UJVN LIMITED

(A Govt. of Uttarakhand Enterprise)

BIDDING DOCUMENT

1	Officer Inviting Tender	**EXECUTIVE ENGINEER PROJECT CIVIL MAINTENANCE, DHALIPUR, DISTT.- DEHRADUN - 248142**
2	Name of the Work	**Cutting Down and disposal of 88 trees located on the land of Colony Dhalipur.**
3	Completion Time of the Work	**30 days**
4	Tender No	**Tender 22/EE/PCM/Dhalipur/2025-26.**
5	Minimum value to be quoted	**Rs. 7,00,000.00 + GST Extra as applicable.**
6	Cost of Document	**Rs. 590/- (including GST)**
7	Earnest Money	**Rs. 17,500.00**
8	Last Date of Submission of Tender	**13:00 hrs of 15.09.2025**
9	Date of Opening of Tender	**15:30 hrs of 15.09.2025**
10	Name of Contractor/Firm Submitting the Tender with Address	

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SECTION-I

- NOTICE INVITING TENDER
- PRESS NOTICE

Short Term Tender 22/EE/PCM/Dhalipur/2025-26.

NOTICE INVITING TENDER

Tenders are invited for & on behalf of the UJVN Ltd ("the Employer") from the interested bidders in two bid systems for "**Cutting Down and disposal of 88 trees located on the land of Colony Dhalipur.**"

1. **Completion Time**
   The entire Works under the Contract shall have to be completed in all respects within **30 days** from the date of start of procurement.

2. **Availability of Tender Document**
   The bidding documents may only downloaded online from **"www.uttarakhandjalvidyut.com"**. Bidding Documents is available online on **"www.uttarakhandjalvidyut.com" from 15:00 hrs of 01.09.2025 upto 17:00 hrs of 14.08.2025**

3. **Submission of Tenders**
   Sealed Tenders super scribed "**Cutting Down and disposal of 88 trees located on the land of Colony Dhalipur."** shall be submitted in two separate sealed envelops.
   Part I: Self signed Bid Document along with EMD/Tender Security and cost of Tender for downloaded tenders and shall comprise of all documents detailed in clause 10 of instructions to tenderer (ITT) in section –II .
   Part II: Price Bid

   The Tender document must reach in the following Offices by **15.09.2025 up to 13:00 hrs.**
   1. Office of the Executive Engineer, Project Civil Maintenance Dhalipur, Dehradun

   If the due date of receipt of Tenders as aforesaid is declared holiday/strike/ bundh/ on any account, Tenders would be received on the next working day up to stipulated time.
   Tenders received late on account of any reason whatsoever and telegraphic/fax Tenders & incomplete Tenders will not be entertained.

4. **EARNEST MONEY DEPOSIT**
   Part I: Bid document of the tender must be accompanied with Earnest Money **Rs. 17,500.00** valid up to **Six(6) months** from the date of opening of tender, failing which, tender shall not be considered. Earnest Money shall be deposited by the Tenderer in form of FDR/CDR/TDR from any scheduled National bank / State bank & duly pledged in favour of Deputy General Manager(CM-YV), Dhalipur, Dehradun
   NO FIRM SHALL BE EXEMPTED FROM DEPOSITING EARNEST MONEY ON ANY GROUND WHATSOEVER.

5. **Opening of Tender**
   Part-I & Part-II will be opened by the E.E, P.C.M. Dhalipur or his authorized representative on **15.09.2025 from 15:30 hrs** onwards in the presence of authorized representative(s) of the Bidders who choose to remain present.

6. **Tender Validity Period**
   Tender shall be valid for a period of 120 days from the date of opening of Techno-Commercial Tender.

7. **Cost of Tender Document**

   The cost of Bid document is **Rs. 590/- (including GST)** which is non-refundable and the payment against the cost of Bid document shall be made in the form of Demand Draft/banker's Cheque in favor of **'UJVNL, P.N.B A/c No 0639002100009390' payable at Dhakrani District Dehradun** accompanied with **Part I .**
   (*In case the Demand Draft/banker's Cheque is payable outside Dhakrani, a sum of Rs. 100.00 (or as applicable) shall be required extra in such case on account of collection charges. However any short amount of tender fee will not be acceptable and tender shall be rejected*)

8. **Whom to Contact**
   For any further information on the Tender, the Tenderers may contact the office of the **Executive- Engineer (PCM), UJVNL, Dhalipur, Dehradun Contact No-+91 94565 90204**

9. The undersigned shall have the right to reject all or any of the Tenders and shall not be bound to accept the lowest or any other Tender or to give any reason for such decision.

10. Tenders for part of work shall not be accepted.

11. UJVN Ltd has no responsibility regarding failure of communication/ internet problem and consequent upon problems encountered by bidders

For & On behalf of UJVN Ltd
Sd/-
Executive- Engineer (PCM), UJVNL, Dhalipur, Dehradun

NOTICE INVITING TENDER

(For publishing in News papers only)

UJVN Limited
(An Uttarakhand Govt. Enterprise)
H.O. "UJJWAL" Maharani Bagh, GMS Road,Dehradun.-248006
Telephone-0135-2763508, 2763808 Fax 0135-2763507

Short Term-TENDER INVITING NOTICE

Office of the Executive Engineer PCM Dhalipur, Dehradun invites sealed tenders from interested parties. Brief summary of the tender is given below:

Tender No	Name of work
22/EE/PCM/Dhalipur/ 2025-26	Cutting Down and disposal of 88 trees located on the land of Asan Colony Dhalipur.
Minimum Bidding Amount:	Rs. 7,00,000.00 (GST extra)
Date & Time of availability of bid document on website	: 01.09.2025 at 15:00 Hrs
Last Date & Time for submission of tender	: 15.09.2025 up to 13:00 Hrs

For fuller and further details, kindly visit our website. The tender documents can be downloaded from the Nigam's website www.ujvnl.com.

Executive Engineer
PCM-Dhalipur, Dehradun

"Avoid wasteful use of Electricity"

यूजेवीएन लिमिटेड
(उत्तराखण्ड सरकार का उपक्रम)
मुख्यालय "उज्जवल" महारानी बाग, जी० एम० एस० रोड
देहरादून–248006 दूरभाषः 0135–2763508, 2523100

अल्पकालीन निविदा आमन्त्रण सूचना

कार्यालय अधिशासी अभियन्ता, परियोजना जानपद अनुरक्षण–ढालीपुर, द्वारा इच्छुक निविदादाताओं से मोहरबन्द निविदा आमन्त्रित की जाती हैं। निविदा का संक्षिप्त विवरण निम्नवत हैः–

निविदा संख्या	कार्य का नाम
22/EE/PCM/Dhalipur/ 2025-26	ढालीपुर आसन कालोनी की भूमि पर स्थित 88 वृक्षों के पातन एवं निस्तारण का कार्य।
न्यूनतम बोली राशि	Rs. 7,00,000.00 (GST अतिरिक्त)
वैव साईट पर निविदा की उपलब्धता की तिथि एवं समय	:01.09.2025 को 15:00 बजे से
निविदा जमा करने की अन्तिम तिथि एवं समय	:15.09.2025 को 13:00 बजे तक

अन्य जानकारी हेतु कृपया हमारी बेबसाईट देखें। निविदा प्रपत्र निगम की बेबसाइट www.ujvnl.com" से डाउनलोड किये जा सकते हैं।

अधिशासी अभियन्ता
परियोजना जानपद अनुरक्षण, ढालीपुर

"बिजली का बरबादी पूर्ण उपयोग न करें"

Section-II

Instructions to Tenderer (ITT)

Section-II

Instructions to Bidder (ITB)

A. General

1. Scope of Bid

1.1 The UJVN LTD. hereinafter referred to as Employer invites Tenders for the work as mentioned in Notice Inviting Tender "SECTION-I" and referred to as "the Works".

1.2 The successful Tenderer will be required to complete the Works in the period as mentioned in Notice Inviting Tender "SECTION-I" for Completion specified in the Schedule-C in accordance with Conditions of Contract.

1.3 Throughout these documents, the terms "Tender" and "Bid" and their derivatives (Tenderer/Bidder, Tender/Bid, Tendering/bidding, etc.) are synonymous.

2. Eligible Bidder

2.1 The tenders are limited to those firms, companies, Tenderers, who meet minimum qualification requirements as stipulated in the sub-clause 3 of this Section.

2.2 Tenderers shall provide such evidence of their continued eligibility to the Employer as the latter shall reasonably request. Tenderers should not be under a declaration of ineligibility for corrupt and fraudulent practices by the Employer, any Government institution or Public Sector Undertaking in India in accordance with Sub-clause 31.

Technical Eligibility:

Experience of having successfully completed similar works as Prime contractor in Govt. department or Govt. Organization or PSU or PPP mode or Public Limited Company during last 7 years ending last day of month previous to the one in which tenders are invited should either be of the following-

Here similar work means "Cutting Down and disposal of trees"

3. Qualification of the Tenderer

3.1 All Tenderes shall include the following information and documents with their Tenders in Qualification Information unless otherwise stated in the ITT:

(a) Copies of original documents defining the constitution or legal status, place of registration, and principal place of business; Council of Architecture Registration Certificate, written power of attorney of the signatory of the Tender to commit the Tenderer (This is in the case of a registered firm or company)

(b) Information regarding any litigation or arbitration during the last three years in which the Tenderer is involved, the parties concerned, the disputed amount, and the matter;

3.3.1. To qualify for award of the Contract, each Bidder should have minimum following eligibility:

i. PAN No
ii. GST registration

3.3 .2. **(a)** Each Bidder must produce self attested copy of following documents:
(i) The PAN No
(ii) GST registration

(b) **i.** Earnest money in desired shape
ii. Tender cost in form of Demand Draft
iii. Non- judicial stamp paper of Rs. 100/- plus Rs. 1/- revenue stamp affixed on it with proper signature on revenue stamp by the contractor/firm regarding Tender Form.

(c) **i.** Duly filled and signed Tender Form, Form of Declaration, Qualification information and other schedules.
ii. The duly filled and signed original (as downloaded) application downloading form which has been used by the vender for downloading the tender document from the web site. If this "Application Form" is not submitted in original with the tender, it will be summarily rejected.

3.3.3. Sub-Contractor's experience and resources shall not be taken into account in determining the Tenderers compliance with the qualifying criteria.

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

(i) made misleading or false representations in the forms, statements, declarations and attachments submitted in proof of the qualification requirements; and/or

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

(iii) participated in the previous Tendering for the same work/trade and had quoted abnormally high or low Tender prices and could not furnish rational justification for it to the Employer.

4. Cost of Tendering

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

5. Site Visit/Familiarizations with Nature of Work/Trade

5.1 The Tenderer, in his own interest and cost, should inspect and examine the site and get familiarize with nature of work/ supply and satisfy themselves, before submitting their tender, in respect of the site conditions which may influence or affect the work/supply or cost thereof under the Contract:

a) Site conditions including access to the site, existing and required roads and other means of transport/ communication for use by him in connection with the works;

b) The type of equipment and facilities needed, preliminary to, for and in the performance of the work supply; and

c) All other information pertaining to and needed for the work/supply including information as to the risks, contingencies and other circumstances which may influence or affect the work or the cost thereof under this contract.

d) Source and extent of availability of suitable materials including water etc. and labour (skilled and un-skilled) required for work and Laws and Regulations governing their use and employment;

e) Geological, meteorological, topographical and other general features of the site and its surroundings as are pertaining to and needed for the performance of the work;

f) The limit and extent of surface and sub-surface water to be encountered during the performance of the work and the requirement of drainage and pumping;

g) The type of equipment and facilities needed, preliminary to, for and in the performance of the work; and

h) All other information pertaining to and needed for the work including information as to the risks, contingencies and other circumstances which may influence or affect the work or the cost thereof under this contract.

5.2 The Tenderer should note that information, if any, in regard to the site and local conditions, in these tender documents, except for the material agreed to be supplied by the Employer, have been given merely to assist the Tenderer and are not warranted to be complete.

5.3 The Tenderer should note and bear in mind that the Employer shall bear no responsibility for the lack of acquaintance of the site and other conditions or any information relating thereto, on their part. The consequences of the lack of any knowledge, as aforesaid, on the part of the Tenderer shall be at their risk and cost and no charges or claims whatsoever consequent upon the lack of any information, knowledge or understanding shall be entertained or payable by the Employer.

B. Tender Document

6. Contents of Tender Document

6.1 The set of Tender documents comprises the documents listed below and addendum issued in accordance with Clause 8 of ITT.

1 Notice Inviting Tender
2 Instructions to Tenderer (ITT)
3 Special Conditions of Contract
4 Schedules
5 Tender form and procedures
6 Bill of Quantity
7 Safety Manual

6.2 The Tenderer is expected to examine carefully all instructions, Forms, Bill of Quantities, qualification information and other schedules, General and Special conditions of contract, specifications and drawings in the Tender Documents. Failure to comply with the requirements of Tender Documents shall be at the Tenderer's own risk. Pursuant to clause 22 hereof, Tenders, which are not substantially responsive to the requirements of the RFP Documents, shall be rejected.

7. Clarification of Tender Documents

7.1 The Tenderer is requested to submit any question in writing so as to reach the employer within 5 days after publishing of Tender.
7.2 The Tenderer is requested to submit any questions in writing so as to reach the Employer not later than one week before the meeting.
7.3 Any modifications in the Tender documents listed in Clause 6.1 of ITT, which may become necessary, shall be made by the Employer exclusively through the issue of an Addendum pursuant to Clause 8 of ITT.

8. Amendment of Tender Documents

8.1 Before the deadline for submission of Tenders, the Employer may modify the Tender documents by issuing addendum.
8.2 Any addendum thus issued shall be part of the Tender documents and shall be communicated in writing by registered post or by cable to all purchasers of the Tender documents. Prospective Tenderer shall acknowledge receipt of each addendum by cable to the Employer.
8.3 To give prospective Tenderer reasonable time in which to take an addendum into account in preparing their Tenders, the Employer shall extend, as necessary, the deadline for submission of Tenders, in accordance with Clause 18 of ITT.

C. Preparation of Tenders

9. Language of Tender

All documents relating to the Tender shall be in English language.

10. Documents Comprising the Tender

10.1 The Tender submitted by the Tenderer shall be in two separate parts:

Part I This shall be named **"Part-I"** and shall comprise of:

I. For documents downloaded from the website, non-refundable cost of the Tendering documents placed in a separate cover, marked **"cost of Tendering document downloaded from the internet"** in the form of Bank Draft / Banker's Cheque pertaining to the tender cost (Including applicable tax).

II. Earnest Money in a separate cover marked **'Earnest Money'**;

III. **Tender Form, Form of Declaration, Qualification information and other schedules, supporting documents, as specified in Clause 3 of ITT**.

IV. any other information/documents required to be completed and submitted by Tenderer, as specified in the ITT,

V. **The duly filled and signed original (as downloaded) application downloading form which has been used by the vender for downloading the tender document from the web site. If this "Application Form" is not submitted in original with the tender, it will be summarily rejected**.

Part II It shall be named **"Financial Tender"** and shall comprise Priced Bill of Quantities for items specified in Section-VII;

10.2 Each part shall be separately sealed and marked in accordance with Sealing and Marking instructions in clause 17 of ITT.

10.3 The following documents, which if not submitted with the Tender, will be deemed to be part of the Tender.

Section	Particulars

1	Notice inviting tender
2	Information and Instructions to Tenderer
3	
4	

11. Tender Prices

11.1 The Contract shall be for the whole Work, as described in Clause 1.1 of ITT, based on the Priced Bill of Quantities submitted by the Tenderer.

11.2 The Tenderer shall adopt the Item Rate Method for Priced Bill of Quantities as specified in Section-VII.

Item Rate Method requires the Tenderer to quote rates and prices for all items of the works described in the Bill of Quantities. Corrections, if any, shall be made by crossing out, initialling, dating and rewriting.

11.3 All duties, taxes, royalties and other levies payable by the Contractor under the Contract, shall herein be included in the rate prices and the total tender price submitted by the Tenderer. GST shall be paid extra by the successful bidder as applicable.

12. Currencies of Tender and Payment

The rates and the prices shall be quoted by the Tenderer entirely in Indian Rupees.

13. Tender Validity

13.1 Tenders shall remain valid for a period of 120 days after the deadline date for Tender submission specified in Clause 18 of ITT.

13.2 In exceptional circumstances, prior to expiry of the original time limit, the Employer may request that the Tenderer may extend the period of validity for a specified additional period. The request and the Tenderer's responses shall be made in writing or by cable. A Tenderer may refuse the request without forfeiting his Earnest Money. A Tenderer agreeing to the request will not be required or permitted to modify his Tender, but will be required to extend the validity of his earnest money for a period of the extension, and in compliance with Clause 14 of ITT in all respects.

14. Earnest Money Deposit (EMD)

14.1 The Tenderer shall furnish, as part of the Tender, Earnest Money, for the amount specified in the NIT,

14.2 Any Tender not accompanied by an acceptable Earnest Money shall be rejected by the Employer as non-responsive.

14.3 The Earnest Money of unsuccessful Tenderer will usually be returned within 28 days of the award of works to the successful Tenderer. But if not returned in due time, no claim from contractor's side shall be entertained.

14.4 The Earnest Money of the successful Tenderer will be discharged when the Tenderer has signed the Agreement and furnished the required Performance Security / initial security Deposit. EMD, in later stage may be converted into Performance Security / Initial Security Deposit; if so than contractor has to extend validity of EMD upto a period as specified for Performance Security Deposit / initial security Deposit

14.5 The Earnest Money may be forfeited:

a) if the Tenderer withdraws the Tender after Tender opening during the period of Tender validity;

or

b) If, the employer rejects the tender under corrupt and fraudulent practice as per Sub-Clause 31 of ITT.

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. Execute the work within time specified.

15. Alternative Proposals by Tenderer

Tenderer shall submit offers that comply with the requirements of the Tendering documents, including the Bill of Quantities and the basic technical design as indicated in the drawings and specifications. Alternative proposals will be rejected as non-responsive.

16. Format and Signing of Tender

16.1 The Tenderer shall submit one set of the Tender comprising of the documents as described in Clause 10 of ITT.

16.2 The Tender shall be typed or written in indelible ink and shall be signed on each page by a person or persons duly authorized to sign on behalf of the Tenderer, pursuant to Sub-clause 4.1 or 4.2, as the case may be. All pages of the Tender where entries or amendments have been made shall be initialed by the person or persons signing the Tender. The unsigned Tender shall not be considered and shall liable to be rejected forthwith by Employer. To avoid any discrepancies Tenderer should quote the rates in figure and words of English language also

a) If the tender is submitted by an individual, it shall be signed by the proprietor above his full name and with its current business address.

b) If the tender is submitted by a proprietary firm, it shall be signed by the proprietor above his full name and full name of his firm with its name and current business address.

c) If the tender is submitted by a firm in partnership, it shall be signed by all the partners of the firm above their full names and current business addresses, or by a partner holding the power of attorney for the firm for signing the tender, in which case a certified copy of the power of attorney shall accompany the tender. A certified copy of the partnership deed duly registered and current business address of all the partners of the firm shall also accompany the tender.

d) If the tender is submitted by a limited company or a limited corporation, it shall be signed by a duly authorized person holding the power of attorney or any other legally valid document for signing the tender, in which case a certified copy of the power of attorney or any such legally valid document shall accompany the tender. Such limited company or corporation may be required to furnish satisfactory evidence of its existence before the contract is awarded.

e) If the tender is submitted by a Joint Venture/ consortium of firms, one of the partners shall be nominated as the lead Partner who shall submit complete information pertaining to each partners in the Joint Venture/ consortium and shall be authorized to receive instructions and incur liabilities for and on behalf of the Joint Venture/ consortium during pre-award/post award (if awarded) and this authorization shall be evidenced in the Joint Venture Agreement submitted with the tender signed by legally authorized signatories of all the partners. The tender and in case of successful tender, the agreement shall be signed by all partners of the Joint Venture/ consortium so as to be legally binding on all partners. All partners of the Joint Venture/ consortium shall be liable jointly and severally for the execution of the contract in accordance with the contractual terms and a statement to this effect shall be included in the Joint Venture Agreement copy of which shall be submitted with the tender.

f) All witnesses and sureties shall be persons of status and their full names, occupations and addresses shall be stated below their signatures. Each page of the Tender Documents shall be signed by the Tenderer.

16.3 The Tender shall contain no overwriting, alterations or additions, except those to comply with instructions issued by the Employer, or as necessary to correct errors made by the Tenderer, in which case such corrections shall be made by scoring out the cancelled portion, writing the correction and initialling and dating it by the person or persons signing the Tender.

D. Submission of Tenders (For e-tendering please see clause-32 of ITT)

17. Sealing and Marking of Tenders

17.1 The Tenderer shall place the two separate envelopes (called inner envelopes), superscripted as **Part-I** and **Part-II "Financial Bid"** for which tendering is being done. Both the envelope shall be kept inside an outer envelope. The outer envelope shall be superscripted **Part-I & Part-II of Tender No:** For which tendering is being done.

The contents of the Techno-commercial and Financial Tenders shall be as specified in clause 10.1of ITT.

17.2 The inner and outer envelopes containing the Technical and Financial Tenders shall
a) be addressed to the authority inviting tender
b) bear the name and Tender No. of the Work as mentioned in Tender Notice

17.3 In addition to the identification required in Clause 17.1. and 17.2, each of the envelopes shall indicate the name and address of the Tenderer to enable the Tender to be returned unopened, in case it is declared late, pursuant to Clause 19 of ITT, or is declared non-responsive pursuant to Clause 20 of ITT.

18. Deadline for Submission of Tenders

18.1 Complete Tenders (including Technical and (financial) must be received by the Employer/ Authority inviting tender at the address specified in the Tender Form not later than the date and time indicated in the Tender Form. In the event of the specified date for the submission of Tenders being declared a holiday for the Employer, the Tenders will be received up to the specified time on the next working day.

18.2 The Employer/ Authority inviting tender may, in the exceptional circumstances and at its discretion, extend the deadline for submission of Tenders by issuing an amendment in accordance with Clause 8 of ITT, in which case all rights and obligations of the Employer and the Tenderer previously subject to the original deadline will then be subject to the new deadline.

19. Late Tenders

Any Tender received by the Employer after the deadline prescribed in Clause 18 of ITT will be returned unopened to the Tenderer.

E. Tender Opening and Evaluation

20. Tender Opening

20.1 The Employer/ Authority inviting Tender will open the Tenders received (except those received late) in the presence of the Tenderer/Tenderer's representatives who choose to attend at the time, date and place specified in the Tender issue Form. In the event of the specified date for the opening of Tenders being declared a holiday for the Employer, the Tenders will be opened at the appointed time and vanue on the next working day.

20.2 The envelope, superscripted as **Part-I** shall be opened first and if the cost of the Tendering documents is not there, or incomplete, the remaining Tender documents will not be processed, and Tender will be rejected.

20.3 In all other cases, the amount of Earnest Money, forms and validity shall be announced. Thereafter, the Tenderer' names and such other details as the Employer may consider appropriate, will be announced by the Employer at the opening.

20.4 Evaluation of the techno-commercial bid with respect to Tender security, qualification information and other information furnished in Part-I of the Tender pursuant to Clause 10.1 of ITT, shall be taken up and a list will be drawn up of the responsive Tenderers whose financial Tenders are eligible for consideration.

20.5 The Employer/ Authority inviting Tender shall inform the Tenderer, whose techno-commercial Tenders are found responsive, date, time and place of opening of financial. In the event of the specified date being declared a holiday for the Employer/ Authority inviting Tender, the Tenders will be opened at the appointed time and venue on the next working day. Tenderer or their representative may choose to attend the meeting of opening of financial Tenders.

20.6 At the time of the opening of the **Part-II "Financial Bid"**, the names of the Tenderer whose Tenders were found responsive in accordance with clause 20.4 of ITT will be announced. The financial Tenders of only responsive Tenderers whose financial Tenders are eligible for consideration, will be opened . The remaining Tenders will be returned unopened to the Tenderer. The responsive Tenderer' names, the Tender prices, the total amount of each Tender, and such other details as the Employer may consider appropriate will be announced by the Employer at the time of Tender opening. Any Tender price which is not read out and recorded, will not be taken into account in Tender Evaluation

20.7 The Employer/ Authority inviting tender at his discretion may open **Part-I** and **Part-II "Financial Bid"** of Tender simultaneously and evaluate the Tender completely including checking for responsiveness.

21. Process to be Confidential

Information relating to the examination, clarification, evaluation, and comparison of Tenders and recommendations for the award of a contract shall not be disclosed to Tenderer or any other persons not officially concerned with such process until the award to the successful Tenderer has been announced. Any attempt by a Tenderer to influence the Employer's processing of Tenders or award decisions may result in the rejection of his Tender

22. Examination of Tenders and Determination of Responsiveness

22.1 During the evaluation of "Part-I" of Tenders, the Employer will determine whether each Tender:
(a) Meets the eligibility criteria defined in Clauses 2 and 3;
(b) Has been properly signed;
(c) Is accompanied by the required EMD and cost of tender document; and
(d) Is substantially responsive to the requirements of the Tendering documents.

22.2 A substantially responsive "Tender" is one which conforms to all the terms, conditions, and specifications of the Tendering 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; or
(b) Which limits in any substantial way, the Employer's rights or the Tenderers obligations under the Contract; or
(c) Whose rectification would affect unfairly the competitive position of other Tenderer presenting substantially responsive Tenders or
(d) Which is inconsistent with the Tendering documents.

22.3 If a "Tender" is not substantially responsive, it will be rejected by the Employer/Authority inviting tender, and may not subsequently be made responsive by correction or withdrawal of the nonconforming deviation or reservation.

23. Correction of Errors

23.1 In the Price-Bid of Bill of Quantities the rates shall be written both in words and in figures. Tenderer shall also show the total on each page and the Grand Total of the whole Contract. Corrections, if any, shall be made by crossing out, initialing, dating and rewriting**.**

23.2 If on check, there are found to be differences between the rates given by the contractor in words and figures or in the amount worked out by him in the Bill of Quantities and General Summary, the same shall be adjusted in accordance with the following rules;.

a) In the event of a discrepancy between description in words and figures quoted by a Tenderer, the description in words shall prevail.
b) In the event of an error occurring in the amount column of Bill of Quantities as a result of wrong multiplication of unit price and quantity, the unit price shall be regarded as firm and multiplication shall be amended on the basis of the price.
c) All errors in totaling in the amount column and in carrying forward totals shall be corrected.
d) The totals of various sections of Bill of Quantities amended shall be carried over to the General Summary and the tendered sum amended accordingly. The tendered sum so altered shall, for the purpose of tender, be substituted for the sum originally tendered and considered for acceptance instead of the original sum quoted by the Tenderer. Any rounding off of quantities in Price Bid of Bill of Quantities or in General Summary by the Tenderer shall be ignored.

24. Evaluation and Comparison of Tenders

24.1 The Employer will evaluate and compare only the Tenders determined to be substantially responsive in accordance with Clause 22.

24.2 In evaluating the Price-Bid of Tenders, the Employer will determine for each Tender the Evaluated Tender Price by adjusting the Tender Price as follows:

a) Making any correction for errors pursuant to Sub-clause 23;
b) Applying any discount offered by the Tenderer (Sub-clause 11.2)

F. Award of Contract

26. Award Criteria

Subject to Clause 28 of ITT, the Employer will award the Contract to the bidder whose Tender has been determined:

i. to be substantially responsive to the Tendering documents and who has offered the **highest** evaluated Tender price, provided that such Tenderer has been determined to be (a) eligible in accordance with the provisions of Clause 2 of ITT, and (b) qualified in accordance with the provisions of Clause 3 of ITT; and (c) the evaluated Tender Price is within a reasonable variation of the estimated amount of Work and

27. Employer's Right to accept any Tender or Reject any or all Tenders

Notwithstanding Clause 26 above, the Employer reserves the right to accept or reject any Tender, and to cancel the Tendering process and reject all Tenders, at any time prior to the award of Contract, without thereby incurring any liability to the affected Tenderer or Tenderer or any obligation to inform the affected Tenderer or Tenderer of the grounds for the Employer's action.

Employer/ Authority Inviting Tender reserves the right to relax the eligibility criteria for tenders for any or all the work as per requirement.

28. Notification of Award and Signing of Agreement.

28.1 The Tenderer whose Tender has been accepted will be notified of the award by the Employer prior to expiration of the Tender validity period through the "Letter of Acceptance", which will state the sum that the Bidder will pay to the Employeer in consideration of the execution, completion by the Contractor as prescribed by the Contract.

28.2. The notification of award will constitute the formation of the Contract until the Formal Agreement is signed pursuant to clause 28.3 of ITT and further subject only to the furnishing of a quoted amount .

28.3. The Agreement will incorporate all agreements between the Employer and the successful Tenderer. It will be signed by the Employer and the successful Tenderer after the performance security deposit is furnished.

28.4 Upon furnishing by the successful bidder of the quoted amount, the Employer will return the Earnest Money of the other Tenderer informing that their Tenders have been unsuccessful.

29. Deposition of quoted amount

29.1 Within 07 days after receipt of the Letter of Acceptance, the successful Tenderer shall deliver to the Employer a quoted amount including GST.

29.2 The deposit shall be in the form of Demand Draft in favor of **'UJVNL, P.N.B A/c No 0639002100009390' payable at Dhakrani District Dehradun.**

29.3 Failure of the successful bidder to comply with the requirements of Clause 29.1.shall constitutes sufficient grounds for cancellation of the award and forfeiture of the Earnest Money. He will also be debarred from participating in Tenders invited by the Project for one year.

30. Advances

No advance will be provided to contractor against Mobilization and for procurement of new equipment.

31. Corrupt or Fraudulent Practices

The Employer requires the Tenderer/contractors under this contract observe the highest standard of ethics during the procurement and execution of this contract. In pursuance of this policy, the Employer:

(a) defines, for the purpose of these provisions, the terms set forth 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 be detriment to the Employer, and includes collusive practice among Tenderer (prior to or after Tender submission) designed to establish Tender prices at artificial non-competitive levels and to deprive the Employer of the benefits of free and open competition.

(b) will reject a proposal for award of work if he determines that the Tenderer recommended for award has engaged in corrupt or fraudulent practices in competing for the contract in question.

(c) Will declare a Tenderer ineligible, either indefinitely or for a stated period of time, to be awarded a contract/contracts if he at any time determines that the Tenderer has engaged in corrupt or fraudulent practices in competing for, or in executing, the contract.

(d) Canvassing in any form is strictly prohibited and in case any Tenderer is found doing the same his tender shall be summarily rejected.

SECTION-III

SPECIAL CONDITIONS OF CONTRACT

SPECIAL CONDITION OF CONTRACT

If there be any conflict or inconsistency between the Special Condition and other Conditions then special conditions shall prevail**.**

SCOPE OF WORK:

- **Cutting Down 88 nos trees from the lowest portion of the trunk** and its uprooting**.**
- **Disposal of the trees.**

PRICE:

Prices shall be firm as specifically indicated in Bid Document by the Bidder. The Bidder shall quote his rates payable for all items required for complete work. GST shall be paid extra by the bidder to the Employer.

Terms & Conditions :-

1. The bidder shall quote a minimum amount of Rs. 7,00,000.00/- (Rupees Seven Lac only) +GST extra. Any bid quoted below Rs. 7,00,000.00/- (GST extra) will be rejected.
2. The work of cutting and disposal of 88 nos trees will be awarded to the bidder who shall quote the highest amount. The successful bidder shall deposit the quoted amount in advance as per direction of Engineer In-charge, then the permission for cutting the trees will be granted.
3. During the cutting /disposal of tress, if any of the Nigam's property/ electric pole is damaged, the bidder will execute the repair work of that property at his own expenses at the earliest. If, the bidder fails to do so within prescribed time, the earnest money will be forfeited.
4. Once the cutted portions of the trees are out of the Nigam's premises, it will be the responsibility of the bidder for its proper disposal at its end.
5. The time allowed for the completion of the work is 30 days.
6. Bidder should visit the site before offering their rates.
7. No T&P will be issued by the Nigam and rates should be inclusive cost of all T&P etc.
8. All the equipment machines deployed should be in good working condition.
9. Contractor has to follow the labour laws, tax laws and all other rules applicable for this type of work and statuary rules of GoU/GoI.
10. Rates offered by the contractor should be inclusive of all taxes (excluding GST) applicable as per the statuary rules of GoU/GoI.
11. Contractor will be responsible for safety of machines, staff and structure etc.
12. The work shall be carried out to the entire satisfaction of Engineer-In Charge.
13. Contractor shall be responsible for mobilization and demobilization of men, material, equipment and all other necessary resources to ensure timely completion of the work.
14. No escalation shall be paid by the Nigam.
15. All arrangement for execution of work shall be made by the contractor including arrangement for storage of material, camp office/residences etc.
16. No advance payment shall be given by the Nigam.
17. The Contractor shall at all time exercise reasonable and proper precautions for the safety of the labour and equipments at site. The Contractor shall be responsible for all risk to the lives and property belonging to the Nigam and other Contractors working in the area. Although all the reasonable and proper precautions may have been taken by the Contractor. He shall be called upon by a Court of law to make good any loss or damage. Properly ascertained by reasons of any act of negligence or omission of the Contract which the Nigam may be required to pay in respect thereof any amount or any cost or charge including legal charges in connection with all -legal proceedings which the Nigam may incur in reference thereto shall be chargeable from- the Contractor.
18. Any penalty if imposed by any authority on account of transportation/disposal of trees or other reasons shall be borne by the contractor.
19. The Electricity connection for the work shall be arranged by the contractors and all expenditure in this regard shall be the responsibility of the contractor.
20. Sub division of the work or any alternate proposal will be deemed to be disqualified.
21. All permissions for extraction/clearance and transportation of felled trees from concerned department have to taken and bear by biddger
22. The work shall be completed in all respect within the prescribed time if, the bidder fails to do so, the earnest money will be forfeited.

Signature of Contractor

Executive Engineer
PCM-Dhalipur, Dehradun

SECTION-IV

SCHEDULES

SCHEDULE-A

ISSUE OF DEPARTMENTAL MATERIALS TO THE CONTRACTOR

Sl. No.	Particulars of Stock Material	Rate at which material will be issued			Quantity	Place of issue
		,Unit	Rs.	P.		
1	2	3	4		5	6
1						
2						
3						
4						
5						
6						

Note: 1. No material shall be issued to contractor.

SCHEDULE-A

SCHEDULE OF CONSUMPTION OF MATERIAL

SI. No.	Item	Unit	No. of cement bag	Sand in Cum	Bricks in Nos,	Stone/Ballast Cum.
A	Its Class Brick Work in cement mortar					
1.	1:3 Mix	Cum	2.65	0.27	460	-
2.	1:4 Mix	Cum	1.90	0.27	460	-
3.	1:5 Mix	Cum	1.58	0.27	460	-
4.	1:6 Mix	Cum	1.33	0.27	460	-
5.	1:8 Mix		0.94	0.27	460	-
B	Cement Concrete					
1.	1:1:2	Cum	11.00	0.40	-	0.80
2.	1:1.5:3	Cum	7.80	0.44	-	0.85
3.	1:2:4	Cum	6.00	0.46	-	0.90
4.	1:3:6	Cum	4.25	0.48	-	0.92
5.	1:4:8	Cum	3.20	0.51	-	0.95
6.	1:5:10	Cum	2.50	0.50	-	0.95
7.	1:6:12	Cum	2.25	0.48	-	0.95
C	Cement Plaster 12mm thick.					
1.	1:2 Mix	Sqm	0.19	0.015	-	-
2.	1:3 Mix	Sqm	0.16	0.015	-	-
3.	1:4 Mix	Sqm	0.11	0.015	-	-
4.	1:5 Mix	Sqm	0.09	0.015	-	-
5.	1:6 Mix	Sqm	0.08	0.015	-	-
6.	20mm thick Cement Plaster. (1:2 Mix) in DADO.	Sqm	0.28	0.019	-	-
7.	20mm thick marble flooring 1:2 Cement mortar cover 15mm base coat & top coat 5mm. Rough cast finish plaster. Extra material for rough phase plaster.	Sqm	0.32	0.019	-	-
8.	3mm thick floating coat of neat cement	Sqm	0.09	-	-	-
				-	-	-
					-	-
				-		
D	Damp Proof Course.					
1.	20mm thick DPC with 1:2 Mix.	Sqm	0.28	0.019	-	-
2.	20mm thick DPC with 1:1.5:3 Mix.	Sqm	0.20	0.011	-	0.021
3.	40mm thick DPC with 1:2:4 Mix.	Sqm	0.26	0.018	-	0.036
4.	25mm thick DPC in 1:1.5:3.	Sqm	0.247	0.011	-	0.023
5.	40mm thick DPC in 1:1.5:3.	Sqm	0.40	0.022	-	0.042
E	Cement Pointing					
1.	1:2 Mix	Sqm	0.045	0.003	-	-
2.	1:3 Mix	Sqm	0.035	0.003	-	-
3.	1:4 Mix	Sqm	0.027	0.003	-	-
4.	Raised Pointing on brickwork in 1:2 C.M.	Sqm	0.107	0.004	-	-
5.	Drip course in 1:2 Mix (25x12mm section)	R.M.	0.005	0.010	-	-
F	Flooring					
1.	25mm thick 1:2:4 in flooring over 75mm cc 1:4:8 including rendering etc. complete.	Sqm	0.45	-	-	-
2.	25mm thick CC 1:2:4 flooring without base concrete 40mm thick CC 1:2:4 flooring without base concrete	Sqm	0.21	-	-	-
3.	Flat brick soiling 1:6 without top pointing. BOE flooring 1:6 without top pointing.	Sqm	0.30	0.018	-	0.036
4.	Mosaic flooring including 6mm mosaic 25mm CC 1:2:4	Sqm	0.09	-	-	-
5.	and 75mm CC 1:4:8 complete.	Sqm	0.13	-	-	-
6.	20mm Mosaic dado complete with plaster 1:2 Mix. Top coat 5mm thick white cement over 15mm thick 1:2 cement mortar.	Sqm	0.55	-	-	-
7.	6mm thick white glazed tiles flooring & skirting in 1:3 cement mortar.	Sqm	0.30	-	-	-
8.	½" thick white glazed tile flooring in 1:3 Mix. 75mm thick CC 1:3:6 in Apron with rendering in 1:2 mix.	Sqm	0.23	0.019	-	-
9.		Sqm	0.35	-	-	-

				- -	- -	- -
G.	R.B. work in 1:3 Mix.	Cum	3.60	0.33	420	-
H.	Stone work					
1.	R.R. 1:6	Cum	1.40	0.30	-	1.00
2.	R.C.R. 1:6	Cum	1.24	0.25	-	1.25
3.	R.C.R. 1:4	Cum	1.85	0.25	-	1.25
I.	White Washing					
1.	Cement washing	Sqm	0.008	0.64	-	-
2.	Cement washing in 1:2 (Cement & Lime)	Sqm	0.002	0.62	-	-
J.	Block Masonry					
1.	Masonry in CC 1:4:8 laid in 1:6 C.M.	Cum	4.40	-	-	0.91
2.	Masonry in CC 1:3:6 laid in 1:6 C.M.	Cum	5.60	-	-	0.88
K.	Laying of Kota stone	Sqm	0.11	0.08	-	-

SECTION-V

TENDER FORM & PROCEDURE

APPLICATION FOR TENDER

To

_____
_____
_____
_____

1. I/We have read and examined the following tender documents relating to "---------- ----------" *(Name of work)*

I (a) Notice Inviting Tender
(b) Instructions to bidders.
(c) Tender Forms, Form of Declaration, Qualification Information and Schedules
(e) Forms for Deeds of Guarantees and Hypothecation
(g) Special Conditions of Contract
(h) Safety Manual

2. I/We hereby tender for execution of the works referred to in the documents mentioned in paragraph above upon the terms and conditions contained of referred to in the aforesaid documents and within the period(s) completion and subject to such terms and conditions as stipulated in contract.

3. I/We agree to keep this tender open for acceptance for 120 days from the date of opening thereof and also agree not to make any modifications in its terms and conditions of our own accord.

4. A sum of Rs…… (Rupees……. ……only) is hereby forwarded in form of Demand draft/Bank Guarantee from Nationalized or Scheduled Bank of India as earnest Money. I/We agree that if I/We fail to keep the validity of tender open, as aforesaid, or make any modifications in the terms and condition of my/our tender of our own accord and/or fail to commence the execution of the works as provided in the documents referred in paragraph I above, after the acceptance of our tender, I/We shall become liable for forfeiture of my/our earnest money, as aforesaid and the Employer shall without prejudice to any other right of remedy, be at liberty to forfeit the said earnest money absolutely.

   Should this tender be accepted, I/We agree to abide by and fulfill all the terms and conditions and provisions of the above mentioned tender documents.

   I/We certify that the Tender submitted by me/us is strictly in accordance with the terms, conditions, specifications etc. as contained in your tender documents referred in paragraph I above and it does not contain any deviations to the aforesaid documents. It is further certified that information furnished in the Tender submitted by us correct to the best of our knowledge and belief.

(Signature of person duly authorized to sign the Tender on behalf of the Contractor along with seal of company)

Witness:

Name _____ Signature _____

Signature _____ Designation _____

Date_____ Name of Company

_____

_____

Date _____

Name & Address _____

_____

_____

Postal Address _____

_____

_____

Telephone No. _____

Fax No. _____

e- mail _____

FORM OF DECLARATION

M/s_____ *(name of Tenderer*) having its registered office at _____ (hereinafter referred to as "The Tenderer") having carefully studied all the documents, specifications, drawings etc. pertaining to the Work for "----------" *(name of work)*, the local and site conditions and having undertaken to execute the said works.

DO HEREBY DECLARE THAT:

1. The Tenderer is familiar with all the requirements of the Contract.
2. The Tenderer has not been influenced by any statement or promise of any person of the Employer but only the Contract Documents.
3. The Tenderer is financially solvent.
4. The Tenderer is experienced and competent to perform the contract to the satisfaction of the Employer.
5. The Tenderer is familiar with all the general and special laws, acts, ordinances, rules and regulations of the Municipalities, District, State and Central Government of India that may affect the work, its performance or personnel employed therein.
6. The Tenderer hereby authorize the Employer to seek reference from the bankers of Tenderer for its financial position.
7. The Tenderer undertakes to abide by all labour welfare legislations.
8. The statement submitted by the Tenderer is true and correct.
9. After submitting the tender, if it is found at later stage that Tenderer has submitted any wrong/ false document to influence the tender then UJVNL has right to make any suitable legal action against the Tenderer and forfeit the bid security/EMD or any sum payable to Tenderer.

Certify that I/we have visited the site and get familiarized with nature of WORK/ SUPPLY and site conditions and also have understood and discussed the WORK/SUPPLY with concerned site Engineers. I/we will not make any claim regarding damage to WORK/SUPPLY, T&P, labour etc and will be fully responsible to complete the WORK/SUPPLY as per special condition/Bill of Quantity/ as per instructions of Engineer-In-Charge

For and on behalf of the Tenderer

_____

_____

Dated _____

FORM OF AGREEMENT

This agreement made the **----------** between **----------** (herein after referred to as the Contractor of the one part and the **UJVNL** of the other.

WHEREAS the UJVNL is about to construct the **"**……**"** (hereinafter called the works) mentioned, enumerated or referred to in certain Conditions, Form of tender, Covering letter and Schedule of Prices which for the purpose of identification have been signed by: _____ on behalf of…… (Contractor) and _____(The Engineer-in-charge of the UJVNL) on behalf of Managing Director Uttarakhand Jal Vidyut Nigam Ltd and all of which shall from part of this contract as through separately set out herein and are included in the expression (Contract) wherever herein used.

AND WHEREAS the UJVNL has accepted the tender of the Contractor for the provisions and execution of the said work for the sum of **Rupees** _____ **only** upon the terms and subject to the conditions hereinafter mentioned.

NOW PRESENT WITNESS and the parties hereto hereby agree and declare as follows:-
That is to say, in consideration of the payments to be made to the UJVN Ltd by the Bidder as hereinafter mentioned the Contractor shall duly provide the plan for the said works and things in the Contract mentioned or described or which are limited there form or therein respectively or may be reasonably necessary for the completion of said works within and at the time and in the manner and subject to the terms, and conditions and stipulations mentioned in the said contract.

And in consideration at the due provisions, erection, execution consideration and completion of the said works and maintenance thereof, as aforesaid the Bidder will pay to the UJVN Ltd the said sum of **Rupees** _____ **only** or such other sums as may be become payable to the UJVN Ltd under the provisions of this contract such payments to be made at such time and in such manner as is provided of the contract.

In WITNESS WHEREOF the parties hereto have signed this deed hereunder on the dates respectively mentioned against the signatures of each.

Signed	Signed
(For and on behalf of the UJVNL)	by
(date)	(Contractor)
in the presence of and of	in the presence of and of
(date)	

SECTION VI

BILL OF QUANTITIES

PART –II: FINANCIAL-BID

BILL OF QUANTITY

Name of work : - Cutting Down and disposal of 88 trees located on the land of Colony Dhalipur.					
Sl. No.	**Description**	**Qty**	**Unit**	**Rates**	**Amount (in Rs.)***
1	Cutting Down of 88 nos trees from its lowest portion of the trunk and its disposal out of Nigam's premises	1.00	Job		
				Total	

Note:- GST extra as applicable shall be paid by the bidder.

JE *AE*

My / 0ur rates are..... (in words) of item mentioned above.

Terms & Condition:-

1. Any penalty if imposed by any authority on account of transportation or other reasons shall be borne by the contractor.
2. The Electricity connection for the work shall be arranged by the contractors and all expenditure in this regard shall be the responsibility of the contractor.
3. Sub division of the work or any alternate proposal will be deemed to be disqualified.
4. Please refer Special Condition of Contract.

Signature of contractor

Executive- Engineer (PCM)
Dhalipur, Dehradun

SECTION-VII

SAFETY MANUAL

CONTENTS

CHAPTER I
GENERAL

1.1 General

The Engineers at site shall at all times exercise reasonable and proper safety precautions for the safety of the people at all works under their control, in accordance with instructions contained in this Manual. They shall also ensure strict compliance of the same by their subordinates. Also, they shall see that the contractors executing works under their control adopt stipulated safety measures and adequately protect their workers.

In addition to instructions contained in this manual the safety regulations contained in the below mentioned ISI codes shall also apply wherever the provisions in the ISI codes are exhaustive in nature:

I.S. SAFETY CODES:

1.	IS	3764	1992	Excavation work
2.	IS	4756	1978	Tunnelling Work (first revision)
3.	IS	7293	1974	Working with Construction Machinery
4.	IS	7969	1975	Handling & Storage of building materials
5.	IS	4081	1991	Blasting and related drilling operations.
6.	IS	3696 (Pt. I)	1987	Scaffolds & ladders (Pt. I Scaffolds)
7.	IS	3696 (Pt. II)	1999	Scaffolds & ladders (Pt. II ladders)
8.	IS	4138	1977	Working in compressed air (Ist revision)
9.	IS	818	1968	Safety and health protection in electric gas in welding and cutting operations.
10.	IS	4912	1978	Safety requirements for floor and wall openings Railway and toe Boards.
11.	IS	5121	1969	Piling & other Deep foundations
12.	IS	4130	1991	Demolition of Buildings (Ist revision)
13.	IS	5916	1970	Construction involving use of hot bituminous materials.
14.	IS	3016	1982	Fire protection in welding and cutting operations.

1.2 ENFORCEMENT OF SAFETY REGULATIONS:

1.2.1 General Managers/Chief Engineers, Superintending Engineers, Executive Engineers, Supervisors and all other officials in charge of -

j) Make certain that all Central Government, State Government or local laws and ordinance are

execution of work at the various organisational levels in the project shall ensure strict enforcement of safety regulations in the execution of works.

1.2.2 To assist the executive and supervisory staff of the project in spelling out the safety programmes and regulations prescribed in the Manual, a separate safety unit should be included in the project staff. This unit should consist of a Safety Engineer of the rank of Executive Engineer or Senior Assistant Engineer and a number of safety inspectors to assist him. The number of safety inspectors will depend on the magnitude and distribution of work. The safety engineer will be directly responsible to the General Manager or other Engineer-in-Charge of the project in keeping him informed of the compliance or otherwise of all safety regulations and standards by the various executives, supervisory staff and contracting firms and assist him in maintaining safe standards of working.

The detailed duties of the safety staff shall be as under:

a) To look into all procedures and practices and examine temporary structures, the failure of any of which may result in an accident.

b) To go around the works regularly and advise the contractors and the department as to the measures to be taken to ensure safety of the works whether under the contractors or under the department.

c) To see that the rules and regulations laid down in the safety manual are observed. Non-compliance with these regulations if any, should be brought to the notice of the Safety Engineer.

d) To develop and execute programmes for the training of supervisory personnel in the application and observance of safety practices.

e) To receive and analyse reports of all accidents and fires and initiate corrective actions warranted by the situations.

f) To conduct safety education and propaganda.

g) To recommend revisions or additions to the safety manual on safety measures in the light of project experience.

h) To prepare safety posters, signs, displays, leaflets, bulletins, etc., and display them on neat attractive bulletin boards. Cartoons may also be displayed.

i) Suggestions from the workers may also be obtained by means of suggestion boxes which may be kept at various places.

iv) Employees must not leave naked fires unattended. Smoking shall not be permitted

complied with

1.2.3 A Project Safety Committee shall be constituted under the Chairmanship of General Manager of the Project, and shall have members from amongst the Senior Officers, Safety Engineer and representative of the contractor. The number of the members may vary and shall be decided by the General Manager according to the magnitude of the work and jobs involved. This Committee would meet from time to time, generally supervise the Safety arrangements, advise and give suggestions to the Safety Engineer, and consider the reports of the safety engineer.

1.3 CONTRACTORS' SPECIAL RESPONSIBILITIES:

1.3.1 The contractors shall at all times exercise reasonable and proper precautions for the safety of the people on the works and shall comply with the provisions of current safety laws, building and construction codes of the State Governments as may be applicable. All machinery and equipment and other sources of physical hazards shall be guarded in accordance with the requirements of this manual and regulations or laws of the State Governments of the Government of India.

1.3.2 In order to supervise the work from point of view of safety, the contractor shall provide a full time Safety Engineer who shall report and be responsible to the Safety Engineer of the Nigam, an executive or his designated representative and shall be responsible for coordinating the safety programmes.

1.3.3 The contractor shall provide all necessary fencing and lights to protect the public from accidents and shall be bound to bear all the expenses of defence of every suit, action & other proceedings at Law that may be brought by any person for injury sustained owing to neglect of the above precautions and to pay any damages and costs which may be awarded in any such suit, action & proceedings to any such persons or which may with the consent of the contractor be paid to compromise any claim by any person.

1.4 IMPORTANT SAFETY RULES:

i) Each employee shall be provided initial indoctrination regarding safety by the contractor so as to enable him to conduct his work in a safe manner.

ii) No employee shall be given a new assignment of work unfamiliar to him without proper introduction as to the hazards incident thereto, both to himself and his fellow employees.

iii) Under no circumstances shall an employee hurry or take unnecessary chances when working under hazardous conditions.

around fire prone areas and adequate fire fighting equipment shall be provided at crucial locations.

v) Employees under the influence of any intoxicating beverage, even to the slightest degree should not be permitted to remain at work.

vi) There shall be a suitable arrangement at every worksite for rendering prompt and sufficient first aid to the injured under the guidance of a Medical officer.

vii) The staircases and passageways, shall be adequately lighted.

viii) The employees when working around moving machinery, must not be permitted to wear loose garments. Safety shoes are recommended when working in shops or places where materials or tools are likely to fall. Only experienced workers shall be permitted to go behind guard rails or to clean around energized or moving equipment.

ix) The employees must use the standard protection equipment intended for each job. Each piece of equipment shall be inspected and after it is used.

1.5 ACCIDENT REPORTS:

1.5.1 Monthly reports on prescribed proforma of all accidents shall be promptly submitted to the Safety Engineer of the Nigam, with a copy to the Engineer-in-Charge giving such data as may be prescribed by the contracting officer.

1.5.2 On the occurrence of any accident a report should be made to the Safety Engineer of the Nigam with a copy to the Engineer-in-Charge within 12 hours of the occurrence of the accident. In case of fatal accidents or those which are so serious that they are likely to result in the death of any workman, a report should be made immediately to the Engineer-in-Charge of the work.

1.5.3 The following sample forms (specimens attached at the end of this Chapter) may be used for reporting accidents and keeping relevant statistics:

INJURY REPORT-PRELIMINARY

(To be submitted immediately after the accident)

(N.B.)-Answers to all the items should be precise and definite.

No. ……
Date……

1. Name of the person injured

2. Sex, Adult/Minor

3. Department/Project/Division

4. Designation

5. Regular/Work Charged/ Muster-Roll /Contractor's employee

6. Date & hour of accident

7. Cause of accident

8. Fatal, serious or minor

Signature with designation of Reporting Officer

To

Medical Officer

9. Nature of injury

10. Period of estimated disablement.

Signature of Medical Officer.

Distribution:

1. Engineer-in-Charge
2. Safety Engineer

C. INJURY REPORT-DETAILED

Project……Date of Report……

Section-I Name…….Age……Occupation

Who was injured? Employer…How long employed….

Salary or wage….Dates of previous injuries

Remarks……

Section-II Date of injury……..Time

Time & Place Exact place where injury occurred……..

Section-III Describe injury……

Name & Severity of injury……

Did injury result in death or Probable permanent disability……

Yes/No.

Return to work ……..

Date of death ……

Section-IV (Description of Accident which caused the injury)

Describe the accident in full…… ……

Section-V Type of Accident (Check one)

Fall of person- Same level
Falls of persons-One level to another
Flips (Causing strains not falls)
Struck by flying, rolling, sliding object
Stepping in or on object
Strains or sprains-lifting
Struck by or cut by hand tools
Other injuries from handling objects.
Burning or scalding
Electric shock or flash Explosions
Caught in or between
Striking against object
Struck by or run over by vehicle
Buried or partially buried by collapse of sides or fall of material
Drowning or suffocation
Poisoning, Infection
Other Describe……..

Section VI (Supervisor/Foreman's Statement)

I have personally investigated this accident, and concur in the analysis of causes given below:

Recommendation for prevention……...

Remarks……..

Signature of Foreman or other Immediate Superior.

Causes of the Accident

(To be completed by the Safety Engineer)

For one cross (x) in the appropriate box in Section 7, Mechanical causes; and one cross (x) in Section 8, Personal causes, Select the cause in each Section which could have been most readily removed and the removal of which would have helped most to prevent the accident. In addition to marking the appropriate box, describe briefly but exactly the causes selected. Secondary or contributing causes may be indicated by drawing a circle in the appropriate box.

Section VII Improper guarding……
(Unguarded, inadequately guarded, guard removed etc.)

Defective substances or equipment…….
(Broke, poorly designed, slippery, defective brakes etc.)

Hazardous arrangement……
…….(Unsafely piled material, poor labour, poor house-keeping, loose rock etc.)

Improper illumination……..

Improper ventilation……
(poor, dusty, gassy, high humidity, excessively hot etc.)

Improper dress or appeal……
(Goggles, gloves, shoes, hard hat respirator etc.)

No mechanical cause Insufficient data to classify

Section VIII (Personal Causes)

Injured person Other person

Physical or mental defect……..
(Poor eye sight, arm amputated, deaf, epilepsy, etc)

Lack of knowledge or skill……
(Unable to read, poor training, etc.)

Wrong attitude……
(Deliberate, chance-taking, disregard for instructions, etc.)

No Personal causes Insufficient data to classify

Section IX (Supervisory Fault)
Was Inadequate or faulty supervision or foremen ship a cause or contributing cause of this accident?
……
(Yes or No)

Explain ……..

Section X (Corrective Action)
What has been done to prevent the occurrence of similar accidents in the future?……
……..

This Report submitted by……

(Safety Engineer)

Approved…….
(Construction Engineer or Superintendent)

CHAPTER 4
CONSTRUCTION

4.1 SCAFFOLDS:

4.1.1 Scaffolds of proper type shall be provided for all work that cannot be done from the ground or from part of a permanent structure or from a ladder or other available means of support and safe means of access shall be provided to every place at which workers are required to work.

4.1.2 Every scaffold and every part thereof including supports shall be of good construction, of suitable and sound material and of adequate strength for the purpose of which it is used and it shall be properly maintained. Construction and dismantling of every scaffold shall be under the supervision of a competent person. Boards and planks used for the floors shall be of uniform thickness, butt jointed, closely laid, and securely fastened in place.

4.1.3 Every scaffold shall be securely supported or suspended and shall, where necessary be sufficiently and properly strutted or braced to ensure stability. The use of cross braces or framework, as means of access to the working surface shall not be permitted.

4.1.4 All scaffolds or working platforms of any nature shall be securely fastened to the building or structure, or if independent of the building shall be braced or guyed to prevent sway.

4.1.5 In the construction of dams sufficient anchorage shall be provided in the dam itself at the time of construction. The projecting anchorage shall be cut off only on completion. It is safer to avoid support on the sloping runners. The points should be provided with bolts and nuts and not bent rods.

4.1.6 SUSPENDED SCAFFOLDS:

i) Outriggers or other means of supports of suspended scaffolds shall be of adequate length and strength, (not more than 2m length unless specified by the Engineer-in-Charge) properly constructed, installed and securely fixed by anchor bolts or other equivalent means.

ii) Ropes chains, or other means of suspension shall be of good construction, sound material, adequate strength and free from patent defects and properly secured. The ropes and chains shall have a factor of safety of 8.

The platform shall not be less than 45 cms wide and points of suspension not more than 3 metres apart and so arranged or secured that at the working position the edge is as close as practicable to the working face when persons have to work in a sitting position.

iii) All rolling scaffolds shall be equipped with a positive locking device to prevent accidental movement of the scaffolds. These shall be periodically tested.

iv) Suspended scaffolds shall be tested as frequently as may be necessary to ensure that minimum safety factors are maintained. The test will be made by raising the working surface 30 cms above the ground and loading it with at least three times the maximum weight that will be imposed upon it.

4.1.7 Skips, buckets, baskets and similar equipment shall only be used for work of short duration when use of suspended scaffold is unreasonable and shall be used under the supervision of a responsible person. The skip, bucket or basket shall be at least 75 cm deep.

4.1.8 Trestle scaffolds shall not be of more than three tiers and the working platform shall not be more than 4.5 metres above the ground or floor or other surface upon which the scaffold is erected, and no trestle scaffold shall be erected on a suspended scaffold.

4.1.9 Men shall not be allowed to work from scaffolds during storms or high winds.

4.1.10 If scaffolds are to be used to a great extent or for a long period of time, a regular plank stairway, wide enough to allow two people to pass, shall be erected. Such stairways shall have hand rails on both sides.

4.1.11 When work is being performed above a scaffold platform a protective overhead covering shall be provided for the men working on the scaffold.

4.1.12 Whenever workmen have to work or constantly pass under a scaffold on which men are working a screen or other protection shall be provided to catch any falling material. Such protection shall extend outside the scaffold properly in order to catch any material falling off the edges of scaffold platforms. 12 mm wire mesh netting of No. 18 gauge or better may be used for this purpose.

4.1.13 Side screens shall be provided on scaffolds erected along passageways or other thorough fares.

4.1.14 On high scaffolds a netting or equivalent guard shall be provided for the space between toe-boards and railings.

4.1.15 During dismantling of scaffolds necessary precautions shall be taken to prevent injury to

4.1.16 persons due to fall of loose materials, bracings and other members of the scaffold shall not be removed prematurely while dismantling, the entire scaffold shall be maintained stable and rigid so as to avoid the danger of collapse. Nails from the planking and various members of the scaffold shall be carefully removed and all material carefully piled.

BALLI STAGINGS:

4.1.17 These stagings used upto a height of 12 metres shall be designed and erected with adequate bracings securely fastened under the supervision of an experienced and competent person and shall be regularly inspected and properly maintained.

4.2 PLATFORMS, GANGWAYS AND RUNS:

4.2.1 All working platforms, gangways and runs from which workers are liable to fall more than 2 metres shall be:

a) Of adequate width depending upon the type of work done and closely boarded, planked or plated. For platforms the width shall not be less than 60 cms. For gangways and runs the minimum width shall be 45 cms but when such gangways or runs are used for passage of materials the width shall not be less than 60 cms.

b) Provided with suitable guard rails of adequate strength to a height of 1 metre above the working surface and toe-boards of at least 20 cms in height to prevent fall of persons, materials or tools.

4.2.2 Every platform gangway run or stairs shall be kept free from any unnecessary obstruction, material or rubbish and from any projecting rails, and when they become slippery appropriate steps shall be taken by way of sanding, cleaning or otherwise to remedy the defect

4.2.3 Each supporting member used in the construction of runways, platforms, ramps and scaffolds shall be securely fastened and braced. The supporting member shall be placed on a firm, rigid, smooth foundation of nature that will prevent lateral displacement. The thrust-out members from which a scaffold is suspended shall be sufficiently strong and shall extend at least 30 cms outside the platform being suspended and have a stop block or bolt at the outer end.

PLATFORMS:

4.2.4 The minimum uniformly distributed design load per sq. metre of platforms shall be 300 kgs. In case of stone masonry it shall be 450 kg per sq. metre. Any concentrated load at any point in the span shall not exceed the designed uniformly distributed load. A factor of safety of 4 shall be adopted. Planking shall not be less than 30 mm thick.

4.2.5 A scaffold platform plank shall not project beyond its end-supports to a distance exceeding four times the thickness of the plank unless it is effectively secured to prevent tipping.

4.2.6 Cantilever of scaffold planks shall be avoided. Ledgers or putlogs should be erected to support the ends of such planks.

4.2.7 Where planks are butt jointed, two parallel putlogs must be used, not more than 10 cms apart, giving each plank sufficient support.

4.2.8 The following minimum widths of platforms for various types of scaffolds are recommended:

a) Where platform is not more than 2 metres above the ground or solid floor:

i) For painters, decorators and similar work men…….30 cms

ii) For other types (Men and Tools only)…….50 cms

b) Where platform is more than 2 metres above the ground or solid floor;

i) For men, tools & materials …….120 cms

ii) For men, tools, material & vehicles ……150 cms

GANGWAYS AND RUNS:

4.2.9 All planks forming a gangway or run shall be so fixed and supported as to prevent undue or unequal sagging.

4.2.10 No gangway or run the slope of which exceeds 1 vertical to $1^{1}/_{2}$ horizontal shall be used.

4.2.11 Where the slope of a gangway or run renders additional foot-hold necessary, and in every case where the slope is more than 1 vertical to 4 horizontal, there shall be provided proper stepping laths which shall:

i) be placed at suitable intervals, and

ii) be of the full width of the gangway or run except that they may be interrupted over a width of not more than 10 cms to facilitate the movement of borrows.

4.3 LADDERS:

4.3.1 Every ladder and step-ladder shall be of good construction, sound material and adequate strength. These shall be inspected at least one a fortnight and observations recorded.

a) No ladder with defective or missing rung or with any rung which depends for its support solely on nails, spikes or other similar fixing shall be used.

b) Wooden ladders should not be pained as point covers up defects but linseed oil or clear varnish should be used.

4.3.2 The use of ladders for other than a means, of access should be eliminated as far as possible.

4.3.3 Whenever a platform is 1-5 meters or more above the ground, a ladder or stairway shall be provided, one for each successive platform. Safe access from and to ladders or stairs must be provided at all platforms.

4.3.4 Every ladder used for a vertical height of more than 9 metres shall be provided with an intermediate landing and vertical distance between two successive landing places shall not exceed 9 metres. All intermediate landings shall be provided with suitable guard rails to a height of at least 1 metre above the landing place.

4.3.5 Where a ladder is used as a means of communication or as a working place the ladder shall rise, or adequate hand-hold shall be provided, to a height of at least 1 metre above the place of landing of the highest rung to be reached by the feet of any person working on the ladder, as the case may be, or if that is not possible to the greatest practicable height.

4.3.6 When using a ladder or a step ladder, the user should always face the ladder. The transportation of materials by ladders should be reduced to the minimum. Tools and materials should wherever practicable, be pulled up with a rope.

4.3.7 Ladders should not be placed in front of doors opening towards the ladders or against window sashes. Stepladders should be opened out fully before use. Two ladders should be spliced together to provide access to a greater height than when a single ladder is used.

4.3.8 When permanent or portable ladders are used, the upper ends shall extend 110 cms above the platform. Portable ladders shall be securely fastened at the bottom and top.

4.3.9 All ladders shall be periodically inspected. The stability of ladders should be tested before using it.

4.3.10 A ladder should not be placed upon a box, barrel or other movable insecure object.

4.3.11 Portable ladders should be in a safe position before being climbed. The slipping of a ladder at either end should be carefully guarded against, especially where the supporting surfaces are smooth or vibrating. If necessary, a person shall be stationed at the base of the ladder to prevent it from slipping.

4.4 OPENING, DANGEROUS CORNERS, BREAKS OR EDGES & SLOPPING SURFACES:

4.4.1 Every accessible opening through which any person is liable to fall a depth of more than 12 metres or to fall into any liquid or material so as to involve risk of drowning or of serious injury shall be provided with guard rails 1 metre above the edge and toe boards at least 20 cms high or a covering to prevent fall of persons, tools or materials through the opening.

4.4.2 Every dangerous corner, break or a edge or any structure which is accessible to any person shall be provided with guard rails of adequate strength and, if necessary, with the toe boards.

4.4.3 Any person employed on a sloping surface of a vertical fall of more than 2 metres shall be provided with suitable ladders or crawling boards properly secured and a suitable working platform fitted with suitable guard rails and in case it is impracticable or inappropriate to provide such ladders, crawling boards or working platforms, suitable safety belt of sound material and in good condition with a rope of adequate strength and length enabling the wearer to attach himself to a secure anchorage shall be supplied, or where the wearer cannot so attach himself, a second person shall attach or hold the rope in a secure manner.

4.6 WELDING AND CUTTING:

4.6.1 All welding and cutting shall be done by workmen who are thoroughly trained in the work or by trainees under competent supervision. Shields shall be placed around the work to protect persons from glare.

4.6.2 Welding and cutting shall be not done in the immediate proximity of flammable materials.

4.6.3 Welders and helpers shall wear non-combustible helmets and gloves during welding operations they should be careful to keep out of the line of sparks and hot metal; and they should wear clothing free from grease, gasoline, oil and other flammable materials.

4.6.4 Oxygen and acetylene cylinders or container shall never be permitted in small spaces of compartments where welding operations are in progress.

4.6.5 A helper shall always be at hand to shut off the gas in case of an accident when the welder is working in a space from where escape is difficult.

4.6.6 All welding operations should be carried out in a well-ventilated space. Where any considerable amount of welding is to be done, an exhaust system for carrying away the fumes should be installed. If brass, bronze or zinc is to be welded,

a suitable respirator should be worn if exhaust system is not installed.

4.6.7 All torches, regulators, cylinders and other such equipments shall be of an approved design, regularly inspected and kept in good condition. Defective apparatus and equipment shall be removed services, replaced or repaired and re-inspected before again being placed in service. Repairs shall be made only by persons thoroughly familiar with such apparatus.

4.6.8 Welders and helpers shall wear suitable eye-protective devices during welding and cutting operations. Eyes exposed to welding or flashes should be washed with Rose water for better relief.

FIRE PROTECTION:

4.6.9 To avoid fire hazards the following additional precautions should be observed on all oxy-acetylene cutting and welding:

a) Keep hose and cylinder valves free from grease, oil, dust and dirt.

b) Keep cylinders away from stoves, furnaces and other sources of heat.

c) Only 'Gas Lighter' be used to light the torch.

d) Avoid use of oxy-acetylene flame in confined spaces.

e) Clean thoroughly with steam all containers that have been used for storage of flammable liquids, or wash with hot water and soda, and ventilate thoroughly before welding and cutting.

f) When testing for leaks use only soap water and watch for bubbles.

g) Valve protection caps shall be in place when cylinders are not in use.

h) All employees shall be made familiar with the location and proper use of fire extinguishers in their area of work.

GAS CYLINDERS:

Due care shall be taken while loading and unloading oxygen/acetylene gas cylinders.

4.6.10 Gas cylinders shall be kept up right in approved safe places where they cannot be knocked over, and well separated from radiators, furnaces and combustible materials. These safe places shall be painted with appropriate warning signs. Empty cylinders should be marked "EMPTY' and the valves closed. Loaded and empty cylinders should be kept in separate places.

4.6.11 Oxygen cylinders shall not be stored in close proximity to acetylene cylinders or other fuel gas inside the building and in no circumstances either oxygen or acetylene cylinders shall be stored under direct rays of sun or in places where excessive rise of temperature is likely to occur.

4.6.12 Tempering with or attempting to repair safety devices or valves of gas cylinders shall be prohibited and if trouble is experienced in any cylinder, a report shall be sent to the supplier forthwith describing the character of the trouble and particulars of the cylinder.

4.6.13 When acetylene cylinders are coupled, approved flash arrestors shall be inserted between each cylinder and the coupler block or between the coupler block and the regulator and only cylinder of approximately equal capacity shall be coupled.

4.6.14 Cylinders found to have leaky valves or fittings which the closing of the valve will not stop shall be taken into the open way from any source of ignition, and slowly drained of gas.

4.6.15 Electric magnets or direct slings shall not be used for handling cylinders and only special cradles shall be used.

HOSES AND TORCHES

4.6.16 The hose shall be specially designed for use on cutting and welding operations. Special care shall be taken to avoid interchange of oxygen and acetylene hoses, as the mixture of these gases is highly explosive. Some coloured code should always be used on each gas-red for fuel gas and black for oxygen. Glycerine shall be used for lubricating valves.

4.6.17 Some manufactures dust the inside of the hoses with fine talc, new hoses shall, therefore, be thoroughly cleaned on the interior before attaching to the torch. Compressed air shall never be used to clean hoses as it may contain oil from the compressor. Oxygen shall be used to clean oxygen hoses and acetylene shall be used to clean acetylene hoses.

4.6.18 Torches that leak at any connection get hot, or flash black shall not be used. Copper or brass wire shall be used to clean the tips. Hardwood sticks may also be used.

GAS WELDING AND CUTTING OPERATIONS:

4.6.19 The gas cylinders shall not be used unless fitted with the following: high pressure gauge on cylinder, reducing valve with pressure regulator and safety relief device, low pressure gauge for indicating pressure on the torch. The fuel gas and oxygen cylinder shall have left hand and right hand threads respectively so, that they cannot be interchanged.

4.6.20 Cylinder valves shall be opened only with hand wheels or tools, specially designed for that purpose and left in place while cylinders are in

use. Cylinder valves shall be closed when not in use.

4.6.21 Since an explosion may occur oxygen/acetylene gas cylinders and fittings shall be kept away from oily or greasy substance and shall not be handled with oily hands or gloves. A jet of oxygen shall not be directed at oil surfaces, greasy clothes, or within a fuel oil other storage tank or vessel.

4.6.22 Under no circumstances shall acetylene be used at a pressure exceeding 1.1 kg per sq. cm. Oxygen pressure should always be such that acetylene does not flow back into the oxygen cylinder, as oxy-acetylene mixture is highly explosives.

4.6.23 After attaching the regulator and before opening the cylinder valve, the operator should see that the adjusting screw of the regulator is released. Oxygen should not be permitted to enter the regulator suddenly. The cylinder valve should be opened slowly.

4.6.24 Oxygen and acetylene hoses shall be tapped or clamped together at 1 meter intervals. Tape shall never be used to make repairs to hoses.

4.6.25 Oxygen or acetylene cylinders shall never be placed where they can be contacted by electric wires or with ground wires of electrical equipment. If electric arc welding is being done in the same vicinity, such precautions as necessary must be observed to make sure that the oxygen-acetylene gas equipment does not come in contract with electric are welding equipment.

4.6.26 Closed tanks or containers shall never be welded until they are thoroughly cleaned, dried out and ventilated and it has been determined that they contain no explosive or harmful fumes.

4.6.27 No smoking shall be permitted by workmen or welders, while handling gas cylinders.

ELECTRIC ARC WELDING AND CUTTING:

4.6.28 The flash from electric are welding is much more severe than that from oxy-acetylene welding, therefore, the welder shall have adequate eye protection and all persons working in the immediate vicinity should wear suitable coloured goggles unless the work is completely shielded.

4.6.29 Welding shall not be done in the presence of any person not amply protected from the flash. Persons should never look at an electric are with the naked eye; to do so may cause serious eye injury.

4.6.30 Only heavy-duty electric cable with unbroken insulation shall be used, and all connections shall be water-proof. All connections shall be checked before welding is started, and frequent inspection shall be made during welding operations

4.6.31 When it is necessary to couple several lengths of cable for use as a welding circuit and occasional coupling or uncoupling is necessary, insulated cable connectors shall be used on both the ground line and electrode holder line.

4.6.32 Frames of all electric welding machines operated from power circuits shall be effectively grounded.

4.6.33 When the operator has occasion to leave his work or stop work for any appreciable time, the power supply switch in the equipment should be opened and the unit shut down.

4.7 PAINTING:

4.7.1 Packages containing paints, varnishes, lacquers or other volatile painting materials shall be kept tightly closed when not in actual use, and shall be placed where they will not be exposed to excessive heat, sparks, flame, or direct rays of the sun.

FIRE HAZARD:

4.7.2 Most paint materials are highly combustible, and every precaution should be taken to eliminate danger from fire.

(a) No attempt should be made to heat paint materials except by placing containers in air, or water at moderate temperature. Dirty wiping rags, paint scrapings and paint saturated debris, which always involve the hazard of spontaneous combustion or ignition from other sources, should not be allowed to accumulate but should be collected and disposed of at frequent intervals.

(b) Smoking, open flame, exposed heating elements, and other source of ignition of any kind should not be permitted in paint stores or area where spray painting is done.

(c) Fire extinguishers of appropriate capacity shall always be at hand where flammable paint materials are being mixed, used or stored. Sandpails or extinguishers of the carbon dioxide and carbon tetrachloride type are generally effective.

PROTECTION FROM DUST AND FUMES:

4.7.3 Apart from its explosiveness, air laden with dust or fumes may cause suffocation or other respiratory injury and may also have toxic effects through the skin or alimentary system. In painting, the dust comes chiefly from operations preparatory to painting such as sand blasting, scaling, scraping and brushing. Injurious fumes are given off when volatile paint materials are being mixed or applied specially when they are sprayed, Dust and fume nuisance is most

dangerous in constricted spaces. Coal tar paint fumes are particularly obnoxious.

a) Workmen must be provided with an ample supply of fresh air. If natural circulation is not adequate, artificial ventilation shall be provided. Ventilation shall be sufficient to carry away harmful accumulations of dust and fumes or workmen shall wear approved type respirators.

b) Spray-painting operations shall be so confined as not to contaminate the air where other men are working. Spray gun operators should be required to wear clothing, which fits snugly at the ankles, neck and wrists and should wear gloves, goggles and respirators.

HANDLING PAINT MATERIALS:

4.7.4 Serious harm may result if the skin is exposed to prolonged contact with paint materials. Injury may take the form of burns or toxic effects resulting from absorption into or through the skin. It is well be avoid the use of pain solvents for cleaning the skin. These materials are not only injurious themselves, but they also carry poisonous ingredients of the pain into the pores of the skin. There area a number of protective creams which may be applied to the skin before exposure to paint substances, and which wash off easily in warm soapsuds, taking paint off with them. The use of protective creams by all painters is recommended.
Food shall never be placed where it might be exposed to fumes or dust from paint. Painters should clean their hands before eating.

CREOSOTE

4.7.5 Creosote is a lumber preservative and is closely related to carbolic acid. Extreme care is required to prevent contact with the skin or eyes, as it will cause severe burns. Protective cream or jellies should be used on exposed skin surface when engaged in handling creosoted materials. Affected parts of the body should be washed immediately, and in most cases the services of a physician should be secured.

CHAPTER 5
PLANT AND MACHINERY

5.1 TOOLS

HAND TOOLS:

5.1.1 All hand tools shall be kept in good conditions and used only for the purpose for which designed.

5.1.2 Tools having mushroomed/heads, spilt or defective handles, worn parts, or other defects that will impair their strength or render them unsafe for use, shall be removed from service and shall not be reissued until the necessary repairs have been made.

5.1.3 All sharp tools shall be kept in sheaths, shields, tool chests, or other containers when not in actual use, to protect the tools, the workers and other persons.

5.1.4 Tools shall not be left on scaffolds, ladders or overhead working spaces when not is use. When work is being performed overhead on scaffolds or ladders, containers shall be used to hold tools and prevent them from failing.

5.1.5 The practice of throwing tools from one location to another, from one employee to another or dropping them to lower levels, shall not be permitted. When it is necessary to pass tools or material under the above conditions, suitable containers and/or ropes shall be used.

5.1.6 Sharp-edged or pointed tools shall be carried in workmen's pockets.

5.1.7 Only non-sparking tools shall be used in location where sources of ignition may cause a fire or explosion.

PNEUMATIC AND POWER TOOLS:

5.1.8 (a) Hand tools and portable power tools should be inspected frequently for worn-out parts and connections. The sudden cessation of operation or the 'Kicking' or 'bucking' or such a tool may cause a serious accident especially when the operator is at an elevation exposed to the danger of falling.

(b) In using heavy tools, it is best to support them where possible from some detached object or support in order to safeguard the operator's feet.

(c) Loose clothings with free ends should be worn by operators of portable electric drills, reamers, etc. Neither should gloves be worn. Smooth overalls should be worn with the jumper tucked in.

(d) All tools should be laid flat when not in use. They should never be kept standing on the nozzle or cutting edge.

PNEUMATIC TOOLS:

5.1.9 Pneumatic tools shall be used only by employees familiar with and properly instructed in their use.

5.1.10 Pneumatic tools shall be kept in good operating condition thoroughly inspected at regular intervals and particular attention given to control and exhaust valves, hose connections, die clips on hammer, and the chucks of reamers and drills.

5.1.11 Safety clips or retainers shall be installed on pneumatic impact tools to prevent dies and tools from being accidentally expelled from the barrel.

5.1.12 Pressure shall be shut off and exhausted from the line before disconnecting the line from any tool or connection.

5.1.13 Safety lashing shall be provided at connection between tool and hose.

5.1.14 Air hose shall be suitable to safely withstand the pressure for which it is intended. Leaking or defective hose shall be removed from service.

5.1.15 Hose shall not be laid over ladders, steps, scaffolds or walkways in such a manner as to create a tripping hazard.

5.1.16 The use of compressed air for blowing direct from hands, face or clothing is prohibited.

POWER TOOLS:

5.1.17 Power actuated tools shall be used only by persons who have been trained and instructed in their safe use.
5.1.18 Such supervision and safeguards as are necessary to prohibit their use by unauthorised persons shall be provided.

5.1.19 In electrically operated tools a three-conductor cord shall be used so that a ground wire may be taken off the tool. Even a slight electric shock may result in a sudden jump on the part of the operator resulting in a bad fall or a severe bump or fracture.

5.1.20 Connecting cord should have oil resistant rubber insulation. Protection against kinking should be provided by the use of the short coiled steel spring or rubber protecting tube securely fastened in place at the motor end. Care should be taken to see that strain on the wires is not transmitted to the connection at the terminal or binding post.

(i) Never oil an electric motor to excess. This oil may prove harmful to cord insulation.

(ii) When a motor is in storage, coil the card in a free coil, not around the motor.

(iii) Inspect cord frequently.

(iv) Do not lay cord on oily or chemically saturated floor while the tool is in use.

(v) Never pull on the cord when it is kinked or pinched.

(vi) Do not lower or lift the tools with the cord; use a small rope.

(vii) Do not leave the cord where a car or truck might run over it.

5.1.21 Premature starting of the motor presents a major hazard. Wherever possible, select tools that are equipped with safety devices to guard against this danger.

5.1.22 The use of power actuated tools is prohibited in explosive or flammable atmospheres.

JACKS:

5.1.23 Maximum working load shall be permanently marked on a jack and it shall be provided with a positive stop to prevent over travel unless this is impracticable in which case the jack shall carry a warning that a stop has not been provided. Every jack shall be thoroughly examined at suitable intervals depending upon service conditions.

STORAGE BATTERY:

5.1.24 Care shall be exercised in handling acids.

5.1.25 When preparing electrolyte the acid must be added slowly to the water until the solution has the proper specific gravity. Never bring an open flame near or allow sparks to shower on a storage battery as the gases produced are explosive under certain conditions.

5.1.26 Ordinary baking soda will prevent skin and eye burns, if used with water immediately after contact with the acid or electrolyte. If soda is not available, a weak solution of ammonia or plain clear water can be used.

5.2 DRILLS:

5.2.1 All drilling equipment shall be kept in good working order. Safe handling and lifting methods should be used.

5.2.2 Drills shall be stopped before greasing the machinery or moving parts.

5.2.3 Crown blocks shall be mounted securely and should be inspected frequently for loose connections.

5.2.4 Drillers should be required to block all finished drill holes over 10 cms in diameter before moving to a new location.

5.2.5 When using compressed air drills as well as other compressed air driven equipment the hose connections should be made only after the pressure has been released.

5.2.6 Electrically operated drills and all other electrically driven equipment should be provided with specially insulated power transmission cables with water-proof connections.

5.2.7 The use of gas engine or petrol engine driven drills underground shall be prohibited. If used on open air work the engine shall be kept in good operating condition and the operator shall be trained in the use of the tool, including necessary precautions to avoid burns from the engine. The engine shall be stopped while filling the fuel tank.

5.3 ROPES, CHAINS AND SLINGS:

5.3.1 The use of ropes, cables and chains shall be in accordance with the safe usage recommended by the manufacturer.

5.3.2 No chain or rope shall be used unless:

(a) It is of good construction, sound material, and adequate strength and free from patent defects.

(b) Safe working load is plainly marked on it or an identification number is marked on it and the safe working load corresponding to this number is entered in a register maintained by the person-in-charge.

CHAINS:

5.3.3 All chains in continuous use shall be inspected once a month. Each chain shall be measured for length at each inspection. If a stretch of 2.7 cms in 1 metre is found, it shall be inspected for cracks. Any link that shows evidence of a crack or cross-section reduction by wear, nicks or cuts shall be removed. The reduced link section shall never be less than two-thirds of the original section.

5.3.4 No chain shall be used which has been broken and mended with a bolt, nor shall the end of the chain be bolted to the chain to form a loop.

5.3.5 Chains shall never be knotted, nor shall they be shortened by twisting the chain.

5.3.6 Before any strain is put on the chain, it shall be inspected to see that all links are lined up so that the pull is through the long diameter of the link.

5.3.7 All chains except those mentioned below shall be annealed once a year (6 months for 12mm bar chains and below) when in continuous use. This work shall only be attempted by competent men having the proper facilities for such work. The particulars of annealing or heat treatment and tests shall be entered in the register maintained for the purpose. It is recommended that all chains be returned to the manufacturer for annealing. Chains that need not be annealed are:

i) Bridle chains attached to derricks or masts;
ii) Chains made of malleable cast iron;
iii) Plate link chains;
iv) Chains of Steel; and
v) Pitched chains.

FIBRE ROPES:

5.3.8 Manila, sisal or hemp ropes are commonly used. For all normal use pure manila rope which is hard but pliant should be used. Sisal rope is 2 to 3 times as strong as manila rope, but its fibre are hard and stiff and have a tendency to splinter. Hemp ropes are as strong as manila ropes, but they are more soft.

5.3.9 The weight, breaking strength and safe working strength with a factor of safety of 8 of standard manila rope(3 strand) are given in the table below(The values are only suggestive):

T A B L E 5.1

Diameter (mm)	Weight per feet (kgs)	Strength(Kgs)	
		Breaking	Working
6	0.97	270	35
12	0.110	1200	150
18	0.250	2500	310
25	0.400	4080	510
32	0.625	6100	770
40	0.890	8400	1050
50	1.610	14060	1760
65	2.485	21090	2630
75	3.600	29030	3630

When a table of strengths is not available an approximation of the working strength of rope may be obtained by squaring the numerator of the diameter in eights and multiplying by 13. This gives strengths somewhat lower than those given in the table (e.g. if the dia of rope is 3/4" the dia in eights will be 6/8" and working load will be found to $(6)^2$ x 13 lbs or 468 lbs).

5.3.10 Fibre ropes should be regularly inspected for wear and tear while in use to make sure that they are in good condition.

5.3.11 Fibre ropes should be protected from abrasion by padding when drawn over square corners or sharp rough surfaces. Frozen rope or wet rope subjected to acids or excessive heat should not be used. Ropes having dark or pinkish brown colouration on them due to exposure to acids shall not be used.

5.3.12 Suitable care should be taken while uncoiling, using and storing the fibre ropes. Sheaves should have a diameter not less than 36 times the diameter of the rope.

WIRE ROPES

5.3.13 Wire ropes have almost superseded fibre ropes and chains for hoisting and haulage purposes.

(a) Standard hoisting rope consists of 6 by 19 wire strands and a fibre core made of iron, cast steel mild plow steel, plow steel or special plow steel.

(b) The breaking strength of standard wire hoisting rope is shown in the following tabulation (The values are only suggestive):

TABLE 5.2

Breaking Strength (Tons)
(*Factor of Safety=8 for working out safe working strengths)

Dia (mm)	Weight (kg/m)	Iron	Cast Steel	Mild Plow Steel	Plow Steel	Special Plow Steel
1	**2**	**3**	**4**	**5**	**6**	**7**
6	0.115	-	2.1	2.3	2.5	2.9
10	0.36	2.05	-	-	-	-
12.5	0.60	3.57	7.7	8.5	9.4	10.8
25	2.40	13.70	29.5	33.0	36.5	42.0
37.5	5.40	29.70	65	72.5	80.5	92.5
50	9.60	51.80	114	127.0	140.0	161.0

(c) Extra flexible hoisting rope, for use with smaller sheaves and drums, such as are usually found in derricks, consists of 8 by 19 wire stands and one fibre core. The breaking strength of this rope is approximately 87 per cent of the standard wire hoisting rope given in the preceding tabulation.

(d) Special flexible hoisting rope consists of 6 by 37 wire stands and one fibre core. It is extremely flexible and is specially adapted to high-speed service on cranes or where sheaves are small. The breaking strength of special flexible hoisting rope is approximately the same as that of standard wire hoisting rope.

5.3.14 Wire rope or cables shall be inspected by a competent person at the time of installation and once each week thereafter when in use.

5.3.15 No wire shall be used in hoisting or lowering if in any length of 8 diameters the total number of visible broken wires exceeds 10 per cent of the total number of wires or the rope shows signs of excessive wear, corrosion or other defect which in the opinion of the person who inspects it renders it unfit for use.

5.3.16 Wire rope removed from service shall be plainly marked or identified as being unfit for further use on cranes, hoists or other load carrying service and stored separately.

5.3.17 Wire ropes should be carefully uncoiled; coiled or used to prevent kinking; kinked strands damage the rope permanently. Even slight burning of rope reduces its load capacity because of drying out of lubrication.

5.3.18 Thimbles of proper size should always he used when a loop is formed at the end of a wire rope.

5.3.19 Socketing, splicing and seizing of cables shall be performed by qualified persons.

5.3.20 Connections, fittings, fastenings, parts etc. used in connection with ropes and cables shall be of good quality and of proper size and strength and shall be installed in accordance with recommendations of the manufacturer.

5.3.21 Drum sheaves and pulleys shall be smooth and free from surface defect such as cracks, kinks, destrands etc. Drums, sheaves or pulleys having eccentric bores or cracked hubs, spokes or flanges shall be removed from service.

5.3.22 The ratio between rope diameter and sheave diameter should never be less than 27. Good practice favours a ratio of 45. Grooves of sheaves or drums should be 2mm larger than nominal rope diameter.

5.3.23 Running lines of hoisting equipment located within 2 metres of the ground or working level shall be boxed off or otherwise guarded, the operating area restricted.

5.3.24 Hooks, shakles, rings and pad eyes, U Bolts and other fittings shall be of proper size and those showing excessive wear or that have been bent, twisted or otherwise damaged shall be removed from service.

5.3.25 Slings, their fittings and fastenings, when in use shall be inspecting daily by a qualified person for evidence of overloading, excessive wear or damage. Slings found to be defective shall be removed from service.

5.3.26 Slings shall be of proper construction and size for the load to be hoisted. Slings should not be attached to load as to provide an angle of less than 60^0 between sling leg and the horizontal. The efficiency varies with the angle of sling as follows:

TABLE 5.3

Angle (Degree)	Efficiency (Percent)	Angle (Degree)	Efficiency (Percent)
90	100	50	76
80	98	45	71
70	94	40	64
65	91	35	57
60	87	30	50
55	82	5	8.5

5.3.27 Single legged and sleeved slings shall be avoided as far as possible except for small or unyielding leads under competent supervision.

5.3.28 Slinging should be done only by a crew trained for the purpose. Accidental over loading out of ignorance is frequently the cause of fatal injuries. For all normal practice 2 or 4 part sling should be used.

5.3.29 Suitable protection shall be provided between the sling and sharp unyielding surfaces of the load to be lifted.

5.3.30 The maintenance, repair and testing of slings shall be done only by qualified persons. Proper storage shall be provided for slings while not in use.

5.4 LIFTING APPLIANCES
GENERAL:

5.4.1 Every lifting appliance and every part thereof including all working gear and all plant or gear used for anchoring or fixing such appliances shall:

(a) be of good mechanical construction, sound material, adequate strength and free from patent defects;

(b) be properly maintained; and

(c) as far as construction permits, be inspected at least once every week by a competent person and a report of the result of inspection entered in a register maintained for the purpose.

5.4.2 Every lifting appliance or part thereof during the course of erection, working or dismantling shall be properly supported and all the fixing and anchoring arrangements shall be adequate and secure.

TRAVELLING:

5.4.3 When lifting appliances with travelling and slewing motions are used, there shall be 2 metres clear distance between any part of the appliance in its extreme position and any guardrails or fencing or other fixtures; provided that if it is impracticable to maintain this distance, all reasonable steps shall be taken to prevent the access of any person to such guardrail, fencing or fixture.

5.4.4 Where minimum clearance of 2 metres from nearby structures is not possible, suitable warnings like peal of gongs should be sounded before crane commences to move.

5.4.5 A minimum distance of 2 metres must be maintained between the boom and all power lines of feeds during the travelling operation of a mobile crane.

5.4.6 Under no circumstances an attempt should be made to raise electric wires by a person other than the employee of the Electricity Department.

PLATFORMS AND CABINS:

5.4.7 Platforms for persons driving or operating the cranes or for signallers shall be provided with safe means of access and the floors of such platforms shall be close planked or plated and be of sufficient area for persons employed thereon.

5.4.8 The driver of every power driven lifting appliance shall be provided with a suitable cabin for protection from the weather and it should be so constructed as to afford ready and safe access to parts of the lifting appliance in the cabin which required periodic inspections and maintenance and it shall not be so placed that it prevents the driver from having clear and unrestricted view of all lifting operations outside the cabin.

DRUMS AND PULLEYS:

5.4.9 Every chain or rope which terminates at the winding drums of a lifting appliances shall be properly secured thereto and at least two drums of such chains or rope shall remain on the drum in every operation.

5.4.10 Drums or pulleys of lifting appliances shall be of suitable diameter in relation to the sizes of chains or wire ropes used round them.

COMPETENT PERSONS FOR OPERATION:

5.4.11 Lifting appliance shall not be operated except by a person trained and competent to operate that appliance except that for the purpose of training it shall be permissible for any person to operate the appliance provided such a person is under the direct supervision of a competent person. Operators shall have the following additional qualifications:

i) Be able to read and understand the signs, notices, operating instructions and signal code used.

ii) Be not less than 21 years of age.

iii) Must have had a physical examination within one year to determine that they have no deficiencies of eyesight or hearing or they are not subject to epilepsy, heart failure, or similar ailments that would be detrimental to safe operation of equipment.

5.4.12 If the person operating a lifting appliance has no clear view of the load, there shall be appointed signallers to give signals to the operator.

5.4.13 The crane operator should recognise signals from only one person designated as signalman.

5.4.14 Every crane operator and rigger should be made familiar with the rules and regulations for crane operators and standard crane signals for the safe operation of the crane.

TESTING AND EXAMINATION:

5.4.15 All lifting appliance shall be tested and thoroughly examined one in every period of four years and thoroughly examined once every year by a competent person.

5.4.16 Any lifting appliance, to which any substantial alteration has been carried out, shall not be taken into use unless it is tested and thoroughly examined by a competent person.

5.4.17 Results of all tests and thorough examinations shall be entered in a register to be maintained by the occupier.

MARKING OF SAFE WORKING LOADS:

5.4.18 The safe working load or safe working loads and a means of identification shall be plainly marked:

i) upon every crane, crab and which, and;

i) upon every pulley block, gin wheel, shear legs or derrick pole or mast used in the raising or lowering of any load.

CHAPTER 6
MISCELLANEOUS

6.1 STORAGE OF MATERIALS:

6.1.1 All materials in bags, containers or bundles stored in tiers shall be stacked, blocked, interlocked, and limited in height so that it is stable and otherwise secured against sliding or collapse.

6.1.2 Inflammable liquids and grease shall be stored in a 'NO SMOKING' area and properly separated from other stored materials.

6.1.3 Used lumber shall have all nails withdrawn before it is stacked for storage.

6.1.4 In withdrawing sand, gravel, and crushed stone from frozen stockpiles, no overhanging shall exist at any time.

6.1.5 Materials dumped against walls or partitions shall not be stored to a height that will endanger the stability or exceed the resting strength of such walls and partitions.

6.1.6 Persons working in hoppers or on high piles of loose material shall be equipped with life lines and safety belts.

6.2 ATMOSPHERE IN CONFINED PLACES:

6.2.1 In every working place where persons are required to work in a confined place, adequate ventilation by the circulation of fresh air shall be provided an no person shall be allowed to enter any place where there is reason to apprehend that the atmosphere is poisonous or asphyxiating unless the person wears a suitable breathing apparatus and is equipped with life line held by a person stationed for the purpose in safe place.

6.2.2 When workers are employed in sewers and manholes which are in use, it shall be ensured that the manhole covers are opened and ventilated at least for an hour before the workers are allowed to get into the manholes and the manholes so opened shall be cordoned off with suitable railing and provided with warning signals or boards to prevent accidents to the public.

6.2.3 There shall also be provided in a suitable position and readily available sufficient and appropriate rescue apparatus including:

i) Suitable breathing apparatus;

ii) Suitable reviving apparatus; and

iii) Suitable safety belts of sound material with ropes of adequate length and strength.

All such equipment and apparatus shall be in charge of a competent person conversant with their use and he shall be available at all time while any person is working in the confined place. All such equipment shall be properly maintained, tested and examined at intervals of not more than one month.

6.3 PREVENTION FROM DROWNING:

6.3.1 Where adjacent to the site of any operation there is water, into which a person employed, in the course of his employment, is liable to fall with risk of drowning, suitable rescue equipment shall be provided and maintained in an efficient state and steps shall be taken for the prompt rescue of any such person in danger of drowning.

6.3.2 The rescue equipment shall include life saving skiffs properly maintained with life vests and life buoys of approved type with 16 metres of 10mm rope attached.

6.3.3 Life preservers, vests or belts shall be worn by all persons while working:

(a) On floating pipeline, pontoons, rafts, float stages etc;

(b) On open deck-floating plant not equipped with bulwarks, guardrails or other life lines;

(c) On structures extending over or adjacent to water except where proper guardrail or safety belts and life lines are provided;

(d) Working alone at night where there are potential drowning hazards regardless of other safeguards provided and;

(e) In skiffs, small boats or launches except when inside of enclosed cabin or cockpit.

6.3.4 Life preservers or working vests shall have a buoyancy of at least 7.5 kgs. When new and shall be removed from service when buoyancy decreases below 5.75 kgs.

6.3.5 Walkways and structures extending over or immediately adjacent to water shall be provided with ring buoys of 7.5 kgs buoyancy at intervals of not more than 60 metres.

6.4 FIRE PREVENTION AND PROTECTION:

FIRE PREVENTION:

6.4.1 All construction areas and storage yards should be kept clean and well arranged.

6.4.2 A clear space of 15 metres around the outer boundary of sawmill and lumber storage area may be provided. All lumber should be stored in sections with firebreaks with a distance of 15 metres between consecutive sections.

6.4.3 All combustible waste material, wood scalings, soiled rags etc. shall be removed daily and burden in suitable burning areas. The saw mill and lumber yard shall be kept free from accumulation of combustible debris.

6.4.4 Fires, welding, flame cutting shall in general not permitted in combustible areas. Fires and open flame devices shall not be left unattended.

6.4.5 Smoking shall be prohibited in all flammable material storages viz. carpentry, pain shops garages, services stations etc. "No smoking" signs should be posted on all such areas.

6.4.6 Accumulations of flammable liquids on floors, walks etc. should be prohibited. All spills of flammable liquids shall be cleaned up immediately.

6.4.7 Smoke pipes from Diesel Engines passing through roof of combustible material e.g. in compressor stations at dam site and quarry shall be insulated by asbestos. All joints of smoke pipe should be riveted, welded or otherwise securely fastened together and supported to prevent accidental displacement or separation. The joints should not be leaky.

6.4.8 Flammable liquids, lubricants etc. should be handled and transported in safety containers and drums which can be kept tightly capped.

6.4.9 Petrol or other flammable liquids with a flash point below 100^0F shall not be used for cleaning purposes.

6.4.10 Oxygen cylinders shall not be stored with combustible materials.

6.4.11 All electric installations should be properly earthed. Repairs should not be made on electrical circuits until the circuit has de-energized.

FIRE FIGHTING ARRANGEMENTS;

6.4.12 Fire extinguishers and fire buckets, painted red, shall be provided at all fire hazardous locations viz. Batching and Mixing Plant, which Houses, Workshops. Store yards, Saw-Mill, Switch Gear Room, Compressor Stations, Office establishments etc. The extinguishers shall be inspected serviced and maintained in accordance with manufacturer's instructions. The inspections shall be evidenced by notations on tag attached to the extinguisher.

6.4.13 Where building and establishments are located in or near cities or towns, definite arrangements shall be made to ensure protection by the established municipal fire department In more isolated locations, it will be necessary to provide for and install complete fire fighting facilities including provision for fire tenders commensurate with the number, size and importance of buildings, equipments, or supplies to be protected.

6.4.14 Full reliance should never be placed on portable hand extinguishers as all of these have a very limited capacity. Water, in ample amounts and under adequate pressure, should always be available for fire fighting.

6.4.15 Where a group of buildings are located beyond the range of protection from a public water supply, the installation of water system for private fire protection may be warranted. The following design factors should be considered in the planning of a private water supply. The standard fire stream is recognised as 1155 litres per minute. Multiple streams of 1155 litres must be provided for protection of important groups of buildings. While the daily domestic consumption is basis used in the design of a domestic type of water system, additional capacities should be provided for use during fire emergencies. For example, two standard fire streams (2310 litres per minute) discharged for 1/2 hour amount to 69,300 litres of water. Therefore, additional water storage for fire use must be provided. A loop system of hydrants from two directions with a reduction of friction losses and a resultant higher water pressure for fire-fighting purposes. No underground pipes that are a part of the system should be smaller than 15 cms in diameter and valves should be provided for shutting of the domestic connection outside of all building served. Hydrants should not be over 120m apart and so located that not less than two hose streams concentrate on any building. Hydrants in cold climate should be designed and installed to prevent freezing. Two 60mm outlets with standard 5 hose thread should be used for all private hydrants. It is good

practice to provide hose houses at hydrants in a private water supply system. The houses should be equipped with a minimum of 60 metres of 60mm hose and accessories, including axes, spanner, wrench and other tools.

6.4.16 Excavation facilities and fire exit may be provided at all locations featuring the hazards.

6.4.17 Siren or other suitable fire alarm arrangement shall be made on all projects. Warning signs may be posted at all locations featuring fire hazards.

6.4.18 All staff shall be conversant with the use of all types of fire extinguishing apparatuses.

6.4.19 Demonstrations and training in fire fighting shall be conducted at sufficient intervals to ensure that sufficient personnel are familiar with and are cable of operating fire fighting equipment.

6.5 FIRST AID AND MEDICAL CARE:

6.5.1 At every work site suitable arrangement for rendering prompt and efficient first aid to injured persons shall be maintained under the guidance of the Medical Officer in charge of the project.

6.5.2 First aid appliances including an adequate supply of sterilised dressings and sterilised cotton wool shall be maintained in a readily accessible place. The appliances shall be kept in good order and they shall be placed under the charge of a responsible person who shall be readily available during working hours. The minimum requirements of the first aid kit shall be as under:

10 cms compressed bandage	- 12 Nos.	
5 cms compressed bandage	- 12 nos.	
2.5 cms adhesive plaster	- 1 reel	
1 metre triangular bandage	- 3 Nos.	
Spirit Ammonia Aromatic	- 1 bottle	(4 ounces)
Tannic acid jelly	- 1 tube	
Tineture iodine	- 1 bottle	(2 ounces)
Tourniquet	- 1 No.	
Foreceps	- 1 No.	

When purchasing first aid kits, dust proof containers should be specified.

6.5.3 Where work sites are remote from regular hospitals an indoor ward in charge of a Medical Officer with such nursing staff as may be necessary shall be provided with one bed for every 250 workers.

6.5.4 Adequate identification and directional markers shall be provided to readily denote location of all first aid stations and hospitals.

6.5.5 An ambulance shall be provided to transport seriously injured persons to the hospital.

6.5.6 Small crews working at a distance from the project headquarters or from the main body of workmen shall be equipped with standard first-aid kits and at least one man in each crew shall have had first aid training.

6.5.7 Adequate lighting, heat, water and ventilation shall be provided in the first aid station and/or hospital.

6.5.8 The Medical Officer in charge of the project should be responsible for issuing special instruction indicating certain 'do's and 'don'ts' on subjects like sunstroke, heat exhaustion, sanitation, out-break of epidemics etc.

6.6 PERSONAL PROTECTIVE EQUIPMENT:

6.6.1 The following safety equipment shall be provided to workers as required and their use enforced:

Rubber boots; hard toe safety boots; hard hats; safety belts; goggles for stone or metal grinders, stone chippers, gas welding aprons; respirator shields; manila ropes and slings for life lines; gloves; flashlights; battery lamps, magazine shoes; safety nets; boatswains chairs; helmets, life and ring buoys.

6.6.2 Items of personal wear shall be maintained in serviceable condition and shall, before being reissued to other employees or returned to stores be cleaned, sterilised, inspected and repaired, if necessary.

6.6.3 Loose and frayed clothing, hand rings loose watch chains etc. shall not be worn around moving machinery or other sources of entanglement.

6.6.4 The use of personal safety equipment as occasioned by the type of work being performed has been indicated in relevant places of this Manual.

6.7 MISCELLANEOUS

SECURITY OF LOADS

6.7.1 Every receptacle used for raising or lowering stone, bricks, tiles, slates, or other objects shall be so enclosed, constructed or designed as to prevent the accidental fall of such objects.

6.7.2 All gears, tools, goods or loose material shall be properly loaded into the bucket or receptacle in which they are being raised or lowered and if necessary, properly secured or effective precautions shall be taken by enclosure or otherwise to prevent their fall.

PROJECTING NAILS:

6.7.3 No timber or material with projecting nails shall be used in any work in which they are a source of danger to such persons.

DANGER FROM COLLAPSE OF STRUCTURE:

6.7.4 When any work is carried on which is likely to affect the security or stability of a building or structure or any part thereof and endanger any persons employed, all practicable precautions shall be taken by shoring or otherwise to prevent collapse of the building of structure or fall of any part thereof and thus remove the cause of danger to such structures and the persons employed.

HANDLING OF CORROSIVE MATERIALS:

6.7.5 For persons engaged in handling of corrosive materials adequate equipment shall be provided.

6.7.6 Where in connection with any grinding, cleaning, spraying or manipulation of any material there is given off any dust or fume of such character and to such extent as is likely to be injurious to the health of persons employed, all practical measures shall be taken by securing adequate ventilation or by the provisions and use of suitable respirators or otherwise to prevent inhalation of such dust and fume.

LEAD COMPOUNDS AND OTHER POISONOUS SUBSTANCES;

6.7.7 Men below the age of 18 years and women shall not be employed on the work of painting with products containing lead in any form. Wherever men above age of eighteen years reemployed on the work of lead painting, the following precautions shall be taken:

(a) No paint containing lead or lead products shall be used except in the form of paste or ready made paint.

(b) Suitable face masks should be supplied for use by the workers when paint is applied in the form of spray or a surface having lead paint dry rubbed and scrapped.

(c) Overalls shall be supplied to the workmen and adequate facilities shall be provided to enable the working painters to wash during the cessation of work.

(d) While lead, sulphate of lead, or product containing these pigments shall not in painting operation, except in the form of pastes or paints ready for use.

(e) Cases of lead poisoning, and suspected lead poisoning shall be immediately notified, and shall be subsequently verified by a member appointed by the competent authority of project.

(f) Instructions with regard to special hygienic precautions to be taken in the painting trade shall be distributed to working painters.

6.7.8 Lead compounds shall not be used in the form of a spray in the interior painting of the structures.

6.7.9 Road work:
Workers employed on mixing asphalt materials shall be provided with protective footwear and protective goggles. Stonebreakers shall be provided with protective goggles and protective clothing and seated at sufficient safe distance from each other.