted and fixed to the line.

4. Joints :

The joints of pipes, fitting & accessories shall be made as specified and unless otherwise specified, no separate payment shall be allowed.

(i) G. I. Pipes fittings, valves and cocks with jute and white lead paint.

(ii) C. I. soil pipes & fittings : The jointing shall have to be done by either of the two methods as specified : (1) The half of the depth of the annular space between spigot and socket shall be packed with spun yarn and the remaining half to be filled up with molten lead well caulked with caulking tools.

(2) The half of the depth of the annular space between spigot and socket shall be packed with tarred gasket and the remaining half will be filled up three quarters with valamoid and the top quarter with cement morter (4:1) and shall be finished beveled at 45°.

(iii) Stone Ware Pipes & fittings : The half of the depth of the annular space between socket and spigot shall be packed with tarred gasket and the remaining half shall be filled up with cement morter (3:1) & shall be finished beveled at 45°.

(iv) C. I. water mainline : The jointing shall have to be done with Tyton joints as per manufacturer's specifications.

5. Test of pipe lines, valves and cocks :

The pipe lines, valves and cocks shall be tested at the contractor's expense for which no extra payment shall be allowed. The available water supply sources may however be allowed to be utilised for testing but in absence of any such arrangement the contractor shall have to conduct the following tests.

(i) C. I. Water main pipe lines : The pipe shall have to be tested at least for designed working pressure.

(ii) C.I. Soil Pipe line : Smoke test.

(iii) S. W. Pipe lines : All sections between two inspection pits shall have to be tested seperately. The funne shall be at least 1.3 meter above the soffit of the S. W. pipe at the upper inspection pit.

Any defect or defects detected during testings shall be rectified at the contractor's expenses.

6. Septic Tank :

Construction of septic tank shall be done as per approved design. After completion of the tank, the tank shal have to be filled up with clear water after removing any foreign materials from the inside of the tank, if any. N separate payment shall be allowed on this account.

7. Painting :

All pipes (G.I., C.I. Water main and soil) and fittings shall have to be painted outside with two coats of pai of approved brand and shade. No separate payment shall be allowed on this account and rates of respective item shall be deemed to be inclusive of such work.

B. MODE OF MEASUREMENT

1. G. I., C. I. Water main & Soil, S. W. Pipe line :

All the pipe lines shall be measured in fitted condition along the central line of the exposed surface.

2. Strainer :

The strainer as used in the Tube-Well shall be measured in fitted condition along the central line of the expos surface.

3. Boring of Tube-Well :

Boring for tube-wells always shall have to be done by the contractor's pipes. In no case Deptt. pipes or the pip which will be actually lowered shall be used for the purpose of boring. Labour rate of boring is inclusive of h charges of boring pipes. Generally measurement of the boring will be taken on the basis of the finished leng of the tube-well from the ground line. If for some special reasons, boring depth is required to be more than t finished length of the tube-well, previous permission of Engineer-in-charge is to be taken to get the payme of extra boring in excess of the finished length.

General Instructions

Introduction

1.1 In the Part of the publication, the fundamental principle and procedure for execution of the works have been dealt with. The essential requirements and precautions to be taken in respect to execution of all types and class of Electrical and Lightning Conductor works for ensuring safe. economical, durable and more practical use and application of electricity including prevention from fire hazards and protection of structures from lightning have been incorporated.

Scope

1.2 This booklet shall be a guide to Engineers. Subordinate Officers, Contractors, in respect to preparation of estimates, drawing up Schedule of works, execution of works and also settlement of additional item of works arising-during execution.

Preparation of estimates and Schedule and dealing with Scheduled & Non-Scheduled items, prior to calling tender.

2.1 While preparing the Detailed Estimate and the Schedule of Works for calling tenders, all terms shall be so styled as to fall within the scope of items incorporated in the "Schedule of Rates" hereafter called, the Scheduled items, as far as possible. But where it necessary to incorporate one or more items not covered by the "Schedule of Rate" hereafter called. Non-scheduled items, may be provided in the Scheduled of Work for which the tender is to be called, provided that such items are incorporated in the Estimate technically sanctioned by the Superintending Engineer prior to calling of tender.

Prior approval of S.E. in respect to Non-Scheduled items, for calling tender.

Provided always, in case where such items are in the Estimate, technically sanctioned by the officer below the rank of the Superintending Engineer, the details of such items together with the analysis of rates and the complete schedule (in triplicate) shall be submitted to the Superintending Engineer for approved.

Value of Scheduled & Non-Scheduled items to be allocated and have the approval of S.F.

2.2 Scheduled of work containing one or more "Non-Scheduled items" shall not be accepted by an officer below the rank of the Superintending Engineer unless the approval of the Superintending Engineer is obtained. The estimated value of items of non-scheduled work and scheduled work in such cases shall be allocated while calling tenders.

Correct Grouping of items, explained

3.1 In no case two or more scheduled items shall be combined. All items are to be stated (described) in such a manner that the correct bill of quantity and actual requirement of the Department can easily be understood. An illustration given below will explain the correct procedure.

3.2 Incorrect Procedure :

3.3 Such items must be avoided

a) 2 Cm, 1.1 kv. Grade. P.V.C.A.U.G. cable (size 50 Sq mm-95 Sq.mm) from X to Y land direct in ground at an average depth of 0.75 metre below ground level in trench with single layer of bricks (8 Bricks/metre) protection on Top ....

-800 Metres.-

(b) -do- (size 225 sq. mm) -do- -200 Metres.

(c) Providing 50 mm (2" inch) G.I. pipe. (Class"B") protection for crossing roads,drain,vertical rise etc.-100 Metres.

Here, it is possible to assess the correct length and grade of G.I. pipe. Since the rate of laying U.G.cable of 50 to 95 sq. mm is same, it is not objectionable to include both the cross-section of cables in one item.

3.5 To be clean and precise, the items of works in the estimate, and schedule shall be adequately described, so that the requirement can be easily ascertained and that there is least possible embiguity as to the quantity, quality and size etc.

Price escalation

3.6 In view of occurance of time lag between preparation of estimate and receipt of sanction there to provision of 5% price escalation per annum may be added to the total amount of the estimate, particularly for major estimates. So as to avoid preparation of revised estimates due to delayed administrative approval and increase of cost for estimated works in the intervenning period. The requisitioning authority is to be requested to take note of the price escalation clause and to include the additional cost to the estimate before according sanction if the time lag between submission of estimate and sanctioning there of is more than a year.

Engineer-in-charge

4.1 For the purpose of execution of the works as per Terms of Contract incorporated in Form No. 2911, 2911(i) and 2911 (ii), the Engineer-in-charge of the work is normally meant the Executive Engineer. But the Assistant Engineer shall be the Engineer-in-Charge in respect of the works within the limit of his financial power of acceptance.

Delegation of power

4.2 An Executive Engineer may also delegation power of the Engineer-in-Charge in working to the Assistant Engineer-in-Charge of the Sub-Division in respect of a particular work or all works exceeding their financial limit. The delegation of such power shall be intimated to the contractor also.

Function of A.E. on behalf of the Engineer-in-Charge

4.3 Assistant Engineers shall, however, in all works executed within their jurisdiction, shall supervise, issue day to day instructions to the contractor in writing, with copies of such correspondences to the Executive Engineer, even when these officers are not delegated with the powers of the Engineer-in-Charge.

Dutiesof A.E.

5.1 Assistant Engineer is to be provided with the copies of the sanctuioned estimate, Plans, copy of Administrative Approval, Allotment of Funds, Complete Tender documents and all copies of correspondences between the Executive Engineer and the contractor. The Executive Engineer shall take steps so that these clauses are properly implemented.

Issue of work order to contractor

5.2 No work shall be allowed to be commenced by a contractor unless his tender is accepted and the work order be issued by the appropriate authority.

Reference to Clause to satisfy above condition

6.2 Therefore, in order to execute the work by skilled and qualified workmen under the proper guidance and direct supervision of such a

qualified Electrical Supervisor or Engineer, the procedure as stated in Clause 6.3 be shall adopted .

Introduction of a statement and its submission with B.F. Form No. 2911,2911 (i),2911(ii)

6.3 While submiting tender including duplicate or more copies of Tender Form for acceptance by the Assistant Engineer, the Executive Engineer or the Superintending Engineer, as the case may be the contractor shall submit a statement as below, with each copy of B.F. Form No. 2911, 2911(i),2911(ii) to the tender accepting authority. The statement shall contain the necessary information and declaration by the Contractor as well as by his Supervisor appointed to execute and supervise the work.

(a) Name of work.
(b) Name of the Electrical Engineer Supervisor.
(c) Qualification (i.e. the parts in which the Electrical Supervisor's Certificate of Competency has been issued by the Licensing Board).
(d) Registration No. of Supervisor.
(e) Next date of renewal of Supervisor's Certificate.
(f) Contractor's License No. etc.

Licensed supervisor/ Engineer to represent contractor and to apply for layout.

6.4 The contractor shall be represented by his Supervisor or Engineer, holding Electrical Supervisor's Ceertificate of Competency granted by the Licensing Board, West Bengal, for supervision and execution of the work. Such Supervisor or Engineer of the contractor shall apply to the Assistant Engineer-in-Charge of the work for layout immediately on the issue of the acceptance of the tender.

Fixation of date and time for layout where contractor fails to respond.

6.5 No layout shall be given by any Departmental Officer, other than to a qualified licensed Engineer or Supervisor as stated above. If the Contractor fails to be represented by a Supervisor in the manner stated above or does not immediately apply for layout, the date and time of layout shall be fixed by the Deptt.'s Officer and intimated to the contractor, but no extension of time shall be granted to the contractor for such delay in commencement of work, unless there is sufficient cogent reason – which shall however be recorded in writing by the officer granting the extension of time.

Supervision signature in M.B.

6.6 While recording measurement, the M.B.shall be signed by the contractors Engineers or Supervisor ,whose License No. noted therein as a token of not only for the acceptance of measurement but also for the acceptance ----------under his supervision.

6.7 No bill shall be paid by an Executive Engineer unless the contractor's Supervisor signs the M.B. as stated above.

Where delay in signing M.B.by contractor occurs

6.8 In case of delay on the part of the contractor to sign the M.B the measurement of the work shall not however be deferred. The bill may however be drawn and the amount of the passed bill may be debited to Deposit Schedule and credited against the work.

Acting acquired decleaning to sign M.B.

6.9 The payment in such case shall only be made on receipt of the explanation from the contractor. Frequent ommision of the part of the contractor to sign M.B., shall be reported to the Superintendent Engineer for administrative action.

Step against Sub-standard work

7.1 The workmanship is to be given the utmost importance. Good and skilled workmanship is as essential, as the good quality of materials. Good workmanship is an essential requirement for compliance with

		the Regulation. Where the workmanship is considered to be sub-standard the work shall be dismantled and re-done as directed by the Engineer-in-Charge or by an officer duly authorised by him. This shall, however, be decided during the progress of the work within one month from the date of completion of the work. This, however, shall not be prejudiced to the power of rectification of defective or rejected work in Terms of Contract in B.F. Form No. 2911, 2911(i) and 2911(ii), as embodied in Clause 3. and other relevant rules made thereunder.
Removal of the bad workman	7.2	The workman, who is in the opinion of the Engineer-Officer, not sufficiently efficient or otherwise unsuitable for any reason what-so-over, the contractor shall immediately remove such man from the site of work on receipt of the intimation in writing by Engineer-in-Charge. The decision of the Eengineer-in-Charge shall be final.
Programme and commencement of work, exceeding Rs.10,000.	8.1	In the case of work, exceeding the estimated value of Rs.10,000 /- the contractor shall draw out the programme for execution of the work in consultation with the Assistant Engineer and shall submit 4 copies of such programme to the Executive Engineer for approval within 5 days from the date of issue of the work order.
Approval of work-programme by the Engineer-in-Charge.	8.2	The Executive Engineer on receipt of the programme, shall approve, amend, or reject the programme and promptly send one copy of the final programme to the contractor, two copies to the Assistant Engineer and retain one copy in his office.
Programme and layout of work for Rs. 10,000 /- or below.	8.3	In the case of work, estimated value of which is Rs. 10,000 /- or less, the programme for execution of the work shall be approved and finalised by the Assistant Engineer or in the manner prescribed in the para 8.2. but the time taken for approval of programme of the work shall not be a cause of extension of time. It is expected that the contractor on receipt of the acceptance of such work will send his Supervisor to the Assistant Engineer or to the Sub-Assistant Engineer for layout and programme to execute the work expeditiously.
Compliance with Acts and Rules.	9.1	All Electrical works (both internal and external) shall be carried out in accordance with the proviso of : - (i) Indian Electricity Act 1910. (ii) Indian Electricity Rule 1965 and Regulations framed thereunder. (iii) The rules and bye-laws of the Local Electricity Supply Authorities.
	9.2	All Electrical and L.C. Installation works shall also comply with the General Specification and shall be subject in all respects to the aproval and entire satisfaction of the Engineer-in-Charge.
Failure to comply Rules & suspension of work.	9.3	Failure on the part of the contractor to comply with the provision of Clauses 9.1 & 2. may tender the suspension of the contractor's work or any other action deemed fit. The decision of the Superintending Engineer, in this respect shall be final.
Use of approved material only.	10.1	Materials which are not in the List of Approved Materials of this Deptt. shall not be used in the work by the contractor. No work below the approved specification shall be executed. All materials, not other-

wise specified shall be in accordance with the latest appropriate Indian Standard, where such exist.

Rejection of Substandard materials and their removal from site.

10.2 All materials brought to site shall be to the approval of Engineer-in-charge. Materials which are sub-standard shall be rejected. The substandard materials brought to the site or used in the work shall be removed, by the Contractor within 24 hours on receipt of the notice to that effect from the Engineer-Officer of the Department.

Appeal by the contractor in----------

10.3 An approval may however, be made by the contractor against such orders to the next higher authority where there is a ground of erroneous decision or any other rightful cause. But the order of the Engineer-office in respect to clause 10.2 shall be binding upon the contractor until revision of the order is made by the higher authority.

Contractor's Appeal to the S.E,. to consider the cases involving loss.

10.4 The final appealed authority in respect to Specification or works and materials, shall be the Superintending Engineer. In case of complicated matter involving financial loss (a) to the Government or the contractor or (b) retardation of the progress of work the contractor may prefer an appeal direct to the Superintending Engineer.

10.5 A copy of application in such cases shall be submitted by the contractor to the Executive Engineer and the Assistant Engineer and due acknowledgement shall be kept by the contractor.

S.Es order in respect to material and work is final.

10.6 The object of the Superintending Engineer shall be binding upon the Contractor and the Department , in the case of such appeal arising out of the technical aspect during the execution of work.

Contractor shall be custodian and shall store, stack and guard the Govt. materials,

11.1 All materials which are to be supplied by the Government to the contractor, shall be handed over by the Department in the manner prescribed in clause 11.6 expeditiously according to the settled programme of the work. The contractor shall therefore, on receipt of the materials properly store and stack in the manner approved by the Departmental officer at the site store. The contractor shall be the custodian of such materials and shall be responsible for any loss or damage to the material.

Inspection of Site-Store

11.2 Departmental Officers, may inspect the materials stored at the contractor's store during the inspection of work.

Mainting account of materials and return of excess quantity.

11.3 The contractor shall maintain day-to-day account of the receipt and the issue of Govt. materials. On completion of the work the said account shall be submitted to the Department measuring- Officer and the balance materials are to be received by the Department or, the Engineer as directed.

No material to be removed by Contractor.

11.4 No material issued to the contractor shall be removed or utilised in any other work than for which it has been intented, without the written order of the Executive Engineer or the Assistant Engineer.

Short & excess of materials,occuring under contractor's custody

11.5 If at any time, the quantity of Departmental materials is found short or excess at the contractor custody by the inspecting , the matter shall fourthwith be reported to the Engineer-in-charge, who shall expeditiously deal with the matter according to its meant.

11.6 Issue of Departmental materials may be of two categorie :

Different Categories of Departmental materials & and procedure of their issue to contractor.

(A) Materials for which the value is to be recovered from the contractor as per tender aggrement or otherwise.

(B) Materials which are issued direct to work (in respect of items whose items cost shall not be recovered from the contractor, as per Terms of Contract).

For formalities of Category (A) the materials shall be issued in P.W.D. Challan Form (S.E's Non-standard Form No.2) or Hand-Receipt Form (B.F. Form No. 28) First copy of such Challan shall be attached with the next bill of the contractor for realisation of cost. Second copy shall be retained with the office copy of the bill at the Sub-Division and 3rd copy shall be retained for Site Account, and 4th copy for the contractor and the 5th copy shall be retained in the Challan Book.

For formalities of Category (B) 5 copies of Challan or H.R. stated in sub-para, above shall be prepared by worked "value not to be recovered".

Contractor's responsibility for materials issued.

11.7 ----------to the Contractor, whatever be their category ---------- shall remain responsible for their proper storage, safe custody and proper utilisation of such materials . The contractor shall also remain responsible for any damage or loss of such materials.

Return of Scrap or excess material issued as per Clause 11.6(B)

11.8 The excess materials including cut lengths of cable, Conductors etc. used to the contraction vide clause 11.6 (B) , shall be returned in good condition to the Engineer-Officer or as directed, through proper Challans in quadruplicate after completion of works.

Measure of Material and the recovery of cost from Contractor,

11.9 The contractor shall use the Developmental materials as stated in clause 11.6 (B), cautiously and Judiciously so that the minimum quantity is wasted or reduced to scrap. In cases where the scraps or wasted materials, are considered in the common to the Engineer-Officer, to be above normal, the value of the excess quantity (after allowing the normal wasted) shall be deducted from the contractors bill. The decision of Engineer-in-charge in such cases, shall be final and binding on the contractor.

Disposal of surplus materials

11.10 All surplus materials shall quickly be disposed of either by transferring to stock account of the store (after obtaining prior orders of the Superintending Engineer) or to other work direct.

Return of dismanteled materials by contractor

11.11 Dismanteled materials (both serviceable and unserviceable) shall be sorted, tested and handed over to the Departmental Officer by the contractor in the manner as decided by the Assistant Engineer.

Recovery of rent or other charges for use of T and P etc.from contractor

12.1 The contractor may use the T and P and other Govt. Testing Instruments provided, they are availabe and permitted by the Engineer-in-charge. Present and other charge for the use of such T & P shall be realised from the contractor bill. Normally the insulation Testing Megger shall not be issued to the contractor by the Dipartment.

Clearence of site

13.1 The Contractor shall clear the site of work and the whole site shall be left clean and tidy to the satisfaction of the Engineer-Officer within the date of completion of the work.

Incomplete work due to nonclearence of site

13.2 Failure on the part of the contractor to clear the site as stated in the aforesaid clause shall be treated as the work is incomplete, even though the work for which the contractor executed, has been completed and the work is in beneficial use.

Charges for clearance of site

13.3 The cost restoring site of work will be realised by the Engineer-in-charge from the contractor bill after a due notice is served on the contractor.

Procedure to be followed on receipt of Administrative Approval of project

14.1 The following procedures shall be adopted by the Departmental Officer on receipt of the Administrative Approval of the project, as well as on the receipt of the estimate from the sponsoring Deptt. in respect of the work relating to O.H. Distribution and U.G. Cable.

Submission of detailed estimate and plan for technical Sanction

14.2 Profile and route survey map in the scale as deemed convenient shall prepared. The position of the pillar box etc. and all other equipments shall be mark on the plant which shall be placed before the appropriate Departmental Officer along with the detailed estimate for technical sanction.

Action to be taken---- ----------obtaining technical Danction

14.3 The list of the materials (with quantity) which are to be procedure by the Department shall be drawn up on receipt of the technical sanction of the estimate or with the approval of the Superintending Engineer. Steps shall be taken for procurement of materials, either by calling tender from the market or direct from the Central Store. Arrangements shall be made for proper storage of materials including guarding.

Preparation of Schedule with specification of materials

14.4 The Schedule for the execution of works and calling tender from the appropriate class of contractor shall be prepared. The grade and specification of materials shall be invariably specified in the Scheduled of work.

Survey, estimates for O.H. line Distribution and U.G. Cable works to be done by the Electrical Planning Division.

14.5 When the route length of O.H. Distribution net-work exceeds one Km. survey, drawing up the list of materials Scheduled for execution of work shall be done by the Executive Engineer, Planning Electrical Division and submitted to the Superintending Engineer for approval, when the route length O. H. Distribution falls below one Km. such action shall be taken by the working Division. The same procedure shall also apply in case of U.G. Cable and the project estimate of elec. works when the value of such work exceeds Rs. 1 lakh.

Importance of engaging skilled and experienced workmen to avoid error or ommission.

15.1 Installation i.e. erection of Transformers. H.T. and L.T. Switchgears, Laying of Underground Cables, developing Sub-Station etc. require highly skilled experienced workmen. Only those personnel, who are fully conversant which such job shall be allowed to handle works. Slight error or ommission may result in serious accident or failure troubles.

It must be remembered that choice of materials, layout of the work and skill and experiences all combined to determine the character and efficiency of the installation.

Graduation of materials and their

16.1 Accesssories and materials for Electrical Works, with special reference to Underground, Overhead and Internal Installation have been

choice depends on the merit of case

classified into ----------
The gradation has been made in consideration to the quality. The materials as Grade I. are comparatively superior and higher in prices. The choice of grade rests with the Engineer-Officer in consideration to the extent of the case. All materials shall be of ----------
----kind and as far as possible. Comply with ----------in separate book.

Basis of rates worked out & provided in the Schedule

16.2 The rates provided in the Scheduled (both for materials and item of works) have been worked out on the basis of analysis of the current market study. But it is generally accepted that the fixing of prices is not strictly possible due to market variation. While preparing Schedule of rates and ambit of minor marginal adjustment to accommodate reasonable fluctuation has been taken into account.

Scope of rules and Sub-rules made hereunder.

17.1 All rules and sub-rules hereunder, shall apply mutadis- mutandis to the context of the tender aggrement made in either of the Form No. B. F. 2911, 2911 (i) and 2911 (ii)

Reference to S. E. in case of doubt

17.2 In case of doubt ambiguity that may arise reference shall be made to the Superintending Engineer and his decision shall be final and binding.

18.0 Instruction for preparation of estimates

Classes of estimates- Major and Minor Works

18.1 The estimates are of two classes viz. Major and Minor Works relating to either Original or Repair works. This has been amply dealt with in the P. W.D. Code , Financial Rule, W.A.D. Manual etc. of the Government . In following clauses practical instruction regarding preparation and presentation of the estimate are dealt with so as to facilitate the checking of the estimates in the Divisional and Circle Officers and to minimise the scope of Audit Objection.

Allocation of cost in Major Work estimates

18.2 In all estimates there shall be (i) Reference (ii) Report (iii) Details of the items of works. In major works estimates a board sheet showing allocation of costs of the various Sub-heads or class of work shall also be ----------

Inclusion of proper reference of letter requisitioning the work

18.3 The reference shall include the correct and appropriate indication of the letter of memorandum requisitioning the work or project to the Public Works Deptt.

It is incorrect to cite the references between Assistant Engineer and the Executive Engineer as reference in the estimate.

Report prefacing and estimate shall fully explain physical and tectional aspects of work.

18.4 The report prefacing and estimate shall be (1) self-contained (2) self-explanation prepared to the physical and technical aspects of the project in the work remain are not specifically requisitioned by the sponsoring authority but ----------in the report

Information to be Included in the report prefacing and estimate

18.5 When it is necessary to consult the officer of the sponsoring department the correct designation of such officer, the date of consultation and the designation of the P. W. D. officer who was present in the consultation shall be indicated in the report. Where conference are held between officer of P.W.D. and other Department, reference of the minutes or proceding shall also be mentioned.