



2004

SAFETY MANUAL

CORPORATE SAFETY SECTION
National Thermal Power Corporation Ltd.
SCOPE COMPLEX LODI ROAD
NEW DELHI

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NTPC SAFETY POLICY

- 1.0 NTPC recognise and accept its responsibility for establishing and maintaining a safe working environment for all its employees. This responsibility arises from :
- (a) Company's moral responsibility to its employees, to provide the best practicable conditions of work from the point of view of health and safety.
 - (b) The obligation to consult with its staff and their representatives to implement policies and procedures developed as a result of discussions.
 - (c) Statutory responsibility in respect of health, safety and welfare of employees emanating from relevant legislations such as the Factories Act. The Indian Electricity Act., The Explosive act, the Boiler Act etc.

2.0 COMPANY'S RESPONSIBILITY

The Company shall take all such steps which are reasonably practicable to ensure best possible conditions of work, and with this end in view the company shall do the following :

- 2.1 To allocate sufficient resources to provide and maintain safe and healthy conditions of work.
- 2.2 To take steps to ensure that all known safety factors are taken into account in the design, construction, operation and maintenance of plants, machinery and equipment.
- 2.3 To ensure that adequate safety instructions are given to all employees.
- 2.4 To provide wherever necessary protective equipment, safety appliances and clothing and to ensure their proper use.
- 2.5 To inform employees about materials, equipment or processes used in their work which are known to be potentially hazardous to health or safety.
- 2.6 To keep all operations and methods of work under regular review for making necessary changes from the point of view of safety in the light of experience and upto date knowledge.
- 2.7 To provide appropriate facilities for first aid and prompt treatment of injuries and illness at work.
- 2.8 To provide appropriate instruction, training, retraining and supervision in health and safety and first aid and ensure that adequate publicity is given to these matters.

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- 2.9 To ensure proper implementation of fire prevention and an appropriate fire fighting service, together with training facilities for personnel involved in this service.
 - 2.10 To ensure that professional advice is made available wherever potentially hazardous situations exist or might arise.
 - 2.11 To organise collection, analysis and presentation of data on accident, sickness and incident involving personal injury or injury to health with a view to taking corrective, remedial and preventive action.
 - 2.12 To promote through the established machinery, joint consultation in health and safety matters to ensure effective participation by all employees.
 - 2.13 To publish/notify regulations, instructions and notices in the common language of employees.
 - 2.14 To prepare separate safety rules for each type of occupation/process involved in a project.
 - 2.15 To ensure regular safety inspection by a competent person at suitable intervals of all buildings, equipments, work places and operations.
 - 2.16 To co-ordinate the activities of the company and of its contractors working on the Company's premises for the implementation and maintenance of safe systems of work, to comply with their legal obligations with regard to the health, safety and welfare of their employees.

3.0 THE RESPONSIBILITY OF THE EMPLOYEE

The establishment and maintenance of best possible conditions of work is, no doubt, the responsibility of Management, it is also necessary that each employee follows prescribed safe methods of work. He should take reasonable care for the health and safety of himself, of his fellow employees and of other persons who may be affected by his actions at work. With this in mind, employees should be health and safety conscious and :

REPORT	Potential hazards
OBSERVE	Safety rules, procedures and codes of practice.
USE	With all reasonable care the tools, equipment, safety equipment and protective clothing provided by the Company; these items should be kept in good condition.

PARTICIPATE	In safety training courses when called upon to do so.
MAKE USE	Of safety suggestions schemes
TAKE	An active and personal interest in promoting health and safety at work.

4.0 **RESPONSIBILITY FOR IMPLEMENTATION**

4.1 The ultimate responsibility for ensuring the implementation of the policy on health and safety at work rests on the NTPC Management the Corporate Personnel Division at the Corporate level and the concerned General Managers at the Project/Station level. The Officer incharge of safety will be functionally responsible to the Corporate headquarter for ensuring that the policy is promulgated, interpreted and carried out in the manner expected.

4.2 Immediate responsibility for safety at work is that of the Managers/Executives of each department/section who are primarily responsible to prevent accidents involving members of their staff and other persons. It is their responsibility to issue clear and explicit working instructions, compliance with which will ensure safe working and to require the effective use of approved equipment.

4.3 Accepted rules, procedures and Codes of Practice which are formulated with proper regard to health and safety consideration must be strictly observed by all concerned. Contracting Agencies executing works should be made responsible through various measures including appropriate provisions in the contract for discharging their safety obligations.

4.4 In designated areas of particular hazard the appropriate Executives are required to authorise, in writing the commencement of any work and, before doing so, personally to satisfy themselves that all necessary safety precautions have been carried out, such executives must themselves be authorised, in writing as competent to perform these duties.

4.5 Safety Officers are appointed to advise Management on questions of safety at work including advice on the application in particular local situations of the system of work, implementation of Company's Rules and Relevant Codes of Practices in consultation with Area Engineers. They will be consulted in the interpretation of rules and codes being formulated by the Corporate Management and shall advise Management in the investigation and analysis of accidents and circulation of appropriate statistics.

4.6 **Major Site Incidents**

The General Manager at each Project/Station is required to ensure that plans are devised for action in the event of fire, major site incident or necessity for evacuation procedure. These plans must be communicated to all staff and

rehearsed from time to time.

- 4.7 Fire-fighting training and the formation of fire-fighting team on a voluntary basis will be encouraged by the Project/Station management.
- 4.8 All accidents and dangerous occurrences will be reported immediately to the General Manager who will implement an established procedure to ensure that an investigation takes place and recommendations are made to prevent recurrence.

PROCEDURE FOR REPORTING OF ACCIDENTS / DANGEROUS OCCURRENCES IN NTPC

1.0 OBJECTIVES

In order to make prompt report of accidents, dangerous occurrences & fire accidents to comply with requirements / obligations under different statutes; and to inform the concerned authorities within the organization for keeping complete information of accidents for record and analysis, which will be of help in taking remedial measures for recurrence of such accidents.

2.0 PROCEUDRE FOR REPORTING NEARMISS ACCIDENTS

2.1 All near miss accidents are to be reported to Head of Safety by the Head of the Department immediately or within 24 hrs. as per Form – III-A.

2.2 Head of Safety should investigate all near miss accidents and circulate the enquiry report along with remedial measures at the Project / Station with a copy to Corporate Safety Department.

3.0 PROCEUDRE IN CASE OF ACCIDENTS CAUSING INJURIES/ FATALITIES

3.1 The executive of the concerned Section where the accident has occurred shall immediately refer the injured to NTPC Hospital / Dispensary / First – aid unit with a preliminary report of Form-I (Annexure-I). In addition he shall inform about the accident to Head of the Department, Head of HR & Head of Safety by any fastest mode of communication with full description of accident and details of the injured persons.

3.2 In case of injury to Contractor's employee, the contractor shall immediately inform the accident / dangerous occurrences to NTPC Engineer Incharge and Head of Safety by any fastest mode of communication with full description of accident and details of the injured persons and will arrange to the injured to NTPC Hospital. The Engineer Incharge shall submit the information of accident as in Pare 2.1 above.

3.3 In case injured has come / is taken directly to hospital / dispensary / first-aid unit, the Medical Officer will inform about the incident to Head of the Department in Form – II (Annexure-II) with a copy to Head of HR & Head of Safety. In case of serious accident, he shall also immediately inform the concerned as above over telephone.

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- 3.4 Subsequently the concerned department / section Incharge will prepare a detailed report of accident within 4 hrs of the accident in Form – III (Annexure-III) and will submit one copy each to the General Manager and Head of HR. Third and fourth copy of the report will be sent to Head of Safety and fifth copy will be retained by him for departmental record.
 - 3.5 The Head of Safety will intimate the accident to concerned Statutory Authorities as per the provisions of relevant Act / Rules. Annexure – IV enclosed contains a list of such authorities. However, the State Rules concerned should be referred to for additional provisions, if any.
 - 3.6 The Head of Safety will also submit a copy of Form – III along with his comments to Corporate Safety Section within one week of occurrence of accident.
 - 3.7 The Head of Safety will send accident report of each calendar month to Corporate Safety Section in Form – V (Annexure-V) before fifth day of every succeeding month. In case of no accident, a 'Nil' report should be sent.
 - 3.8 In case of a fatal accident / dangerous occurrence, information of the accident shall be immediately intimated to Corporate Safety with a copy to Director (HR) by Fax. This should also be communicated over telephone to GM (R&R and Safety) and Director (HR).

4.0 PROCEDURE IN CASE OF DANGEROUS OCCURRENCES

As prescribed under the relevant rules made by the State Government with reference to the provision of Section 88-A of the Factories Act, schedule of some common dangerous occurrences given in Annexure-VI.

- 4.1 In case of dangerous occurrences, the same will be informed by Section Incharge to Head of Safety, Head of Department and Head of HR in Form – VII (Annexure-VII) within 4 hrs.
- 4.2 The Safety Officer will intimate such dangerous occurrences to Statutory Authorities as indicated in the schedule at Annexure-VI as prescribed by the State Government

5.0 ROLE OF CORPORATE CENTRE

- 5.1 Safety Department shall put up monthly accident / dangerous occurrences report to Director (HR) for information.
- 5.2 Safety Department will issue guidelines to various units on accident prevention activities from time to time, as may be deemed necessary.

Procedure for Reporting of Accident / Dangerous Occurrences

Annexure-I

Form-I

NATIONAL THERMAL POWR CORPORATION LIMITED
..... Super Thermal Power Project / Station

To

Incharge

_____ Hospital / Dispensary / First – aid Unit

Subject: Accident of Shri / Smt. _____

Shri / Smt. _____ is referred to your hospital for treatment.
The details of the injured and incidents are as below:

1. Designation of injured : _____
2. Employee No. : _____
3. Department : _____
4. Date & Time of accident : _____
5. Details of accident : _____
6. Causes of the accident : _____

Date: _____

Signature _____

Name _____

Designation _____

Department _____

Procedure for Reporting of Accident / Dangerous Occurrences

Annexure-II

Form-II

NATIONAL THERMAL POWR CORPORATION LIMITED
..... Super Thermal Power Project / Station

ALLEGED WORK ACCIDENT

To

Date: _____

HOD

Shri / Smt. _____ Employee No. _____
Designation _____ of your Department / Section has reported to
First Aid Post / Hospital for treatment of work injury without Form-I. He / She has been
made fit / unfit to work for less than / more than 48 hours.

Please expedite Form-I if it is a work accident.

Medical Officer /
Dispensary Incharge /
First Aid Post Incharge

Copy to:

1. Personnel Head
2. Safety Officer

Procedure for Reporting of Accident / Dangerous Occurrences

Annexure-III

Form-III

NATIONAL THERMAL POWR CORPORATION LIMITED
..... Super Thermal Power Project / Station

ACCIDENT REPORT

1. Full address of the place, where accident or dangerous occurrences happened: ____
2. Branch or Department and exact place, where accident or dangerous occurrences happened : _____
3. Injured Persons's full name and address : _____
4. a) Sex : _____ b) Age on last Birthday : _____
c) Occupation of injured person : _____
5. Date and hour of accident or dangerous occurrences
6. Hour at which they started work on the day of occurrence
7. a) Cause or nature of accident or dangerous occurrences: _____
b) If caused by machinery : _____
 - i. Give name of the machine and part causing the accident: _____
 - ii. State whether it was moved by mechanical power at that time: _____
- c) State exactly what injured person was doing at that time: _____
8. Nature and extent of injuries (e.g. fatal, loss of finger, fracture of leg, scaled scratch followed by sepsis) _____
 - a) Location of injury (right leg, left, hand or left eye etc.)

9. Number of days for which the injured person is likely to be off the work:

a) i) If the accident is not fatal, state whether the injured person has returned to work _____

ii) If so, date and a hour of return to work _____

b) i) Has the injured person died: _____

ii) If so, date and time of death: _____

10. Name of doctor, dispensary or hospital from which the injured person received or is receiving treatment: _____

11. Name of person, who saw the accident and can give important evidence: _____

12. In your opinion was the accident directly attributable to:

i. the injured person having been at the thereof under the influence of drink or drug _____, or

ii. The willful disobedience of the injured person to an order expressly given to a rule expressly framed for the purpose of securing the safety of employee or

iii. The willful removal or disregard by the injured person of any safety guard or other devices which he knows to have been provided for the purpose of securing employee's safety.

13. Describe briefly how accident occurred: _____

Date _____

Signature Incharge: Name _____

Time _____

Designation _____

ANNEXURE - III

REFERENCE		FOR USE OF SAFETY DEPARTMENT ONLY		(One copy of this report is to be sent to Corporate Personnel by Project Safety Officer within one Week of occurrence)	
No.	Date of Receipt				
DETAILS OF INJURED PERSONS					
No. of Days Lost			Remarks		
Non-Reportable (upto 2 days)	Reportable				
	3 to 7 days	above 7 days			
Age Group (Years)		Time Group (Period) (From Start of Work)		No. of Years	
<input type="checkbox"/> Upto 26 <input type="checkbox"/> 26 to 35 <input type="checkbox"/> 36 to 45 <input type="checkbox"/> above 45	<input type="checkbox"/> 1st to 2 Hrs <input type="checkbox"/> 3rd to 4th Hrs. <input type="checkbox"/> 5th to 6th Hrs. <input type="checkbox"/> 7th to 8th Hrs. <input type="checkbox"/> Overtime	Service	Job Experience		
ACCIDENT DETAILS				Treatment Given First Aid/Dispensary/Hospital	
Type	Agency	Nature	Part of Body		
Damage Caused					
Findings					
Action Suggested					
Signature & Date					

NATIONAL THERMAL POWER CORPORATION LTD.
..... Super Thermal / Gas Power Project / Station

Form - III-A

(NEARMISS ACCIDENT REPORT FORMAT)

1. Name of the Department
2. Name of the location / place, where the accident occurred
3. Date and Time of the accident
4. Name(s) & Designation(s) of the person(s) escaped due to the accident
5. Names of the persons who witnessed the accident
6. Direct cause of the accident
7. Indirect cause of the accident
8. Whether the accident took place due to any unsafe actions, if so, give details
9. Whether the accident took place due to any unsafe conditions, if so, give details
10. Immediate actions taken by the Department to prevent recurrence of similar accidents
11. Whether any similar accident took place in the past in the project / department, if so, give the details of the accident e.g. date, place along with brief description
12. What were the direct / indirect loss due to the accident
13. Suggestions by the department to avoid such accident in future

Place:

Signature of Head of the Department

Date:

Name, Designation & Department.

CC to : 1. Head of Safety
2. Head of O&M / Project
3. General Manager - For kind information

Note :

1. All near miss accidents are to be reported to Head of Safety by the head of the Department immediately or within 24 hrs.
2. Head of Safety should investigate all near miss accidents and circulate the enquiry report along with remedial measures at the Project / Station with a copy to Corporate Safety Department.

Procedure for Reporting of Accident / Dangerous Occurrences

Annexure-IV

DETAILS OF AUTHORITIES TO WHOM ACCIDENTS ARE TO BE REPORTED

Sl. No.	Statute under which reporting of accidents/dangerous** occurrences is to be made	To whom to be reported	Time Limit
1.	Factories Act, 1948 and associated State Rules *(For all reportable accidents and dangerous occurrences)	Chief Inspector of Factories & Inspector of Factories	i. Immediate intimation by phone / telegram / messenger etc. ii. For reportable accidents details of accident in the prescribed pro forma within 60 hours.
		Distt. Magistrate & Officer Incharge of Police Station	Immediately if accident causes fatality or is likely to cause death due to injury.
2.	Indian Electricity Rule 1956	Electrical Inspector	Telegraphic information within 24 hrs. ii. Written report on prescribed Form within 48 hours of accident
3	Indian Explosives Act 1884 (Gas Cylinder Rules 1981)	Chief Controller & Explosives	i. Immediately after occurrences through express telegram ii. Detailed intimation within 24 hours.
		(for Gas Cylinder accidents)	Officer Incharge of nearest Police Station Immediately by quickest route.

4	The Building & other Construction Workers (Regulation of Employment and Conditions of Service) Central Rules, 1998.	i. the Regional Labour Commissioner (Central), having jurisdiction in the area in which the establishment in which such accident or dangerous occurrence took place is located. Such Regional Labour Commissioner (Central) shall be the authority appointed under section 39 of the Act;	Immediately by telegram, telephone, fax or similar other means including special messenger within 4 hrs. in case of fatal accident and 72 hrs. in case of other accidents as per prescribed format.
		ii. Board with which the building worker involved in accident was registered as a beneficiary; iii. Director General; and iv. The next in kin or other relative of building worker involved in accident.	

- Note:
- i. *This varies from state to state.
 - ii. **As given in Schedule at Annexure – VI.
 - iii. For details, consult the Acts and Associated rules made there under.

DETAILS OF ACCIDENT

(For the month _____ Year, 19 ____)

(* Should be sent to Corporate Centre by 5th of every month)

Sl. No.	Name, age, designation of the injured	Date & time of accident	Name of employer if NTPC of Contractor	Since when employed in NTPC Project	Full details of accident	Unsafe Act	Hazardous condition	Agency of accident	Type of accident	If accident could have been prevented if suitable protected equipment had been supplied and if, yes, if PPE was supplied & not used by injured	Expected disablement period
1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.

(* In case of no accident 'NIL' report must be sent)

DANGEROUS OCCURRENCES

- i. Bursting of a boiler or vessel used for containing steam under pressure greater than atmospheric pressure.
- ii. Collapse or failure of a crane, derrick which hoist or other appliances used in raising or lowering persons or goods, or any part thereof, or the overturning of a Crane.
- iii. Explosion or fire causing damage to any room or place in which persons are employed.
- iv. Explosion of a received or container used for the storage at a pressure greater than atmospheric pressure of any gas or gasses (including air) or any liquid or solid resulting from the compression of gas.
- v. Collapse or subsidence of any floor, gallery, roof, bridge, tunnel, chimney, wall or building forming part of a factory or within the compound or cartilage of factory.
- vi. Leakage of any dangerous gas / chemical.

- Note:
- 1. The above is only illustrative.
 - 2. A list / schedule of dangerous occurrences are prescribed in the rules framed by the State governments with reference to Section 88-A of the Factories Act, 1948, which should be referred to by the Project / Establishment.

NATIONAL THERMAL POWR CORPORATION LIMITED
..... Super Thermal Power Project / Station

DEPARTMENTAL REPORT OF DANGEROUS OCCURRENCES

1. Time of occurrence (a) Date : _____ (b) Hour : _____
2. Nature of the dangerous occurrence : _____
3. Equipment Involved
 - a) Name _____
 - b) Manufacture _____
 - c) Use _____
 - d) Location of building _____
4. Approximate length of service of equipment _____
5.
 - a) Parts damaged _____
 - b) Date when last tested _____
 - c) Nature and extent of damage _____
6. Apparent reasons of the occurrence _____
7. Was it due to willful negligence of anyone? _____
8. Was there any infringements of rules or instructions ? _____
9. Could this occurrence have been avoided ? _____
If so, how ? _____
10. What action is being taken to prevent occurrence _____
11. Additional remarks _____

Date _____

Signature Incharge: Name _____

Time _____

Designation _____

(CORPORATE SAFETY DEPARTMENT)

GUIDELINES OF CONSTITUTION OF ENQUIRY COMMITTEE AND CONDUCT TO ENQUIRIES IN CASES OF ACCIDENT/DANGEROUS OCCURRENCES.

1.0 OBJECTIVE

With a view to investigate all the accidents in order to examine each case in details and depth to find out the causes of accidents, the extent of loss, the circumstances / individuals responsible and to obtain recommendations for prevention of recurrences in similar or related nature of accidents.

2.0 APPLICABILITY

The procedure shall be applicable in all cases of accidents including fire accidents, property damage / dangerous occurrences, accidents occurred inside / out side the premises pertaining to NTPC including MGR / Ash handling plant townships etc. and accidents caused in respect of its own employees or contractors' / associates employees or to the public if the accident caused due to NTPC activities.

3.0 DEFINITIONS

- 3.1 **"Near Miss Accidens"** : - Event that gives rises to an accident or has the potential to lead to an accident or an incident where no ill health, injury, damages or other loss occurs, is also referred to as near miss accident.
- 3.2 **"Non-reportable injury"** : Non-reportable injury would mean injury by reason of which the person injured is either not prevented, or is prevented from working for a period less than 48 hours immediately following the day of accident.
- 3.3 **"Reportable Injury"** : Reportable injury would mean an injury by reason of which the person injured is either not prevented, or is prevented from working for a period of more than 48 hours immediately following the day of accident.
- 3.4 **"Disablement of permanent nature"** : As prescribed under the Workmen's Compensation Act, 1923 and shall include partial and total disablement of permanent nature.
- 3.5 **"Dangerous Occurrence"** : As prescribed under the relevant Rules made by the State Govt. with reference to the provision of Section 88-A of the Factories Act, 1948.

4.0 PROCEDURE

- 4.1 The Enquiry Committee to be constituted for various types of accident, the authorities competent to appoint enquiry committees and the constitution of the enquiry committees have been prescribed in Annexure-I.
- 4.2 As soon as an accident occurs, the Head of Safety Officer of the concerned project / station, will immediately initiate enquiry in cases of A and B (i) where he is to conduct the enquiry.
- 4.3 Wherever the Enquiry Committee is to be constituted by the AGM (O&M) / (Projects) or GM, the Head of Safety / Safety Officer will make a proposal as per the guidelines for approval of the constituting authority. The constituting authority should ensure that the office order is issued within 24 hours of the accident. It is also the responsibility of the constituting authority to coordinate with concerned Controlling Officer for obtaining a name to be included in the committee through the quickest means of communication where members are from other project / station.
- 4.4 Wherever the competent authority to constitute an enquiry committee is ED the GM of the concerned project, shall immediately put up the draft proposal in consultation with concerned regional ED as per guidelines through the quickest means of communication and ensure that the office order is issued within 24 hours of the accident.
- 4.5 Wherever the competent authority to constitute an enquiry committee is D(HR / CMD, GM (R&R) and Safety), shall immediately put up the draft proposal in consultation with D (HR) as per guidelines through the quickest means of communication and ensure that the office order is issued at the earliest possible.
- 4.6 In cases where finalizing the nomination from other projects / stations / CC may take time, GM of the project / station concerned can still issue the order constituting the enquiry committee indicating the members to be nominated from Corporate Centre/ project concerned. The enquiry committee shall start investigation immediately within the shortest possible time from the communication of the order-constituting enquiry.
- 5.0 The enquiry report should be submitted within the stipulated period as specified against each incident. However, if competent authority feels, it must be expedited under certain circumstances, so that report is submitted even earlier.
- 6.0 The terms of reference for the enquiry committee should generally include :
 - a. Establish the circumstances and reasons of accident.
 - b. Estimate the extent of loss / damage / manpower / man-hours or man days lost / plant / machinery etc.
 - c. Fixation of responsibilities including NTPC employees.
 - d. Suggestion for prevention of recurrence of similar or related nature of accidents, and
 - e. Any other relevant aspect.

-
- 7.0 Occurrence of any fatal accidents and involving loss / damage of Rs.25 lakhs or more, and / dangerous occurrences, shall be intimated to Director (HR) and Executive Director concerned immediately by the quickest possible means of communication by Head of Project / Station.
- 8.0 The enquiry committee should submit its report to constituting authority within stipulated period as mentioned against each incident. All enquiry committee reports in cases of fatal accidents should be sent to Director (HR) along with the comments of the constituting authority and cover page as enclosed at Annexure-II. The Corporate Safety should circulate the gist of the typical fatal accident enquiry reports and recommendations to the concerned Project/Stations for taking appropriate actions to prevent recurrence of similar accidents.
- 9.0 The authorities competent to constitute enquiry committee have been indicated in Annexure-I. However, if considered necessary, Director (HR) / CMD may constitute another committee and the committee constituted by the authority prescribed in the Annexure - I, shall become inoperative. While passing such order, the Director (HR) / CMd can also include additional members in the Committee or alter the level of members of the Committee as deemed necessary.

(Cover Page)

NATIONAL THERMAL POWER CORPORATION LTD.

To be submitted by all Projects / Stations along with
Fatal / Serious / Dangerous Occurrences
Enquiry Committee Reports

1. Name of the Project / Station
2. Head of the Project / Station
(Name & Designation)
3. Date & Time of Accident
4. Name, Designation, Employees No.
of the Diseaded / Inured Person (s)
5. Name of the Employer
6. Name of Principle Contractor
7. Name of sub-contractor
8. Area / Location & Department
9. Brief Description & cause of accident
10. No. of days of work stoppage, if any,
11. Date of Enquiry committee Constituted
12. Date of the Enquiry Committee Report
submitted to Competent Authority
13. Engineer I/c of the Works
(Name & Designation)
14. Project I/c (AGM / DGM project)
(Name & Designation)
15. Head of the O&M, (Name & Designation)
(If accident relates to O&M area)
16. Head of Safety, (Name & Designation)

.....
Signature - Head of the Project / Station

Guidelines for constituting Enquiry Committees - 2004

Sl. No.	Type of Accident	Enquiry Committee to be appointed by	Enquiry Committee to be headed by	Other Members of the Committee	Remarks
A.	Near Miss Accidents	-	Head of Safety/Safety Officer of the project/ station	-	Head of safety should circulate the recommendations with in 48 hours of the incident
B. In case of personal injury					
i.	In case of a non-reportable injury to one person	-	Head of safety / safety officer of the project/ station	-	Head of safety should circulate the recommendations with in seven days of the incident
ii.	Non-reportable injuries up to 5 persons	AGM (O&M) in case of Stations or AGM / DGM (Projects) in case of Project	Not below the rank of Sr. Mgr. not connected with the accident from same project / station	Head of Safety/Safety Officer from same project / station	Enquiry report to be submitted with in seven days of the incident and recommendations to be circulated immediately.
iii.	Non-reportable injury to more than 5 persons	AGM (O&M) in case of Stations or AGM / DGM (Projects) in case of Project	Not below the rank of DGM (not connected with the accident) from same project / station	Head of Safety/Safety Officer from same project / station	Enquiry report to be submitted with in seven days and recommendations to be circulated immediately.
iv.	All reportable accidents except amputation / Disablement	AGM (O&M) in case of Stations or AGM / DGM (Projects) in case of Project	Not below the rank of DGM (not connected with the accident) from same project / station	Head of Safety/Safety Officer of the project	Enquiry report to be submitted with in 15 days and recommendations to be circulated immediately.

Sl. No.	Type of Accident	Enquiry Committee to be appointed by	Enquiry Committee to be headed by	Other Members of the Committee	Remarks
v.	All reportable accidents causing major / serious injuries like amputation	Head of the Project/Station	Not below the rank of DGM (not connected with the accident) from same project/station	1. One Executive at the level of Sr. Mgr. from other project/station 2. Head of Safety/Safety Officer of the Project/	Enquiry report to be submitted with in 15 days and recommendations to be circulated immediately
vi.	Accident causing fatal injury to one person	Head of the Project/Station	Not below the rank of AGM from other project / station of the same region	1. One Executive at the level of DGM from the project/station 2. Head of Safety/Safety Officer of the Project/ Station	Enquiry report to be submitted with in a month and recommendations to be circulated immediately
vii.	Accident causing fatal injury to one person but causing injuries to number of persons	ED - Region	Not below the rank of AGM from other project/station of the same region / Regional HQ	1. One Executive level of DGM from the project/station 2. Head of Safety/Safety Officer of the Project/ Station 3. Sr. Mgr. (Safety) CC	Enquiry report to be submitted with in a month of the incident and recommendations to be circulated immediately
viii.	Accident causing fatal injuries to more than one person	D (HR) / CMD	GM of other project / station / Region / CC	1. One Executive level of AGM/DGM of the same project/station 2. Head of Safety/Safety Officer of the Project/ Station 3. GM (R&R and Safety) 4. Any expert / member if considered necessary	Enquiry report to be submitted with in a month and recommendations to be circulated immediately
C. Accident Causing Damage / Loss to Machinery, Equipment, Properties Etc.					
i.	Estimated loss upto Rs.10,000	-	Head of Safety/Safety Officer of the Project		Head of safety should circulate the recommendations with in seven days of the incident

Sl. No.	Type of Accident	Enquiry Committee to be appointed by	Enquiry Committee to be headed by	Other Members of the Committee	Remarks
ii.	Estimated loss for more than Rs.10,000 & up to 1,00,000	AGM (Project) Head of Construction/ AGM/DGM/Head of O&M	Not below the rank of Sr.Mgr. (not connected with the accident)	Head of Safety / Safety level of Sr. Mgr. from other project/station 2. Head of Safety/Safety Officer of the Project/	Enquiry report to be submitted with in seven days of the incident and recommendations to be circulated immediately
iii.	Estimated loss for more than Rs.1,00,000 & up to 25,00,000	Head of Project / Station	Not below the rank of DGM (not connected with the accident)	i. One officer at the level of Sr. Mgr. from other project/station 2. Head of Safety of the Project/Station	Enquiry report to be submitted with in one month of the incident and recommendations to be circulated immediately
iv.	Estimated loss for more than Rs.25,00,000 & up to 50 lakhs	ED - Region	Not below the rank of AGM (not connected with the accident)	i. DGM/Sr. Mgr. from other project/station 2. Sr. Mgr. of the Project/Station 3. Safety Officer of the Project / Station	Enquiry report to be submitted with in one month of the incident and recommendations to be circulated immediately
v.	Beyond Rs. 50 lakhs	D (Project) / D (O) CMD	GM / AGM from other project / station / CC	i. AGM/DGM from the project 2. One Sr. Mgr. from other Project 3. Outside expert (s), if considered necessary 4. Head of Safety/ Executive of the Project / Station	Enquiry report to be submitted with in one month of the incident and recommendations to be circulated immediately
D.	Any dangerous occurrence including leakage of chemicals, gases, explosion, fire, etc. which may have hazardous impact on the environment, property and people	ED	AGM/DGM (not connected with the accident) from the Project	i. DGM from other Project 2. Sr. Mgr. from the Project 3. Head of Safety of the Project	Enquiry report to be submitted with in one month of the incident and recommendations to be circulated immediately

**ENTITLEMENT AND PERIODICITY FOR DISTRIBUTION OF
PERSONAL PROTECTIVE EQUIPMENTS**

Parts to be protected	Personal Protective equipment	Protection against	Entitlement	Periodicity of distribution	Remarks
1.	2.	3.	4.	5.	6.
A. Head	(1) Industrial Safety Helmet (IS:2925-1975)	Falling Objects	All employees working in projects, sub-station, Constn. and Erection sites (those working in regional offices, township etc. and are not to work ordinary on Construction sites are not to be given helmets.	Initially to all entitled employees & afterward replacement against return of damaged ones	1. In case of loss of helmet of any individual new helmet may be given to employee at the recommendation of concerned HOD at a token price of 300, the cost of Helmet or Rs.20/- whichever is less. 2. Visitors will also be given NTPC marked helmet for use in project & after visit the same will be taken back from them.
	(2) Crash Helmets (IS:4151:1976) (Red Colour)	Head injuries	Two wheeler riders of NTPC vehicles	To be issued to the incharge of 2 wheeler. Replacement against return of damaged ones	Other 2 wheeler riders shall use their own Helmet. Security persons should allow entry of two wheelers, which are driven by drivers wearing helmets.
B. Face	(1) Face Shield with replaceable acrylic visor (IS:8521-1977)	Frontal hazards against splash of chemicals	Water treatment Plant operators, Chemical charging & maintaining personnels/Boiler operators & other handling hazardous chemicals.	Quantity equal to no. of entitled employees, to be kept in the deptt./section on pool basis. Persons using the face shield will return these to nominated representative after use, when damaged replacement to be given to the section.	HOD shall nominate one Executive/Supervisor for maintaining the record of these equipments
C. Eyes	(1) Zero Power Plain goggles with cup type filters on both ends (IS:2553-1977)	Eye injuries due to flying objects	Grinders, Fitters machine operators and those employed in Coal/cement Handling	All entitled employees on individual basis. Afterward replacement against damaged ones.	On specific requirement & request of employment HOD concerned may consider goggles with toughened power lenses. In such cases eyes of the employees will be tested in NTPC Hospital/Dispensary and goggles will be purchased accordingly.

Parts to be protected	Personal Protective equipment	Protection against	Entitlement	Periodicity of distribution	Remarks
1.	2.	3.	4.	5.	6.
	(2) Zero Power goggles with cup type filters on both sides and blue colour glasses (IS:2553-1977)	Radiation due to sparks flames	Boiler/Furnace operators/Gas cutters	-do-	-do-
	(3) Welders equipment for eye & face (IS:1179-1967)	Radiation	Elect. Welders Cutters	-do-	-do-
D. Ear	1) Cylindrical type earplug (made from foam)	Hearing losses (if noise level is above 85 db)	Employees working in turbine/Boiler/Coal mill bay area/coal crussing/compressor area.	All entitled employees on individual basis. Afterward replacement against damaged ones.	-
	2) Ear muffs (IS:9167)	-do-	-do-	Half the no. of entitled employees, to be kept in deptt./section on pool basis. Persons using ear muffs will return the muffs to the nominated representative after use. When damaged, replacement to be given.	HOD shall nominate one Executive/Supervisor for maintaining the record of these equipments.
E. Respiritory	1) Dust Respirator with Filter	Inhalation of harmful dust	Employees working in dusti atmosphere e-g coal handling/mill bay/boiler area, ash handling etc.	All entitled employees on individual basis. Afterward replacement against damaged ones.	Filters should be replaced as and when required but not later than one week.
	(2) Cannister Gasmask (IS:8523)	Inhalation offensive & harmful fumes vapours & gases	Employees working in harmful environment	6 nos. to be kept in Deptt./sectin on pool basis. Per sons using gasmask will return the same to the nominated representative after use. When damaged replacement to be given.	HOD shall nominate one Executive Supervisor for maintaining the record of these equipments.

Parts to be protected	Personal Protective equipment	Protection against	Entitlement	Periodicity of distribution	Remarks
1.	2.	3.	4.	5.	6.
	3) Self contained breathing apparatus (IS:1910-1961)	Hazards of oxygen deficiency & toxic gases	Employees working in chlorination and offensive/harmful environment, Fire Station, Substation, Control Room	-do-	HOD shall nominate one Executive Supervisor for maintaining the record of these equipments.
F. Body	1) Leather apron	Flying particles chips, hot slags etc.	Welders/Cutters/Grinders/Machine Operators	To be kept for all entitled employees as above. Person using apron shall return the same to nominated representative after use. When damaged replacement to be given.	-do-
	2) Rubbensed apron Acid/Alkali Proof (IS:4501-1967)	Contact with corrosive chemicals	Chemicals charging employees of water treatment plant	6 nos. to be kept on pool basis. Person using apron shall return the same to nominated representative after use. When damaged replacement to be given.	-do-
	3) Lead apron	Radiation due to radioactivity	Employees working in Radioactive zone	2 nos. to be kept in FQA Section on pool basis. Person using apron shall return the same to nominated representative after use. When damaged, replacement to be given.	-do-
	4) Boiler Suit	Contact with dirty/sharp/corrosive surfaces	Maint. persons, who are to work in Boiler/ Confined area	2 nos. each entitled employee per year.	GM may decide entitlement

Parts to be protected	Personal Protective equipment	Protection against	Entitlement	Periodicity of distribution	Remarks
1.	2.	3.	4.	5.	6.
	5) Safety Belt/full body (IS:3521) Harners fitted with retractable type fall arrester	Fall from height	Employees working at height	Quantity equal no. of entitled employees to be kept in deptt/ section on pool basis. When damaged replacement to be given.	1. HOD shall nominate one Executive/ Supervisor for maintaining the record of these equipments. 2. The belt should be inspected regularly so as to ensure these to be safer and should br replaced when ever felt necessary to inspection but later than 5 years.
G. Hand	1) Leather Hand Gloves (IS:994-Part-1-1973)	Contact with moderately hot substances/ uneven surfaces	Welders/Cutters/ Grinders	All entitled employees on individual basis, afterward replacement against damaged ones.	HOD shall nominate one Executive/ Supervisor who will keep a stock of these gloves & will issue the same to employees, when required.
	2) Acid/Alkali Proof rubberised hand gloves	Contact with corrosive chemicals	WTP employees/ others handling corrosive liquids	-do-	-do-
	3) Canvas cum leather Hand Gloves with leather palm (IS:6994)	Contat with oily greasy objects/uneven surfaces	helpers/Riggers handling oily/ greasy/uneven sufraces	-do-	-do-
	4) Lead Hand Glove	Radiation	Employees working in radioactive zone	Two nos. to be kept in section -do- on pool basis. Persons using the gloves will return the same after use. When damaged replacement to be given.	

Parts to be protected	Personal Protective equipment	Protection against	Entitlement	Periodicity of distribution	Remarks
1.	2.	3.	4.	5.	6.
	6) Electrically tested electrical resistance Hand Gloves (IS:4770-1968) (to be purchased with the certificate)	Electric shock	Electricians/ Electric supervisors Electrical Engineers working on live line	Quantity equal to no. of entitled employees to be kept in section on pool basis. Persons using the gloves will return the same after use. When damaged replacement to be given.	1. HOD shall nominate one Executive Supervisor for maintaining the records of these gloves. 2. These gloves must be inspected by nominated Executive. Supervisor everyday & if found damaged even minor) must be removed and rejected. 3. The gloves will be tested by inspection department every 6 months to detect electrical reputation, at the test voltage.
H. Foot	1) Industrial Safety shoes with steel toe (IS:5852)	Crushing injuries to foot fingers	Employees of project/ plant except : a) Electricians & Electrical Suprs./ Executives working with electricity b) Employees of Pers./ Fin. & others departments who are not to visit the plant.	One pair per year	All HODs/section will instruct employees to submit their shoes sizes to Safety/ Personnel Department who will liaise for purchase of these shoes
	2) Electrical Safety shoes without steel toe	Electric shock	Workmen/Supervisors/ executives working on electric lines	-do-	-do-

Parts to be protected	Personal Protective equipment	Protection against	Entitlement	Periodicity of distribution	Remarks
1.	2.	3.	4.	5.	6.
	3) Gum Boots	Injuries due to corrosive chemicals etc.	Cleaning mazdoors, WTP employees/FO handling employees, coal/ash handling employees, employees working in cable galleries, solution makers and other working in muddy/sluggish area.	Once in three years	-do-

**NATIONAL THERMAL POWER CORPORATION LIMITED
(CORPORATE SAFETY SECTION)**

1.0 INTRODUCTION :

- 1.1 Safety circle is a small group of employees who regularly meet to identify, analyse and solve problems related to safety and health of work-area, to which they belong.
- 1.2 The basic idea behind safety circle is to fully develop the human capabilities of the employees in identification of hazards and to improve safety and health in the organisation

2.0 OBJECTIVES :

- 2.1 To identify the hazardous conditions or substandard acts having potential of causing accidents.
- 2.2 To suggest practicable measures to over come the hazards arising out of these factors.

3.0 SUGGESTED ORGANISATION :

- 3.1 The circle may consists of 5-6 employees from one area of work.
- 3.2 The circle may have one co-ordinator.
- 3.3 Participation of the member should be voluntary.

4.0 SCOPE OF PROBLEMS :

- 4.1 The circle should select problems related to occupational health and safety.
- 4.2 Problems are not restricted to safety and health only but may relate to compliance of various laws also.

5.0 TRAINING :

- 5.1 Training of circle leaders and members in group working and problems solving skill is essential. Some of important topics like techniques of discovering hazards, plant safety inspection statutory provisions, procedure for investigation of accidents, case studies etc., shall be specifically covered in the training programme.

6.0 MEETINGS :

6.1 Usually one hour per week.

7.0 MANAGEMENT PHILOSOPHY UNDERLYING SAFETY CIRCLE.

- 7.2
- (a) Believe in people
 - (b) Maintain open communication
 - (c) Built self esteem
 - (d) Hep each other
 - (e) Promote a sense of involvement
 - (f) Management by objective
 - (g) Promote education and training
 - (h) Fact finding not fault finding

8.0 BENEFITS OF SAFETY CIRCLE :

- (a) Circle enable the individual members to improve his personnel capabilities.
- (b) Increase the involvement of members.
- (c) Help workers to develop their potentialities.
- (d) Reduce confilct stemming from work environment.
- (e) Involve workers more actively in their job.

9.0 GUIDE LINES FOR THE WORKING SAFETY CIRCLE

- 9.1 The circle must be in existance and active all the time, not only when a problem has been identified.
- 9.2 Emphasis must be placed on autonomous action, with participation of all the members in discussions and in the implementation of improvements.
- 9.3 The type of problem choosen should be entitely up to the group, but actual procedures for improvements should be worked out in great detail in the safety circle and the result recorded for the Company use. It is advisable initially not to get involved in too big problem, but to connections on problem whose remedies lie within the perview of the group.

- 9.4 The head of the group must provide leadership, while getting all the members to provide motive powers. Members as a whole must identify problems, figure out how to solve them apply the solution, check, standards set up regular procedures and make improvements.

10.0 THE SAFETY CIRCLE PROCESS :

The following diagram illustrates the various steps in the operation of safety circle.

Action of Members	Action of Management
- Problem identification by members	- Consideration of recommendations
- Analysis of problem by members	- Decision taking
- Recommendation to management	- Implementation of decisions in time bound frame

11.0 PROBLEM IDENTIFICATION :

- 11.1 The problem usually identified by circle members should pertain to their own work area. A variety of techniques may be used to identify problem by the most affective seems to be through brain storming approach.

12.0 PROBLEM SELECTION :

- 12.1 The list of problems developed in the previous step should be carefully reviewed by the Circle member and prioritized. The number one problem they wish to adopt should be first tackled by committee members.

13.0 PROBLEM ANALYSIS :

- 13.1 It is essential that circle members must themselves work on the problem selected by them since they are the expert in that area. As a first step, the circle should develop an action plan or schedule which is broken up into milestone or responsibilities assigned to various members. The circle can seek the help of outside specialist, if necessary.

14.0 RECOMMENDATION :

- 14.1 The process of communicating the recommendations of the circle should be through a formal presentation to the management during which visual aids like charts and graphs should be used by the members. This is more interesting and satisfying than a mere written recommendation, which may not get a proper response.

15.0 REVIEW OF MANAGEMENT :

- 15.1 The presentations of the circle solution should be usually made to the HOD to whom the circle leader reports. The higher level management people may be present as observers, but the decision should be taken by the normal management hierarchy.

16.0 DECISION BY MANAGEMENT :

- 16.1 The decision to accept the circle, recommendation, if possible, should be taken in the meeting, in which it is presented. This is because the manager usually knows that the circle has been working on and what its recommendation is going to be, long before the presentation takes place. The critical factor ensuring a favourable decision area the solution should be clearly cost effective (b) it should not result in adverse effect in other part of the organisation.

(Corporate Safety Department)

Safety Stewards Scheme

1. Objective : To involve Shop floor Supervisors and / or Executives up to E-5 level in Safety promotional activities.
2. Mode of Selection : Nomination by concerned HOD for each area.
3. Term of Tenure : Two years. The Head of Safety of the concerned Project / Station shall take initiative before expiry of the tenure of the existing members to ensure that the scheme operates timely with new members.
4. Duties and Responsibilities :
 - Arrange / coordinate for Personal Protective Equipments
 - Identify and remove hazardous conditions
 - Identify and remove the unsafe acts
 - Pursue all workers to follow safe working methods / safety rules, Use of Personal Protective equipment etc.
 - Effectively liaison between HOD and Safety Committee Members
 - Conducting Pep talks for NTPC employees and contractor labour on safety issues
 - Ensuring implementation of statutory requirements and safety clauses as mentioned in the contract conditions by the contracting agencies in both construction and operational activities.
5. Functioning :

The date, time and venue of the meeting shall be informed in advance to members by the Head of Safety. The Head of Safety shall chair the meetings to be conducted every month and the following functions of various Stewards shall be co-ordinated and recorded.

 - Punctuality and Attendance of of the Meeting
 - Active Involvement

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- No. of unsafe conditions identified and removed
 - No. of unsafe acts corrected
 - Presentation of Safety Reports, and Special performance of Safety matters.

The Safety Officer shall prepare a consolidated Safety Report on Safety Stewards observations & recommendations and the same to be presented in the Safety Committee Meeting for discussion and further action.

6. Training :

Training shall be provided to all the Safety Stewards during the first quarter of the year for his tenure of two years. At least five days training shall be imparted either by Safety Department at Project level or may be sponsored for external training programmes being organized by CLI / RLI / NSC / NPC etc.

7. Motivation :

All safety stewards shall be awarded with a certificate and a prize worth upto Rs.500/- and also one excellent award should also be given to the Best Safety Steward for his excellent contribution in the area of safety functions recorded by Head of Safety as stated at Sl. No. 5 with a prize worth up to Rs.1000/- after completion of their tenure. The winner of the excellent award shall be decided by the committee consisting of Head of the Project / Station, Head of O&M and Head of Safety.

(CORPORATE SAFETY DEPARTMENT)

Constitution of Safety Task Force at Projects

I. Objective:

To involve executives of various Departments of the Projects under construction stage in implementation of safety standards, compliance of statutory requirements, promoting safety awareness, conducting safety audits, inspections etc. in order to make the construction activities free from hazards.

II. Constitution of the Task Force:

a) Members:

The Head of Department shall to nominate at least one executive from his Department in the rank of E3-E6. The number of executives depends upon the number of units under construction. The total members of Task Force should not be less 6 for units up to 500 MW, 9 for 1000 MW, 12 for 1500 MW, 15 for 2000 MW and above. However, the total members of Task Force should not be exceed 15 numbers in a project. The members should be relieved from their existing duties for their active involvement in the Task Force.

b) Vice-Chairman

Head of the Project shall nominate the Vice-Chairman at the level of E7.

c) Chairman

AGM (Project) shall be the Chairman of the Task Force.

d) Coordinator

Head of Safety shall be the Coordinator.

III. Duties:

Vice-Chairman

- i. The Vice-Chairman shall be required to make the task force in to different groups with 2/3 members and assign the areas to be inspected during the period. The senior most members in the group should be nominated as Group Head.

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- ii. Meeting with all the task force members' daily after inspection is over and compile the observations of the members for forwarding to the concerned Site In-charges & Engineer In-charges during the daily Project Review Meeting for compliance with the target dates.
 - iii. Meeting with Chairman along with the members at least once in fortnight & bring out the observations and suggestions of the members. On the basis of the discussion in the meeting an action taken report shall be prepared.
 - iv. Meeting with the Head of Project along with the Chairman and members at least once in month to appraise about overall Safety at Project, functioning and observations of the Task Force, action plan and for further guidance.

Coordinator:

- i. He will prepare the checklists for different work areas and circulate to all the members for their information and use during daily inspection / audit. He will brief the members about various statutory requirements relating construction Safety and Health to discharge their duties effectively.
- ii. He will organize various meetings with Vice-Chairman, Chairman, and Head of the Project along with the members as prescribed.
- iii. He will prepare agenda and minutes of the meetings in association with Vice-Chairman and circulate it to all the concerned with a copy to the Head of Project.
- iv. He will maintain all the records and assist the Vice-Chairman while discharging his duties with respect to the Task Force for its smooth working.

Members:

- i. To identify the risks / hazardous conditions and unsafe practices in the construction work and suggest remedial measures.
- ii. To go round the construction site with a view to check unsafe practices and detect unsafe conditions and to recommend remedial measures for their rectification on the spot as well as during meetings.
- iii. To look into health hazards associated with the construction activities while handling different types of chemicals and other construction material and ensure the proper use of the personal protective equipments.
- iv. To advise the Site In charges to stop unsafe practices, if any imminent danger is observed while carrying out the construction activities and issue a warning notice on the spot.
- v. To discuss in the meeting various unsafe conditions / practices observed during inspection.

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- vi. Members will also look into fire hazards in the construction area e.g. accumulation of scrap wood, plastic, jute bags, paper waste etc.

IV. Tenure:

The tenure of the Task Force shall be for a period of six months from the date of the constitution of the Task Force. However, if the Head of the Project feels the same Task Force may be extended for another period of six months. Head of Project should constitute another Task Force before completion of the tenure of the existing task force.

SAFETY COMMITTEES

WORKERS PARTICIPATION IN SAFETY MANAGEMENT

RULE NO. 41TH OF FACTORIES ACT

MODEL RULES UNDER FACTORIES (AMMENDMENT) ACT, 1987.

UNDER RULE 79 FOLLOWING PROVISIONS AS MADE FOR SAFETY COMMITTEE

Rule 79 Safety Committee :

(1) In every factory

Rule prescribed
under sections
41 and 41 G

- (a) Wherein 250 or more workers are ordinary employed or
 - (b) Which carried on any process or operation declared to be dangerous under Section 87 of the Act; or
 - (c) Which carried on 'hazardous process' a defined under Section 2(cb) of the Act; there shall be a Safety Committee.
- (2) The representatives of the management on Safety Committee shall includes :
- (a) A senior official, who by his position in the organisation can contribute effectively to the functioning of the Committee, shall be the Chairman ;
 - (b) A Safety Officer and a Factory Medical Officer, wherever applicable and the Safety Officer in such a case shall be the Secretary of the Committee;
 - (c) A Representative each from the production, maintenance and purchase departments.
- (3) The Workers' Representatives on this Committee shall be elected by the workers.
- (4) The tenure of the Committee shall be two years.
- (5) Safety Committee shall meet as often as necessary, but at least once in every quarter. The minutes of the meeting shall be recorded and produced to the Inspector on demand.

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- (6) Safety Committee shall have the right to :-
- (a) ask for necessary information concerning health and safety of the workers.
 - (b) seek any relevant information concerning health and safety of the workers.
- (7) Function and duties of the Safety committee shall include :-
- (a) assisting and co-operating with the management in achieving the aims and objectives outlined in the 'Health and Safety Policy' of the occupier;
 - (b) dealing with all matters concerning health, safety and environment and to arrive at practicable solutions to problems encountered;
 - (c) creating safety awareness amongst all workers;
 - (d) undertaking educational, training and promotional activities;
 - (e) deliberating on reports of safety environmental and occupational health surveys, emergency plans, safety audits, risk assessment and implementation of the recommendations made in the reports;
 - (f) carrying out health and safety surveys and identify causes of accidents;
 - (g) looking into any complaint made on the likelihood of an imminent danger to the safety and health of the workers and suggest corrective measures; and
 - (h) reviewing the implementation of the recommendations made by it.
- (8) Where owing to the size of the factory, or any other reason, the functions referred to in Sub Rule (7) cannot be effectively carried out by the Safety Committee, it may establish sub-committees as may be required to assist it.

**ATIONAL THERMAL POWER CORPORATION LTD.
(CORPORATE CONTRACTS & MATERIALS DIVISION)**

**ANNEXURE - 1 to
Circular NO. 432**

**AMENDMENT TO CONDITIONS SUPPLY CUM ERECTION
(IDA) DOCUMENT CODE NO. DC (02-934-MAY' 88)**

31.0 WORK AND SAFETY REGULATIONS :

31.1 The Contractor shall ensure proper safety of all the workmen, materials plant and equipments belonging to him or to NTPC or to others, working at the site. The Contractor shall also be responsible for provision of all safety notices and safety equipment required both by the relevant legislations and the Engineer as he may deem necessary.

31.2 The Contractor will notify in advance to the Engineer of his intention to bring to the site any container filled with liquid or gaseous fuel or explosive or petroleum substance or such chemicals which may involve hazards. The Engineer shall have the right to prescribe the conditions, under which such container is to be stored, handled and used during the performance of the works and the contractor shall strictly adhere to and comply with such instructions. The Engineer shall have the right at his sole discretion to inspect for which material in the container is required to be used and if in his opinion, its use is not safe, he may forbid its use. No claim due to such prohibition shall be entertained by the owner and the owner shall not entertain any claim of the Contractor towards additional safety provisions/conditions to be provided for/constructed as per the Engineer's instructions.

Further, any such decision of the Engineer shall not, in any way, absolve the Contractor of his responsibilities and in case, use of such a container or entry thereof into the site area is forbidden by the Engineer, the Contractor shall use alternative methods with the approval of the Engineer without any cost implication to NTPC or extension of work schedule.

31.3 Where it is necessary to provide an/or store petroleum products or petroleum mixtures and explosives, the Contractor shall be responsible for carrying out such provision and/or storage in accordance with the rules and regulations laid down in Petroleum Act 1914, Explosives Act 1984, and petroleum and carbide of Calcium Manual published by the Chief Inspector of Explosives of India. All such storage shall have prior approval of the Engineer. In case, any approvals are necessary from the Chief Inspector (Explosives) or any statutory authorities, the Contractor shall be responsible for obtaining the same.

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- 31.4 All equipments used in constuction and erection by Contractor shall meet Indian/ International Standards and where such standards do not exist, the Contractor shall ensure these to be absolutely safe. All equipments shall be strictly operated and maintained by the Contractor in accordance with manufacturer's operation Manual and safety instrutions and as per Guidelines / Rules of NTPC in this regard.
- 31.5 Periodical Examinations and all tests for all lifting/hosting equipment & tackles shall be carried out in accordance with the relevant provisions of Factories Act 1948, Indian Electricity Act 1910 and associated Laws/Rules in force from time to time. A register of such examinations and tests shall be properly mainained by the contractor and will be promptly produced as and when desired by Engineer or by the person authorised by him.
- 31.6 The Contractor shall be fully responsible for the safe storage of his nd his sub-contractor's radio-active sources in accordance with BARC/DAE Rules and other applicable provisions. All precautionary measures stipulated by BARC/DAE in connection with use, storage and handling of such material will be taken by Contractor.
- 31.7 The Contractor shall provide suitable safety equipment of prescribed standard to all employees and workman according to the need, as may be directed by Engineer who will also have right to examine these safety equipments to determine their suitability, reliability, acceptability and adaptability.
- 31.8 Where explosives are to be used, the same shall be used under the direct control and supervision of an expert, experience, qualified and competent person strictly in accordance with the code of practices/Rules framed under Indian Explosives Act pertaining to handling, storage and use of explosives.
- 31.9 The Contractor shall provide safe working conditions to all workmen and employees at the Site including safe means of access, railings, ladders, scaffoldings etc. The scaffoldings shall be erected under the control and Supervision of an experienced and competent person. For erection good and standard quality of material only shallbe used by the Contactor.
- 31.10 The Contactor shall not interfere or disturb electric fuses, wiring and other electrical equipment belonging to the Owner or other contractors under any circumstances, whatsoever, unless expressly, permitted in writing by NTPC to handle such fuses, wiring or electrical equipment.
- 31.11 Before the Contractor connects any electrical appliances to anyplug or socket belonging to the other Contractor or Owner, he shall :
- a) satisfy the Engineer that the appliances is in good working condition;

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- b) inform the Engineer of the maximum current rating, voltage and phases of the appliances;
- (c) obtain permission of the Engineer detailing the sockets to which the appliances may be connected.
- 31.12 The Engineer will not grant permission to connect until he is satisfied that :
- a) The appliance is in good condition and is fitted with a suitable plug ;
- b) Two appliance is fitted with a suitable cable having two earth conductors, one of which shall be an earthed metal sheath surrounding the cores.
- 31.13 No electric cable in use by the Contractor/Owner will be disturbed without prior permission. No weight of any description will be imposed on any cable and no ladder or similar equipment will rest against or attached to it.
- 31.14 No repair work shall be carried out on any live equipment. The equipment must be declared safe by the Engineer and a permit to work shall be issued by the Engineer. The Contractor before any repair work is carried out by while working on electric lines/equipments whether live or dead, suitable type and sufficient quantity of tools will have to be provided by Contractor to electricians/ workman/officers.
- 31.15 The Contractors shall employ necessary number of qualified, full time Electricians/ Electrical Supervisors to maintain his temporary electrical installation.
- 31.16 The Contractor employing more than 250 workmen whether temporary, casual, probationer, regular or permanent or an contract, shall employ atleast one full time officer exclusively as safety officer to supervise safety aspects of the equipments and workmen who will co-ordinate with the Project Safety Officer. In case of work being carried out through sub-contractors, the sub-contractors workmen/ employees will also be considered as the Contractor's employee/workmen for above purpose. The name and address of such Safety Officer of Contractor will be promptly informed in writing to Engineer with a copy to Safety Officer Incharge before the starts work or immediately after any change of the incumbent is made during currency of the contract.
- 31.17 In case any accident occurs during the construction/erection of the associated activities undertaken by the Contractor thereby causing any minor or major or fatal injury to his employees due to any reason, whatsoever, it shall be the responsibility of the Contractor to promptly inform the same to NTPC's Engineer in prescribed form and also to all the authorities envisaged under the applicable laws.

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- 31.18 The Engineer shall have the right at his sole discretion to stop the work, if in his opinion the work is being carried out in such a way that it may cause accidents and endanger the safety of the persons and/or property, and/or equipments. In such cases, the Contractor shall be informed in writing about the nature of hazards and possible injury/accident and he shall comply to remove short-comings promptly. The Contractor after stopping the specific work, can, if felt necessary, appeal against the order of stoppage of work to the General Manager of the project within 3 days of such stoppage of work and decision of project GM of this respect shall be conclusive and binding on the Contractor.
- 31.19 The Contractor shall not be entitled for any damages/compensation for stoppage of work due to safety reasons as provided in para 31.18 above and the period of such stoppage for work will not be taken as an extension of time for completion of work and will not be the ground for waiver of levy of liquidated damages.
- 31.20 The Contractor shall follow and comply all NTPC Safety Rules, relevant provisions of applicable laws pertaining to the safety of workmen, employees, plant and equipment as may be prescribed from time to time without any demur, protest or contest or reservation. In case of any unconformity between statutory requirement and NTPC Safety Rules referred above, the later shall be binding on the contractor unless the statutory provisions are more stringent.
- 31.21 If the contractor fails in providing safe working environment as per NTPC Safety Rules or continues the work even after being instructed to stop work by the Engineer as provided in para 31.18 above, the Contractor shall promptly pay to NTPC, on demand by the Owner compensation at the rate of Rs.5,000/- per day or part thereof till the instructions are complied with and so certified by the Engineer. However, in case of accident taking place causing injury, to any individual, the provisions contained in para 31.22 shall also apply in addition to compensation mentioned in this para.
- 31.22 If the Contractor does not take all safety precautions and/or fails to comply with the Safety Rules as prescribed by NTPC or under the applicable law for the Safety of the equipment and plant and for the safety of personnel and the Contractor does not prevent hazardous conditions which cause injury to his own employees or employees of other contractors or NTPC employees or any other person who are at site or adjacent thereto, the Contractor shall be responsible for payment of compensation to NTPC as per the following schedule :-
- | | | | |
|----|--|---------------------------|--|
| a) | Fatal injuries or accident causing death | Rs. 1,00,000/- per person | These are applicable for death/ injury to any person |
| b) | Major injuries or accident causing 25% or more permanent disablement to workmen or employees | Rs. 20,000/- per person | |

Permanent disablement shall have same meaning as indicated in Workmen's Compensation Act. The compensation mentioned above shall be in addition to the compensation payable to the workmen/employees under the relevant provisions of the Workmen's Compensation Act and Rules framed thereunder or any other applicable laws as applicable from time to time. In case the Owner is made to pay such Compensation then the Contractor is liable to reimburse the Owner such amount in addition to the Compensation indicated above.

- 31.23 If the Contractor observes all the Safety Rules and Codes, Statutory Laws and Rules during the currency of Contract awarded by the Owner and no accident occurs then NTPC may consider the performance of the Contractor and award suitable 'ACCIDENT FREE SAFETY MERITORIOUS AWARD' as per scheme as may be announced separately from time to time.

**ANNEXURE - I
(TO CIRCULAR NO. 493
DTD. 25.6.92)**

**AMENDMENTS TO CLAUSE NO. 16.7.1 (MODEL RULES FOR LABOUR WELFARE)
AND CLAUSE NO. 16.7.2 (SAFETY CODE) - GENERAL CONDITIONS OF
CONTRAT FOR CIVIL WORKS**

S.No.	Clause Reference	Existing Provision	Amendment
1	16.7.1	Model Rules for Labour Welfare : The Contractor shall at his own expense comply with or cause to be complied with Model Rules for Labour Welfre as appended to these Conditions or rules framed by Government from time to time for the protection of health and for making sanitary arrangements for workers employed directly or indirectly on the Works. In case the Contractor fals to make arrangements as aforesaid the Engineer-in-Charge shall be entitled to do so and recover the cost thereof from the Contractor	Add the following as Clause no.16.7.1 (i) after the Clause no. 16.7.1 given alongside: Failure to comply with Model Rules for Labour Welfare and/or provisions relating to report on accidents and/or to grant of maternity benefits to female workers shall make the Contractor liable to pay to the Corporation as Liquidated damages an amount of Rs.1000/- (Rupees one thousand only) for each default or materially incorrect statement. The decision of the Engineer-in-Charge in such matters based on reports from the Inspecting Officers as defined in the Contractors Labour Regulations as appended to these conditions shallbe final and binding and deductions for recovery of such liquidated damages will be made from any amount payable to the Contractor.
2.	16.7.2	Safety Code : The Contractor shall at his own exenses arrange for the safety provisions as appended to these conditions or as required by the Engineer-in-Charge, in respect of alllabour directly or indirectly employed for performance of the works and shallprovide all facilities in connection therewith. In case the Contractor fails to make arrangements and provide necessary facilities as aforesaid, the Engineer-in-Charge shall be entitled to do so and recover the cost thereof from the Contractor.	Delete the entire existing Clause 16.7.2 given alongside.

S.No.	Clause Reference	Existing Provision	Amendment
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(i) Failure to comply with Model Rules for Labour welfare provisions relating to Safety Code or the provisions relating to report on accidents and to grant of maternity benefits to female workers shall make the Contractor liable to pay to the Corporation as liquidated damages an amount not exceeding Rs.50.00 for each default or materially incorrect statement. The decision of the Engineer-in-Charge in such matters based on reports from inspecting Officers as defined in the Contractor's Labour Regulation as appended to these conditions shall be final and binding and deductions for recovery of such liquidated damages may be made from any amount payable to the Contractor.

Add the following new Clause as Clause No. 16.7.2

16.7.2 : SAFETY PROVISIONS

(i) A Contractor employing more than 250 workmen whether temporary, casual, probationer, regular or permanent of on contract, shall employ at least one full time officer exclusively as Safety Officer to supervise safety aspects of the equipment and workmen, who will coordinate with the Project Safety officer. In case of work being carried out through sub-contractor's, the sub-contractor's workmen/employees will also be considered as the Contractor's employees/workmen for the above purpose. The name and address of such Safety Officer of Contractor will be promptly informed in writing to Engineer-in-Charge with copy to Safety Officer-Incharge of NTPC before he starts work or immediately after any change of incumbent is made during currency of the Contract.

S.No.	Clause Reference	Existing Provision	Amendment
			<p>(ii) In case any accident occurs during the construction/erection or other associated activities undertaken by the Contractor thereby causing any minor or major or fatal injury to his employees due to any reason, whatsoever, it shall be the responsibility of the Contractor to promptly inform the same to NTPC's Engineer in charge in prescribed form and also to all the authorities envisaged under the applicable laws.</p> <p>(iii) the Engineering in charge shall have the right at his sole discretion to stop the work, if in his opinion the work is being carried out in such a way that it may cause accidents endanger the safety of the persons and/or property and/or equipment. In such cases, the Contractor shall be informed in writing about the nature of hazards and possible injury/accident and he shall comply to remove short-comings promptly. The Contractor after stopping the specific work can, if felt necessary, appeal against the order of stoppage of work to the Engineer-in-Charge within 3 days of such stoppage of work and the decision of the engineer-in-charge in this respect shall be conclusive and binding on the contractor.</p> <p>(iv) The Contractor shall not be entitled for any damages/compensation for stoppage of work due to safety reasons as provided in para 16.7.2 (iii) above and the period of such stoppage of work will not be taken as an extension of time for completion of work and will not be the ground for waiver of levy of liquidated damages.</p>

S.No.	Clause Reference	Existing Provision	Amendment
			<p>(v) The Contractor shall follow and comply with all NTPC Safety Rules, releant provisions of applicable laws pertaining to the safety of workmen, employees, plant and equipment as may be prescribed from time to time without any demur, protest or contest or reservation. In case of any non-conformity between statutory requirement and NTPC Safety Rules referred to above, the later shall be binding onthe Contractor unless the statutory provisions are stringent.</p> <p>(vi) If the Contractor fails in providing safe working environment as per NTPC Safety Rules or continues the work even fter being instructed to stop work by the Engineer-in-Charge as provided in para 16.7.2 (iv) aboe the Contractor shall promptly pay to NTPC, on demand by the Owner compensation at the rate of Rs.5000/ - per day or part thereof tillthe instruction are complied with and so certified by the Engineer-in-Charge. However, in cae of accident taking place causing injury, to any individual, the provisions contained in para 16.7.2 (vii) below shall also apply in addition to compensation mentioned in this para.</p> <p>(vii) If the Contractor does not take all safety precautions and/or fails to comply with the Safety Rules as prescribed by NTPC or under the applicable law for the safety of the equipment and plant and for the safety of personnel and the Contractor does not prevent hazardous conditions which cause injury to his own employees or employees of other Contractors, or NTPC employees or any other person who are at Site or adjacent thereto, the Contractor shall be responsible for payment of compensation to NTPC as per the following schedule:</p>

S.No.	Clause Reference	Existing Provision	Amendment
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- (a) Fatal injury or accident causing death : Compensation @ two percent (2%) of Contract value or Rs.100,000 (Rupees one lakh only) whichever is less, per person
- (b) Major injuries or accident causing 25% or more permanent disablement to workmen or employees : Compensation @ two percent (1/2%) of Contract value or Rs.100,000 (Rupees twenty thousand) only whichever is less, per person

Note: These compensations are applicable for death/injury to any person whatsoever.

Permanent disablement shall have same meaning as indicated in Workmen Penalty Act. The compensation mentioned above shall be in addition to the compensation payable to the workmen/employees under the relevant provisions of the Workmen's Compensation Act and rules framed thereunder or any other applicable laws as applicable from time to time. In case the owner is made to pay such compensation then the contractor is liable to reimburse the owner such amount in addition to the penalty the compensation indicated above.

- viii) If the Contractor observes all the safety rules and codes, statutory laws and rules during the currently of the Contract awarded by the Owner and no accident occurs then NTPC may consider the performance of the Contractor and award suitable "ACCIDENT FREE SAFETY MERITORIOUS AWARD" as per scheme as may be announced separately from time to time.

CORPORATE SAFETY DEPARTMENT

SAFETY CLAUSES IN GENERAL CONDITIONS OF CONTRACT

I. General

- i) The contractor shall comply with all the requirements of “*The Building and Other Construction Workers (Regulation of Employment & Conditions of Service) Act,*” 1996 and its Central Rule 1998 / State Rules and any other statutory requirements as applicable.
- ii) The Contractor shall follow NTPC Safety Rules as issued from time to time with respect to safety in construction & erection.
- iii) The contractor shall have the approved Safety, *Health and Environment (SHE)* Policy in respect of Safety and health of Building Workers and it shall be circulated widely and displayed at conspicuous place in Hindi and local language understood by the majority of the workers. A copy of the safety policy should be submitted to Engineer in charge.
- iv) The contractor shall submit the safety plan comprising of methods to implement the Safety Policy/ Rules, Risk assessment and ensuring Safety at work areas, Safety audits, inspections and its compliance, Supervision and responsibility to ensure Safety at various levels, Safety training to employees, review of Safety and accident analysis, ensure Health and Safety Procedures to prevent accidents to Engineer I/c for approval as per the format of Safety plan as annexed at Annexure – I.
- v) The Contractors shall ensure proper safety of all the workmen, materials, plant and equipment belonging to him or to the Employer or to others, working at the Site.
- vi) All equipments used in construction and erection by the contractor shall meet BIS / International Standards and where such standards do not exist, the Contractor shall ensure these to be absolutely safe. All equipments shall be strictly operated and maintained by the contractor in accordance with manufacturer’s operation manual. The contractor should also follow Guidelines / Rules of the Employer in this regard.
- vii) The Contractors shall provide suitable latest Personal Protective Equipments of prescribed standard to all their employees and workmen according to the need. The Engineer I/c shall have the right to examine these safety equipments to determine their suitability, reliability, acceptability and adaptability. The contractor should also ensure these before their use at worksite.
- viii) The Contractor shall provide safe working conditions to all workmen and employees at his workplace including safe means of access, railings, stairs, and ladders, scaffolding, work platforms, toe boards etc. The scaffoldings shall be erected under the control and supervision of an experienced and competent person. For erection

of scaffolds, access, work platforms etc. shall be good and the contractor shall use standard quality of material.

- ix) The Contractor shall follow and comply with all the Safety Rules, standards, code of practices of NTPC and relevant provisions of applicable laws pertaining to the safety of workmen, employees, plant and equipment as may be prescribed from time to time without any protest or contest or reservation. In case of any unconformity between statutory requirement and the Safety Rules of the Employer referred above, the latter shall be binding on the Contractor unless the statutory provisions are more stringent. As and when required he can refer / obtain copy of NTPC safety documents as stated above.
- x) The contractor shall have his own arrangements with nearby hospitals for shifting and treatment of sick and injured.

The *medical examination of the workers* employed in hazardous areas shall be conducted as per Rule 223 Of The Building and Other Construction Worker (Regulation of Employment and Condition of Service) Central Rule 1998 Their health records shall be maintained accordingly and to be submitted to Engineer I/c when asked for. If any worker found suffering from occupational health hazard, the worker should be shifted to suitable place of working and properly treated under intimation to Engineer I/c. The medical fitness certificate to be submitted to Engineer (I/c).

- xi) *First Aid boxes* equipped with requisite articles as specified in the Rule 231 of The Building and Other Construction Worker (Regulation of Employment and Condition of Service) Central Rule 1998 shall be provided at construction sites for the use of workers. Training has to be provided on first aid to workmen & office bearers working at site.

a. Emergency Action Plan

The contractor shall prepare an emergency action plan approved by his competent authority to handle any emergency occurred during construction work. Regular mock drills shall be organized to practice this emergency plan. The Emergency Action Plan should be widely circulated to all the employees and suitable infrastructure shall be provided to handle the emergencies.

b. Flood Monitoring (Hydro Projects)

The contractor shall take necessary measures for monitoring of flood / water levels and develop a forewarning system to evacuate people to safer places well before the flood occurs. For this purpose he may maintain liaison with meteorological department and NTPC. The contractor shall make suitable communication and transporting system to rescue the workers to safer places. The contractor shall provide suitable shelters, food, drinking water and other requisite facilities till they are brought back to their colonies and normalcy is restored.

c. Scaffolding

The contractor shall take all precautions to prevent any accidental collapse of scaffolding or fall of persons from scaffolding. The contractor should ensure that scaffolding are designed by a competent person and its erection and repairs should be done under the expert supervision. The scaffolding shall meet the required strength and other requirements for the purpose for which the scaffold is erected. The material used for scaffold should conform to the BIS / International standards.

d. Opening

The contractor shall ensure that there is no opening in any working platform/any floor of the building, which may cause fall of workers or material. Whenever an opening on a platform/any floor of the building is unavoidable, the opening should be suitably fenced and necessary measures for protection against falling objects or building workers from such platform are taken by providing suitable safety nets, safety belts or other similar means.

e. Explosives

The contractor shall take all precautions while handling, using, storing or transporting of all explosives. Before usage of any explosive necessary warning / danger signals be erected at conspicuous places to warn the workers and general public. The contractor should strictly ensure that all measures and precautions required to be complied for use, handling, storing or transportation of explosives under the rules framed under the Explosives Act, 1884.

II. Cofferdam and Caissons

The contractor shall ensure that the cofferdam and caissons are of good construction and adequate strength. The cofferdam and caissons should be provided with adequate means for workers to reach safely at the top of such dams in the event of an inrush of water. The workers should be allowed to work in a cofferdam or caisson only after inspection and found safe by engineer (I/c). Such inspection report is to be maintained in a Register.

Where the workers are employed to work in a compressed air environment at the work site of coffer dam or caissons, a construction Medical Officer assisted by a Nurse or trained first aid attendant should be available at all the times during such work.

III. Fencing of Machinery

The contractor shall provide suitable fencing or guard to all dangerous and moving parts of machinery.

The contractor shall not allow any of the employees to clean, lubricate, repair, adjust or examine during machinery in motion, which may cause injury to the person.

IV. Carrying of Excessive Weight by a Worker

The worker shall not be allowed to lift by hand or carry over his head, back or shoulder more than the maximum limit set by the prescribed rules for the construction Workers.

V. Dangerous and Harmful Gases / Equipment

The contractor shall ensure that the workers are not exposed to any harmful gases during any construction activity including excavation, tunneling, confined spaces etc.

The contractor should not allow any worker to go into the confined space unless it is certified by Engineer (I/c) to be safe and fit for the entry to such work place. Proper record and work permits should be followed to carry out such works.

VI. Overhead Protection

The contractor shall ensure that any area exposed to risk of falling materials, articles or objects is roped off or cordoned off or otherwise suitably guarded from inadvertent entry of any person .

Wherever there is a possibility of falling of any material, equipment or construction workers while working at heights, a suitable and adequate safety net should be provided. The safety net should be in accordance with BIS Standards.

VII. Working at Heights

All working platforms, ways and other places of construction work shall be free from accumulations of debris or any other material causing obstructions and tripping.

Wherever workers are exposed to the hazard of falling into water, the contractor shall provide adequate equipment for saving the employees from drowning and rescuing from such hazards. The contractor shall provide boat or launch equipped with sufficient number of life buoys, life jackets etc. manned with trained personnel at the site of such work.

Every opening at elevation from ground level through which a building worker, vehicle, material equipment etc. may fall at a construction work shall be covered and/or guarded suitably by the contractor to prevent such falls.

Wherever the workers are exposed to the hazards of falling from height, the contractor shall provide full harness safety belts fitted with fall arresting systems to all the employees working at higher elevations and life line of 8 mm diameter wire rope with turn buckles for anchoring the safety belts while working or moving at higher elevations. Safety nets shall also be provided for saving them from fall from heights and such equipment should be in accordance with BIS standards.

Wherever there is a possibility of falling of any material, equipment or construction workers while working at heights, a suitable and adequate safety net should be provided. The safety net should be in accordance with BIS Standards.

The contractor shall provide standard prefabricated ladders on the columns where the workers are required to use them as an access for higher elevations till permanent staircase is provided. The workers shall be provided with safety belts fitted with suitable fall arresting system (Fall arrestors) for climbing/getting down through ladders to prevent fall from height.

VIII. Handling of Hazardous Chemicals

The Contractor will notify well in advance to the Engineer I/c of his intention to bring to the Site any container filled with liquid or gaseous fuel or explosive or petroleum substance or such chemicals which may involve hazards. NTPC shall have the right to prescribe the conditions, under which such container is to be stored, handled and used during the performance of the works and the Contract shall strictly adhere to and comply with such instructions. The Engineer I/c shall have the right at his sole discretion to inspect any such container or such construction plant / equipment for which material in the container is required to be used and if in his opinion, its use is not safe, he may forbid its use. No claim due to such prohibition shall be entertained by NTPC and NTPC shall not entertain any claim of the Contractor towards additional safety provisions / conditions to be provided for / constructed.

Further, any such decision of the Engineer I/c shall not, in any way, absolve the Contractor of his responsibilities and in case, use of such a container or entry thereof into the Site area is forbidden by NTPC, the Contractor shall use alternative methods with the approval of the NTPC without any cost implication to the NTPC or extension of work schedule.

Where it is necessary to provide and / or store petroleum products or petroleum mixtures and explosives, the Contractor shall be responsible for carrying-out such provision and / or storage in accordance with the rules and regulations laid down in Petroleum Act 1934, Explosives Act 1948, and Petroleum and Carbide of Calcium Manual published by the Chief Inspector of Explosives of India. All such storage shall have prior approval of the Engineer I/c. In case any approvals are necessary from the Chief Inspector (Explosives) or any statutory authorities, the Contractor shall be responsible for obtaining the same.

The Contractor shall be fully responsible for the safe storage of his and his Sub-contractor's radio-active sources in accordance with BARC/DAE (Bhabha Atomic Research Centre/ Department of Atomic Energy, Govt. of India) Rules and other applicable provisions. All precautionary measures stipulated by BARC/DAE in connection with use, the contractor would take storage and handling of such material.

The contractor shall provide suitable personal protective equipments to the workers who are handling the hazardous and corrosive substances including alkalis and acids.

As a precautionary measure the contractor should keep the bottles filled with distilled water in cupboard / Boxes near work place for emergency eye wash by worker exposed to such hazardous chemicals.

IX. Eye Protection

The contractor shall provide suitable personal protective equipment to his workmen depending upon the nature of hazards and ensure their usage by the workers engaged in operations like welding, cutting, chipping, grinding or similar operations which may cause injuries to his eyes.

X. Excavation

The contractor shall take all necessary measures during excavation to prevent the hazards of falling or sliding material or article from any bank or side of such excavation which is more than one and a half meter above his footing by providing adequate piling, shoring, bracing etc. against such bank or sides.

Adequate and suitable warning signs shall be put up at conspicuous places at the excavation work to prevent any persons or vehicles falling into the excavation trench. No worker should be allowed to work where he may be stuck or endangered by excavation machinery or collapse of excavations or trenches.

XI. Electrical Hazards

The contractor should ensure that all electrical installations at the construction work comply with the requirements of latest electricity acts / rules.

The contractor shall take all adequate measures to prevent any worker from coming into physical contact with any electrical equipment or apparatus, machines or live electrical circuits which may cause electrical hazards during the construction work. The contractor shall provide the sufficient ELCBs / RCCBs for all the portable equipments, electrical switchboards, distribution panels etc. to prevent electrical shocks.

The contractor should ensure use of single / double insulated hand tools or low voltage i.e., 110 volts hand tools.

The contractor should also ensure that all temporary electrical installations at the construction works are provided with earth leakage circuit breakers.

XI. Vehicular Traffic

The contractor should employ vehicle drivers who hold a valid driving license under the Motor Vehicles Act, 1988.

XII. Lifting Appliances, Tools & Tackles, Lifting Gear And Pressure Plant & Equipment etc.

The contractor shall ensure all the lifting appliances, tools & tackles including cranes etc., lifting gear including fixed or movable and any plant or gear, hoists, Pressure Plant and equipment etc. are in good condition and shall be examined by competent person and only certified shall be used at sites. Periodical Examination and the

tests for all lifting / hoisting equipment & tackles shall be carried out. A register of such examinations and tests shall be properly maintained by the Contractor and will be promptly produced as and when desired by the Engineer I/c or by the person authorized by him.

XIII. Excessive Noise, Vibration

The contractor shall take adequate measures to protect the workers against the harmful effect of excessive noise or vibration. The noise should not exceed the limits prescribed under the concerned rules, Noise Pollution (Regulation and Control) Rules, 2000.

XIV. Electrical Installations

- I The Contractor shall not interfere or disturb electric fuses, wiring and other electrical equipment belonging to the Employer or other contractors under any circumstances, whatsoever, unless expressly permitted in writing by the Engineer I/c to handle such fuses, wiring or electrical equipment.

Before the Contractor connects any electrical appliances to any plug or socket belonging to the other contractor or the NTPC, he shall

- 1.1 Satisfy the Engineer I/C that the appliance is in good working condition;
- 1.2 Inform the Engineer I/C of the maximum current rating, voltage and phases of the appliances;
- 1.3 Obtain permission of the Engineer I/C detailing the sockets to which the appliances may be connected.

The Engineer I/C will not grant permission to connect until he is satisfied that:

The appliance is in good condition and is fitted with suitable plug; having earth connection with the body.

Wherever armored / metallic sheathed multi core cable is used, the same armored / sheathed should be connected to earth.

- 1.4 No repair work shall be carried out on any live equipment. The Engineer I/c must declare the equipment safe and a permit to work shall be issued by the NTPC / contractor as the case may be to carry out any repair / maintenance work. While working on electric lines / equipments whether live or dead, suitable type and sufficient quantity of tools will have to be provided by the contractor to electricians / workmen / Officers.
- 1.5 The contractor shall employ necessary number of qualified, full time Electricians / Electrical Supervisors to maintain his temporary electrical installation.

The installations are provided with suitable ELCBs and RCCBs wherever required.

XV. Safety Organisation

- I The contractor employing more than 250 workmen whether temporary, casual, probationary, regular or permanent shall employ at least one full time safety officer exclusively to supervise safety aspects of the equipments and workmen, who will coordinate with the NTPC Safety Officer. Further requirement of safety officers, if any, shall be guided by Rule 209 of The Building and Other Construction Worker (Regulation of Employment and Conditions of Service) Central Rule 1998. In case the work is being carried out through subcontractor, the employees / workmen of the sub contractor shall also be considered as the contractor's employees/workmen for the above purpose.

In case of contractor deploying less than 250 workmen he should designate one of his Engr / supervisor or the contractor himself (if he is directly supervising the work) as safety officer in addition to his existing responsibilities. The Engr./ supervisor should get atleast 2days safety training from any reputed organization or from NTPC before resuming the work. If already trained in past the declaration along with trg. certificate to be furnished to NTPC safety officer.

- II The name and address of such Safety Officer of the Contractor will be promptly informed in writing to the EIC with a copy to the Project Safety Officer before he starts work or immediately after any change of the incumbent is made during currency of the Contract.

XVI. Reporting of Accident and Investigation

- I In case any accident occurs during the construction / erection or other associated activities undertaken by the Contractor thereby causing any near miss, minor or major or fatal injury to his employees due to any reason, whatsoever, it shall be the responsibility of the Contractor to promptly inform the same to the Engineer I/C, NTPC Safety Officer with a copy to NTPC Head of Project in the prescribed form and also to all the authorities envisaged under the applicable laws.

XVII. Right to stop Work

- I The Engineer I/C shall have the right at his sole discretion to stop the work, if in his opinion the work is being carried out in such a way that it may cause accidents and endanger the safety of the persons and / or property, and / or equipments. In such cases, the contractor shall be informed in writing about the nature of hazards and possible injury / accident and he shall comply to remove shortcomings promptly. The Contractor after stopping the specific work can, if felt necessary appeal against the order of stoppage of work to the Project Manager within 3 days of such stoppage of work and decision of the Project Manager in this respect shall be conclusive and binding on the Contractor.
- II The Contractor shall not be entitled for any damages / compensation for stoppage of work, {Sub-Clause XVIII (I)} due to safety reasons and the period of such stoppage of work shall not be taken as an extension of time for Completion of the Facilities and will not be the ground for waiver of levy of liquidated damages.

XVIII. Fire Protection

The contractor shall provide sufficient fire extinguishers at place /s of work. The fire extinguishers shall be properly maintained as per relevant BIS Standards. The employees shall be trained to operate the fire extinguishers / equipment.

XIX. Penalties

- I If the Contractor fails in providing safe working environment as per the Safety Rules of NTPC or continues the work even after being instructed to stop the work by the Engineer I/C as provided in Clause XVIII (1) above, the Contractor shall be penalized at the rate of Rs. 25,000/- per day or part thereof till the instructions are complied with and so certified by the Engineer I/C. However, in case of accident, the provisions contained in Sub-Clause XX (II) below shall also apply in addition to the penalties mentioned in this sub-clause.

- II If the Contractor does not take all safety precautions and / or fails to comply with the Safety Rules as prescribed by the Employer or under the applicable law for the safety of the plant and equipment and for the safety of personnel and the contractor does not prevent hazardous conditions which cause injury to this own employees or employees of other contractors, or NTPC's employees or any other person who are at the Site or adjacent thereto, the Contractor shall be responsible for payment of penalty to NTPC as per the following schedule:-
 - a) Fatal injury or accident causing death Penalty @10% of contract value or Rs. 5,00,000/- per person, which ever is less.

These are applicable for death to any person whosoever.

- b) Major injuries or accident causing 25% or more permanent disablement to workmen or employees Penalty @2 1/2 % of contract value or Rs. 1,00,000/- per person which ever is less

Permanent disablement shall have the same meaning as indicated in The Workmen's Compensation Act' 1923. The penalty mentioned above shall be in addition to the compensation payable to the workmen / employees under the relevant provisions of the Workmen's Compensation Act' 1923 and rules framed there under or any other applicable laws as applicable from time to time.

- III If any contractor worker found working without using the safety equipment like safety helmet, safety shoes, safety belts, etc. or without anchoring the safety belts while working at height the Engineer I/c / Safety Officer of NTPC shall have the right to penalize the contractor for Rs. 200/- per person per day and such worker shall be sent out of the workplace immediately and shall not be allowed to work on that day. Engineer I/c / Safety Officer of NTPC will also issue a notice in this regard to the contractor.

IV If two or more fatal accidents occur at same NTPC site under the control of contractor during the period of contract and he has

(1) not complied with keeping adequate PPEs in stock or

(2) defaulted in providing PPEs to his workmen

(3) not followed statutory requirements / NTPC safety rules

(4) been issued warning notice/s by NTPC head of the project on non observance of safety norms

(5) not provided safety training to all his workmen,

the contractor can be debarred from getting tender documents in NTPC for two years from the date of last accident.

The safety performance will also be one of the overriding criteria for evaluation of overall performance of the contractors by NTPC. The contractor shall submit the accident data including fatal / non-fatal accidents for the last 3 years where he has undertaken the construction activities Projects-wise along with the tender documents. This will also be considered for evolution of tender documents. If the information given by the contractor found incorrect, his contract will be liable to be terminated.

XX. Award

If the Contractor's performance on safety front is found satisfactory i.e. without any fatal/reportable accident in the year of consideration; he may be considered for suitable award "ACCIDENT FREE SAFETY MERITORIOUS AWARD" as per scheme of the employer.

Safety Plan

01. Safety Policy of the Contractor to be enclosed
02. When was the Safety Policy last reviewed
03. Details of implementation procedure / methods to implement Safety Policy / Safety Rules
04. Name, Qualification, experience of Safety Officer
05. Review of Accidents Analysis Method, Methods to ensure Safety and Health
06. Unit executive responsible to ensure Safety at various levels in work area
07. List of employees trained in safety employed before execution of the job. Give the details of training
08. Safety Training Targets, Schedules, methods Adopting to providing safety training to all employees
09. Details of checklist for different jobs / work and responsible person to ensure compliance (copy of checklist to be enclosed)
10. Regular Safety Inspection Methods and Periodicity and list of members to be enclosed
11. Risk Assessment, Safety Audit by Professional Agencies, Periodicity
12. Implementation of Recommendations of Audit / Inspections. Procedures for implementation and follow up
13. Provision for treatment of injured persons at work site
14. Review of overall safety by top Management and Periodicity
15. System for Implementation of Statutory legislations
16. Issue of PPEs to employees, Periodicity / stock on hand etc.

Signature
Head of the Organisation
with date & stamp

I. EXCAVATION

1. Carrying out ground investigations (including soils and services etc.)
2. Planning for shoring and work system.
3. Providing means for removal of water and soil.
4. Carrying out site inspection and prevention of excessive loading from the excavation edges.
5. providing Gangways for crossing trenches
6. Providing safe access in excavations
7. Ensuring no children are left at excavation sites.
8. Providing fencing and warning lights
9. Providing means for rescue in the event of earth collapse.
10. Providing effective supervision.

II. PILE DRIVING

1. Inspecting piling machines for firm grounding
2. Carrying out inspection of machines for machine guarding
3. Taking precautions in hoisting piles into position
4. Providing tight fitting clothes and personal protective equipment's to employees.

III. SCAFFOLDS

1. Installing according to scaffold requirements
2. Inspecting by competent person
3. Ensuring no overloading of scaffolds/platforms
4. Securing scaffolds with bracing and ties

-
5. Ensuring scaffolds free from defects
 6. Inspecting working platforms of the scaffolds
 7. Inspecting both guard rails and toe boards
 8. Ensuring spacing between guard rails are properly maintained as per standards.
 9. Providing means of access to working platforms

IV. WORKING AT HEIGHTS

1. Covering all floor openings
2. Providing railings on open sides and lift openings
3. Securing access staircase/ladders
4. Providing scaffolds
5. Inspecting hoists, lifts, cranes & lifting gear
6. Co-ordination between the working teams is being done
7. Guarding dangerous parts of machines
8. Providing safe foothold for form work construction
9. Providing safety belts, helmets and other PPEs and ensuring their use
10. Providing provision for tying up safety belts
11. Providing effective supervision to ensure safe operation and practice
12. Welding/cutting is permitted only after taking safety precautions
13. Providing means of protection against fall of objects
14. Providing means of protection against fall of persons
15. Providing means of access to higher elevations
16. Providing refuse disposal means
17. Providing lighting, emergency lights and ventilation

-
18. Inspecting all the ladders and staircases
 19. Providing safe access to move around the floor
 10. Providing fire protection means

V. ELECTRICAL SYSTEMS

1. Ensuring safe components/equipments are used
2. Providing earth leakage circuit breakers on all electrically operated power tools/equipments
3. Inspecting power tools before use and ensuring defective tools are discarded
4. Using 3 core cable and 3 pin plugs for all portable tools and ensuring its earthing
5. Authorised electrician is only attending all electrical job
6. Ensuring double earthing to all equipments
7. Ensuring all the electrical system are as per Indian Electricity Rules
8. Disconnecting and removing all unwanted cables and wires from electrical system
9. Identification Marks and Numbers are clearly being marked on all electrical distribution boards, switchboards, motors etc.
10. All electrical system components being protected against damage
11. All electrical joints are being tested to meet the standards
12. Hand lamps are providing with suitable guards
13. Providing personal protective equipments including electrical safety shoes, rubber gloves etc.
14. Ensuring unauthorized person shall not have access to electrical system
15. Protecting all live parts
16. Ensuring all fuses are replaced with actual current rating

-
17. All the joints are being properly insulated and protected against mechanical damages

VI. WELDING AND CUTTING

1. Providing required personal protective equipments to welders and ensuring their use.
2. Ensuring to protect fall of welding sparks down on the persons working below and combustible material
3. Combustible materials near vicinity of welding/cutting work being protected
4. Fire extinguishers are kept ready for use in case of emergency.
5. Adequate precautions being taken while welding/cutting operation is done in confined space
6. Inspecting all the gas cylinders and ensuring the storage, handling and transportation for safety.
7. Inspecting all welding machines and ensuring their cables are properly connected.
8. Inspecting electrode holders
9. Frames of arc welding machines are effectively earthed
10. Providing refusal boxes to keep refused electrodes and other waste material.

VII. LIFTING MACHINES AND TACKLES

1. All the lifting equipments are tested and certified by competent person
2. Safe working load marked on all lifting equipments and tackles
3. Record for all lifting equipments are being maintained
4. Ensuring only authorised persons are using lifting machines
5. Checking lifting equipments before use
6. Ensuring safe working load does not exceed
7. Assessing the load to be lifted

-
8. Ensured that lifting and placement of material is done properly
 9. Ensuring standard signals are followed
 10. Inspecting all hoists and lifts
 11. Inspecting all the Cranes

VIII DEMOLITION

1. Inspecting the area and structure to be dismantled
2. Disconnecting all the service lines example electricity, water, gas etc.
3. Supporting the uncontrolled collapse of walls, pillars and other structure.
4. Proper means such as chutes are provided to carry the waste material from floor to ground level
5. The area is fenced and caution boards are provided.
6. Personal protective equipments are issued to the workers and ensuring their use.
7. Effective supervision is provided till completion of the demolition and ensured demolition is done systematically.

SUGGESTED CHECK-LIST FOR SAFETY AUDIT

FOLLOWING ACTIVITIES/AREAS SHOULD BE CHECKED DURING THE COURSE OF SAFETY AUDIT

I. CONSTRUCTION AND ERECTION ACTIVITY :

- a) Structural Erection
- b) Boiler Erection
- c) Turbine Erection
- d) Chemney Erection
- e) Civil Construction
- f) Other areas not covered above.

IN ALL ABOVE ACTIVITIES FOLLOWING AREAS/SYSTEM SHOULD BE SPECIFICALLY SEEN AND IT SHOULD BE A PART OF REPORT.

- a) Approaches
- b) Scaffolds
- c) Ladders
- d) Lifting equipments and tackles condition and test certificates.
- e) Earthing of electrical equipments.
- f) Condition of electrical wires/cables
- g) Support for electrical wires/cables
- h) Empoyment of competent and authorised electrician for doing electrical repair/addition/alteration.
- i) House keeping
- j) Guarding of dangerous machines
- k) Practices adopted during lifting of equipments.

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- l) Material handling
 - m) Supply of personal protective equipments to construction workers
 - n) Appointment/nomination of safety officers by the Principal Contractor.
 - o) Any other information, felt necessary.

II. OPERATION AND MAINTENANCE ACTIVITY :

- a) Coal handling unit
- b) Boiler area
- c) Turbine area
- d) Switch yard area
- e) Control room
- f) MGR
- g) Hydrogen Generation Plant
- h) Chlorination Plan
- i) Other auxiliaries

IN ALL ABOVE ACTIVITTIES AT LEAST FOLLOWING ASPECTS SHOULD BE SPECIFICALLY SEEN

- a) Requirements of Factories Act :
All provisions of the Act/Rules sets implementation should be reported.
- b) Requirements of India Electricity Act and Rules :
All provisions of the Act/Rules sets implementation level should be reported.
- c) House Keeping
- d) Approaches
- e) Illumination

-
- f) Ladders
 - g) Supply of personal protective equipments to employees as per guidelines issued by Corporate Centre.
 - h) Conditions of fire fighting installations.
 - i) Preparedness for disaster like fire, explosion, chlorine leakage, etc.
 - j) Any other information, if felt necessary.

III. FOR PLANTS AS WELL AS PROJECTS

SUPPLY AND USE OF PERSONAL PROTECTIVE EQUIPMENTS :

- a) Quantum of various personal protective equipments purchased by the Project.
- b) Quantum of personal protective equipments issued to the employees.
- c) Quantum of personal protective equipments stored in the store for regular or emergency requirements.
- d) Average percentage of employees using the given personal protective equipments.

IV. SAFETY STEWARDS & SAFETY CIRCLE SCHEMES - IMPLEMENTATION

V. CONSTITUTION AND WORKING OF SAFETY COMMITTEE

- No. of Meetings held.
- Implementation of recommendations.

VI. SAFETY TRAINING - No. of training programmes, No. of participants.

VII. USE OF AUDIO VISUAL AIDS FOR CREATION OF SAFETY CONSCIOUSNESS

VIII. SAFETY ORGANISATION

IX. ANY OTHER ACTIVITIES, FOUND NECESSARY

INFORMATION MAY BE SUBMITTED FOR FOLLOWING ALSO. WHILE ASSESSING FOR SAFETY AWARD, THESE INFORMATION SHALL BE THE BASIS OF ASSESSMENT :

A Reporting of Accidents :

- a) is a accident reporting system effective.
- b) Are all accidents reported to Safety Deptt.
- c) Is reporting figure of hospital and safety deptt. same.
- d) Has the hospital maintained a separate record of accidents.
- e) What are total number of accidents (Fatal/non-fatal) in the Project for the last years.

B. Efforts for enhancing Safety Awareness

- a) Training Programmes - Quote details including number of training programmes, duration of programmes, subject of training and level of participants.
- b) Safety Committee - Detailed constitution including name of members, main suggestions, implementation of main suggestions. Dates of meetings.
- c) Safety Suggestions

No. of safety suggestions received. Details of suggestions, number of suggestions awarded and implemented.
- d) Emergency preparedness

Enclose emergency plan. Inquire, if it is submitted to State Govt. and is approved by them.
- e) Celebration of National Safety/Fire Days

Specific activities carried out during the day/week. Collect reading material etc. as distributed.
- f) Investigation of Accidents :

Inquire, if all accidents are investigated. Collect copy of reports and enclose. Find out, if recommendations and implemented.
- g) Prosecutions

Number of presecutions filed by State Govt. against the Plant. Enclose copies thereof.

MODEL EMERGENCY PLAN FOR POWER PLANTS

1.0 AIM OF EMERGENCY PLAN

The emergency planning is aimed to ensure safety of life, protection of environment, protection of installation and restoration of production salvage operations in these order of priorities. For effectively implementing the emergency plan, it will be widely circulated and personnel trained through rehearsals/drills.

2.0 DEFINITION OF MAJOR EMERGENCY

A major emergency is one that effect several departments within the factory or may cause serious injuries, loss of life extensive damage to proprty or serious disruption of woks which require the involvement of several resources to handle if effectively.

3.0 IDENTIFICATION OF MAJOR HAZARD POTENTIAL

3.1 Major Plant Sections

Considering the process and the material to be used at Thermal Power Project, the following can be considered as major plant sections.

- a. Coal Handling Plant
- b. Main plant (Boiler, Turbo Generator etc.)
- c. Water Treatment Plant
- d. Hydrogen Generation Plant
- e. Switchyard including sub-stations
- f. Fuel oil Handling Plant
- g. Off site pump houses

3.2.0 Major Hazard Potential Assessment

The major disasters or emergencies usually take birth from one or any combination of the following :

- a. Slow isolated fires

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- b. Fast spreading fires
 - c. Explosions
 - d. Bursting of pipe lines/vessels
 - e. Uncontrolled release of toxic/corrosive/flammable liquids
 - f. Uncontrolled release of toxic/flammable gases/dusts

Depending upon the nature, speed and impact on environment each of these may constitute an emergency, the hazard potential of various plant sections is identified and tabulated.

3.3.0 Fire Hazard

- a. In coal handling plant and at conveyors
- b. Cables in galleries and on trays in all plant sections
- c. Fuel oil handling and oil tanks in main plant
- d. Transformer oil

3.4.0 Explosion Hazard

- a. Hydrogen plant
- b. Turbo Generators where hydrogen is used for cooling of TG.
- c. Boiler (coal/oil fired)
- e. Coal dust in mills and boilers

3.5.0 Bursting of Pipe Lines & Vessels

- a. Steam pipes due to high pressure
- b. Water pipes due to high pressure

3.6.0 Release of Gases/Dust

- a. Chlorine in Water Treatment Plant
- b. Hydrogen in turbo Generator area of main plant

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- c. Pulverised coal dust from mills and associated piping.
 - d. Fly ash from chimneys and ash ponds, ESP hoppers and bottom ash system.
 - e. Coal dust in Transfer points, CHP, Crusher & Mill areas.

3.7.0 Release of Liquid

- a. Chemical Tanks in Water Treatment Plant
- b. Fuel oil tanks in fuel oil handling section
- c. Ash dyke (bund failure)
- d. Control fluid in 500 MW turbine system

4.0 PROTECTION SYSTEMS

The NTPC Power Station has been carefully designed and protected by sophisticated instrumentation controls and inter-locks and if properly maintained and operated the above risks are negligible. To run the plant and to control the process, experienced, qualified and trained personnel are deployed. Protective Equipment for protection against specific hazard. The plant is provided with fast detectors, multisire, sprinklers etc. and emergency trip and shut down systems.

Fire hydrant system is provided to facilitate supply of water under adequate pressure round the clock to the vulnerable areas/points/plant sections.

A well equipped adequately staffed hospital facility is available round the clock to take care of medical needs.

5.0 OFF SITE EMERGENCY

The plant facilities and protection systems are designed to sufficiency and reasonable adequacy to deal with emergencies arising out of process hazards and to safely contain it within the plant. Off site emergencies are remote.

6.0 EMERGENCY PLAN

However, to tackle the remote possibility of large scale release of chlorine from tonners or disastrous fire or release of poisonous and toxic liquids, the emergency plan is prepared.

6.1.0 Objectives of the Plan

The plant is developed to make best possible use of resources at its command and/or outside agencies for the following purposes.

- a. Rescue of victims and treating them suitably to effect speedy recovery at Hospital.
- b. Safe guard others by evacuating them to safer places
- c. Containing the incidence and control it with minimum damage to life and property.
- d. Identify the personnel affected/dead.
- e. Inform relatives of those deceased/affected.
- f. Providing relevant record/data needed as evidence for subsequent enquiry.
- g. Rehabilitation of the affected.

7.0 **PLANT SECTIONS TO DEAL EMERGENCIES**

- a. Coal Handling Plant
- b. Main Plant
- c. Water Treatment Plant
- d. Hydrogen Generation Plant
- e. MGR Coal Transportation System

Each section will be headed by "Works Incident Controller" reporting to the "Chief Incident Controller".

8.0 **WORKS INCIDENT CONTROLLER (WIC)**

The primary task to works incident controller is to go to the scene of the emergency, make an informed assessment of the situation and decide whether a major emergency exists or is likely. he is responsible for implementing the emergency plan to control and/or to contain the hazard.

Supdt./Sr.Supt. of the section concerned shall be the Works Incident Controller. The names of Works Incident Controller shall be identified.

The Works Incident Controllers shall be assisted by the shift charge engineers/ unit controllers who are posted to warn all shifts to cover round the clock operation.

The unit controllers/shift in charge engineers shall assume the responsibility of Works Incident Controllers when he is off site/or off duty.

8.1.0 The Works Incident Controllers shall identify :-

1. At probable emergency causing situations and take proper precautionary measures to prevent/control such situations.
2. Ensure that all emergency team under him are informed about their functions before and during emergency.
3. Direct all operations within the affected area with the following priorities :
 - a. Secure the safety of personnel
 - b. Minimise damage to plant & environment
 - c. Minimise loss of material
4.
 - a. Provide advise and informations to all concerned as required.
 - b. Direct and guide rescue and fire fighting operations and personnels.
5. Ensure that all non-essential workers in the affected area evacuate to appropriate assembly point.
6. Set up communication contact through telephone/messenger etc., with emergency control centre.
7. Report significant developments to the Chief Incident Controller.
8. Assume duties of Chief Incident Controller pending his arrival and in particular.
 - a. direct the shut down and evacuation of plant and effected areas likely to be threatended by the emergency.
 - b. ensure key personnel are informed and they are called in
 - c. Preserve evidence that would facilitate subsequent inquiry into the causes of the emergency.

9.0 CHIEF INCIDENT CONTROLLER

The Dy. General Manager (O&M), shall be the Chief Incident Controller.

The senior most Sr.Supt. from O&M on duty shall assume responsibility of Chief Incident Controller in the absence of DGM (O&M).

9.10 Functions

Immediately after knowing about the emergency the Chief Incident Controller centre and on arrival he will :

- a. Relieve the Works Incident Controller from the responsibility of over all main control.
- b. Declare major emergency, if considered necessary and ensure outside emergency services are called in and near by firms are informed.
- c. Ensure key personnel are called in to exercise direct operation control.
- d. Directing shutting down and evacuation of plants in consultation with Works Incident Controller and key personnel.
- e. Ensure casualties are received, that they are given adequate attention and rendered needed help.
- f. Establish liaison with Chief Officers of Fire, Safety, MedicalP & IR, Security and Police Deptt.
- g. Where emergency is prolonged, arrange for relief of personnel and catering facilities.
- h. Issue authorised statements to News Media.
- i. Ensure information/reporting to Corporate Centre and othr statutory bodies as per requirements and provisions of statute.

10.0 EMERGENCY CONTROL CENTRE (ECC)

An Emergency Control Centre will be established and equiped with adequate means of communicationto areas inside and outside the worker together with relevant data Personnel Protective equipments and equipment to assist those manning the centre and to enable them to plan accordingly.

The Emergency Control Room will be manned by the Chief Incident Controller, the officials nominated as key personnel and Sr. Officers of outside services called in for assistance. No other personnel shall have access to the Control Centre.

ECC will also contain the following data :

- a. Safety data pertaining to all hazardous materials likely to cause emergency.
- b. Procedure of major and special fire fighting, rescue operations, First Aid etc.
- c. Emergency call out list of persons drafted for emergency control key personnel, fire, safety, first aid, Medical, P & IR, Security, Police and District Admn. Authorities.

11.0 **KEY PERSONNEL**

Apart from Work Incident Controller and Chief Incident Controller, other works personnel will have key role to play in providing advice and in implementing the decisions made by the Chief Incident Controller.

The key personnel include

1. Sr. Supdts./Engineer-in-Charge responsible for
 - a. Production
 - b. Electrical maintenance
 - c. Mechanical maintenance
 - d. C & I
 - e. Chemical
2. Head of Personnel and Officers connected with IR and Labour Welfare.
3. Sr. Manager (Technical Service)
4. Head of Safety
5. Chief Medical Officer
6. Commandant/Asstt. Commandant
7. Fire Officer
8. Transport : Auto Base Engr. I/C
9. Public Relation Officer (PRO)

All list of key personnel and their phone numbers shall be informed to all concerned suitably.

As necessary they will decide the actions needed to shut down plants, evacuate personnel, carryout, emergency, engineering works, arrange of supplies of equipment, personnel etc., carryout atmosphere tests, provide catering facilities, liaison with police, informing relatives of the victims, press media etc.

12.0 **ESSENTIAL DATA**

In plants immediately affected or likely to be affected as decided by the Chief Incident Controller, efforts will be needed to make shut down and make process units safe. This work will be carried out by plant supervisors and essential operators provided they can do it without exposing themselves to undue risk. Some workers/supervisors will also be required to help the above works for example, Attendants, Messengers, Drivers, First Aiders, Steno-Typist etc. These will be "Essential Staff" and it is the responsibility of the Works Incident Controller to identify the essential staff from a task force report at defined plant control centres so that they can be readily contacted. It is the responsibility of the Works Incident Controller to remove all non-essential staff to assembly points.

13.0 **DECLARING EMERGENCIES**

The first person who directs the emergencies shall inform by shouting or by telephone to the shift engineer and fire station about the hazard. The shift engineer will inform to works incident controller, Chief Incident Controller and also telephone operator who shall communicate it to all concerned offices of the emergency. The Chief Incident Controller taking into account the severity of situation shall declare emergency.

14.0 **ALARM**

The emergency alarm will be sounded by control room. The emergency alarm will be located on the central work shop. The control and operation switch will be under fire station control room in charge.

The emergency alarm shall consist of repeated long and short blast for continuous period of 2 minutes. The purpose is to advise all persons on the outbreak of major emergency occurred in the plant.

One minute continuous blast will denote all clear and restoration of normalcy.

15.0 **ONE SITE EMERGENCY PLANNING FOR LEAKAGE OF CHLORINE GAS AT WATER TREATMENT PLANT**

15.1.0 **First Information**

The first person/persons noticing the leakage should immediately raise alarm by shouts or manually operated siren provided in the Water Treatment Plant for this purpose.

Simultaneously Fire Department will be informed on Phone _____ to requisition their services.

15.2.0 **Actions to be taken**

1. All possible steps to control/stop the leakage will be taken by the shift engineer using emergency chlorine kit, breathing apparatus etc.
2. If the situation does not come under control people in the area will be asked to move out to the nearest assembly point taking into consideration the directions of wind etc., and allow only essential staff equipped with necessary protective equipment to ensure they are not exposed to any undue risk.
3. The gates of the plant will be closed/area cordoned to control entry of unauthorised persons.
4. Depending on the seriousness the Works Incident Controller will arrange information to
 - a. Main Control Room
 - b. Chief Incident Controller
 - c. Key Personnels

On emergency the Key Personnel on reaching the spot will take action to control the leakage :

1. If the leakage is from gland nut it may be tightened.
2. If the valve is leaking it should be checked by closing it fully.
3. If the leaking is from the threads, the cylinder should be rolled to such a position that the leakage point is on the top side. This will enable escape of chlorine as gas and not as liquid.

The leak to be attended using chlorine kit and vent connected to neutralisation tank containing caustic soda/lime bath.

Movement of people should be toward perpendicular.

Grease and water should not be applied on chlorine leak.

15.3.0 **Setting up of Medical Centre**

On receipt of information by Chief Medical Officer on the leakage of chlorine special medical aid centre is to be organised by Chief Medical Officer as found necessary.

15.4.0 **Information to Civil Authorities**

Head of Personnel will inform civil authorities giving the details of the incident and steps being taken to control the situations.

The information to local police and traffic police should be given by CISF/ Head of Personnel.

Public Relation Officer will obtain the position from Chief Incident Controller and if required arrange information to press and public.

The head of Safety will arrange reporting of the incident to the Chief Incident Controller/ Director of Factories and Corporate Centre. The Safety Deptt. will render necessary assistance and advice on the use of personnel protective equipment etc.

15.5.0 **Restarting of the plant**

After the situation is normalised detailed inspection must be carried out by a committee consisting of the following :

- Chief Incident Controller
- Works Incident Controller
- Head of Safety

On their satisfaction of the situation, Chief Incident Controller may give necessary recommendations to resume normal working in and around the Plant. The Security will allow the employees to plant for resuming normal working.

16.0 **FIRE ACCIDENTS**

Any fire starts, small. It is easy to control the fire when it is in the incipient stage. In the factory all major fire prone areas are declared as NO SMOKING AREAS. Any job in these areas is prohibited unless authorised by a written permit from the operation Engineer-in-Charge.

16.1.0 Fire Fighting Facility

The following Fire Protection equipments are provided at Thermal Power Plants

1. Fire hydrant system.
2. Sprinkler systems for coalconveyor belts.
3. Deluge water spray and mulsi fire protection system for the transformers and oil tanks.
4. Fire alarm/detector system at various control room.
5. Portable and mobile first aid fire extinguishers.

The water requirement for the proposed hydrant system will be drawn from the raw water reservoir with the help of fire water pumps.

The conveyors are provided with fire detectors and sprinklers. The detectors are capable of detecting moving fire and give impulse to stop the respective conveyor motor. Once the conveyor belts have been stopped by the process, the fire will be confirmed to one area and increase the temperature of a particular area. The quartzoid bulbs type sprinkler provided on both sides of the belt will fuse the bulb due to the temperature raise and water will start spraying on the effected area to extinguish the fire.

The transformers are protected by pneumatically operated automatic defuge water spray system.

In hydrant system water as a pressure of 8 kg. is made available to all the fire vulnerable area. A standby diesel driven fire pump is also provided to meet emergencies in case of power fialures.

16.2.0 Action in case of fire

The following actions will be followed to avoid fires :

- I. Any person discovering the fire
 - a. Any person discovering the first shall be attempt to put off the fire by using the first aid fire fighting applicances available.
 - b. Simultaneously he will start shouting FIRE FIRE FIRE/AAG AAG AAG till assistance arrives. His colleagues or other one who hear him shall intimate the fire control room and plant fire stantion.

II. Action by persons next arriving at the scene at fire

Any person hearing the shout FIRE FIRE FIRE will immediately rush to the scene of fire and start.

- a. Shouting FIRE FIRE FIRE/AAG AAG AAG
- b. Assist in rescue and fire fighting by use of equipment and extinguishers available nearby and intimate fire wing if not done already.

III. Fire Fighting Party

The fire fighting party soon after reaching the scene of fire shall start rescue and fire fighting work as quickly as possible and keep passages doors etc., clear.

- a. Arrange salvage operation protecting valuable property or covering up of machinery etc.
- b. Keep the area clear on unnecessary personnel; and
- c. Inform the fire brigade and help them in all possible.

IV. Work Incident Controller

- a. Immediately on hearing the fire alarm he shall rush to the scene of fire and assume charge of rescue and fire fighting operations.
- b. Post a guide to direct the fire brigade to the scene of fire if not already done.
- c. Get electrical connection of area under fire/which may further catch fire cut off from the main switches and
- d. Guide fire personnel about key special hazard and ensure successful fire fighting.

V. Plant Incharge not involving in fire

- a. Immediately on hearing the fire alarm/emergency alarm he shall relieve all personnel who are trained in fire fighting to proceed to the scene of fire to render assistance as required.
- b. All other work shall normally go uninterrupted.
- c. Remain vigilant and ensure that there is no chance of fire spreading towards his section.

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- d. Ensure that his staff other than those authorised does not leave the plant section and crowd near the scene of fire.

VI. The Fire Control Room Incharge in Fire Station

- a. On getting information regarding fire he shall sound the turn out bell and inform the Officer on duty about the location and nature of fire.
- b. Inform Asstt. Commandant and Commandant as quickly as possible about the location and nature of fire.
- c. Keep record about the time of alarm, time of turn out etc.
- d. Sound emergency alarm and all clear alarm on the electrical siren when instructed to do so by the works main controller.
- e. Give the required information to the Off Duty Personnel for reporting for duty at the fire station to assist the fire fighting if required.
- f. Attend to all telephone calls and to take further action as ordered by the Asstt. Commandant and Commandant or Officer Incharge of the fire fighting operations.

VII. Telephone Operator

Inform the following authorities regarding the location and nature of fire in case of serious fires :

1. General Manager
2. DGM (O&M)
3. Head of Safety
4. Chief Personnel Manager
5. Chief Medical Officer
6. Incharge Auto Base
7. Fire Station

VIII. Head of Safety

On receipt of information of major fire, the Safety Officer shall immediately proceed to the fire spot to assess the situation and coordinate with the plant authorities and fire fighting squad for further steps to be taken to deal with safety of persons and property and arrange necessary personnel protective equipment to the staff and plant staff, wherever required.

IX. Auto Base Incharge

On receipt of information of fire he will proceed along with one expert mechanic to the spot to attend minor defects to the fire engine or pumps to set it right on the spot if possible and to mobilise vehicles for transportation as per the advice of Chief Incident Controller.

X. Chief Medical Officer

On getting the information regarding the out break of fire he shall send the Ambulance along with Attendent and Firest Aid Equipment to the scene of fire, keep himself in readiness aid alert his staff to attend serious and urgent cases.

XI. After the fire is extinguished an "all clear" signal is to be sounded on the siren in consultation with the Commandant CISF and Chief Incident Controller.

XII. On hearing the "all clear" siren, all persons of plant section concerned shall, other than fire staff rescue team, return to the place of duty and resume duty.

XIII. Fire fighting party assisted by the staff as required, shall return all used first aid fire fighting appliances to the fix staff and assist salvage work if so required.

XIV. The Chief Incident Controller and Works Incident Controller along with the Head of Safety shall thoroughly examine the premises of fire and if satisfied order for start of work again.

XV. The Security Staff shall protect or guard the area till the security of all moveable articles is ensured by keeping them insafe custody or removed to safety zones.

XVI. All fires shall be thoroughly investigated as per corporate guidelines.

17.0 **EXPLOSIONS**

NTPC Power Station has been carefully designed and when properly maintained and operated the risk of explosion is negligible. However, potential of explosions exists :

- a. in the pulverised fuel handling section
- b. hydrogen generation plant
- c. in the turbo generators where hydrogen is used for cooling
- d. in the boilers where coaldust and oil is inducted for burning

To prevent explosion in the pulverised fuel handling section the areas are declared as NO SMOKING and the mill temperature is not allowed to exceed 95°C. The mills are provided with high temperature alarm and trip set at 85°C to enable control the temperature. The normal operating temperature is 75°C.

To prevent explosion in the hydrogen plant it is ensured that the purity of hydrogen is always maintained above 98% and care is taken to see that oxygen is not allowed to mix with the hydrogen at any stage. As the explosive range of hydrogen purity do not fall in the explosive range.

Whenever the Turbo Generator is taken for maintenance the Hydrogen is completely purged out and proper purging is ensured by instrument and chemical analysis of purged gases.

In the boilers if the burner flame is not proper or the pulverised fuel feeding is not proper, tripping system is provided to ensure that the burners are cut off and the coal feeding is automatically stopped. Due to continuous and automatic instrumentation the boilers are maintained safe as regards the explosion hazard is concerned.

18.0 RELEASE OF HUGE QUANTITIES OF CHEMICALS AND POISONOUS LIQUIDS

In the Water Treatment Plant Acid and Caustic Storage tanks are provided. Collapse of the acid tank is assumed to consider the worst possible hazard even though such possibility is very remote.

The Water Treatment Plant is equipped with neutralisation tanks wherein all the wash waters are collected. These chemicals are to be effectively neutralised before they are allowed to be pumped out into storm water drain. As the chemical liquids will be completely neutralised and analysed that they are harmless the ONSITE & OFF SITE emergency are not considered.

19.0 CONCLUSION

Emergency Planning is an attempt to achieve better safety. The success depends on proper implementation and follow-up of the systems. Hence it is essential that all aspects of this plant operation precautions shut down procedures are implemented properly as quickly as possible and reviewed and updated regularly taking lessons from the experiences gained. It is obvious that during the early stages there may be a lot of confusion. If the plan is tried and rehearsed it is likely that the confusion is minimised and orderly procedures are developed. Hence it is essential to train for emergency situations and ensure that the systems work for the purpose for which they are designed. Exercises should therefore be arranged to implement the emergency plan by simulating conditions in the operation of the plant.

20.0 IDENTIFICATION OF FIRE HAZARDOUS AREAS & TYPE OF FIRES

Sl. No.	Slow	Fast isolated fires	Explo Spread- ing fires	Burst ions	Burst ing of pipe linng	Uncon trolled release of liquids	Uncon- trolled release of gas	Out burst of high tem- perature ash
1.	2.	3.	4.	5.	6.	7.	8.	9.
1.	C.H.P	Yes	Yes	-	-	-	-	-
2.	Main Plant	Yes	Yes	Yes	yes	-	-	-
3.	W.T.P	Yes	yes	-	yes	yes	yes	-
4.	Hydrogen generation plant	Yes	yes	yes	yes	-	Yes	-
5.	Ash handling plant	-	-	-	Yes	Yes	-	yes
6.	Fuel oil handling	Yes	Yes	Yes	Yes	Yes	-	-
7.	Switch Yard	Yes	Yes	Yes-	-	-	-	-
8.	Off Site	Yes	Yes	-	-	-	-	-

21.0 PROVIDED FIRE PREVENTION SYSTEMS

Sl.No.	Area	Fire protection provided
1.	Conveyors	Water Sprinkler System
2.	Station Transformers	Mulsifyre system
3.	Cable galleries & control room	Smoke detection system
4.	Boilers burner galleries	Hydrnt watr system
5.	Pump house equipment	Hydrant water system
6.	Air heaters	Hydrant water system
7.	Fuel oil tanks	Manual foam through fire foam trolley
8.	Hydrogen Plant	Hydrant system
9.	Stores etc.	Hydrant system

30.0 Material Safety Data Sheet**30.1 Hydrochloric Acid****1 CHEMICAL IDENTITY**

Chemical Name	HYDROCHLORIC ACID	Chemical Classification	Inorganic Acid
Synonyms	Munaltic Acid, Hydrogen Chloride, Chlorohydric Acid		
Spirits of Salts	Trade Name		

Formula	HCl	C.A.S. No. 7647-01-0	: U.N. No. 1789
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Regulated Identification	: Shipping Name : Hydrochloric Acid	: Hazchem Code 2A
	: Codes/Label : Corrosive, Class 8	
	: Hazardous Waste ID No. 16	

HAZARDOUS INGREDIENTS	: C.A.S. No.	: HAZARDOUS INGREDIENTS	C.A.S No.
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1. Hydrochloric Acid	: 7647-01-1	3
2		4

2 PHYSICAL /CHEMICAL DATA

Boiling Pt. Range	. 848 C	: Physical state	Liquid:	: Appearance	colourless
		Vapour Pressure		: Odour	Sharp Initiating Odour

Melting /Freezing Pt	. 1143 C	: @35 C	3040 mm Hg at 17.8 C		
Vapour Density	Not Pertinent	: Solubility		: Others	soluble in Ethyl alcohol
(Air = 1)		: In water at 30 C	Soluble	: & Ethyl	Ether.
Specific Gravity	1.19 at	: pH	> 1		
(Water = 1)	20 C (Liquid)	:			

3. FIRE/EXPLOSION HAZARD DATA

Flammability	No	: LEL	Not Pertinent	%	: Flash Point °C	Not Pertinent	(°C)
Explosion sensitivity to impact		: UEL	Not Pertinent	%	: Flash Point °C	Not Pertinent	(°C)

Autog ignition Temperature oC	: Not pertinent
Explosion sensitivity to Impact	: Stable
Explosion sensitivity to static Electricity	: Stable
Hazardous combustion products	: Emits toxic fumes of Cl
Hazardous Polymerization	: Will not Occur

Combustible Liquid	No	: Explosive Material	No	: Corrosive Material	YES
Flammable Material	No	: Oxidiser	No	: Others	
Pyrophoric Material	No	: Organic Peroxide	No	:	

4. REACTIVITY DATA

Chemical Stability	: Stable
Incompatibility with other material	: With alkali and Active metals

Reactivity	: Violent reaction with Acetic Anhydride. 2-Amino ethanol, NI-14-OH, Ca3P2 Chloro sulphonic Acid, 1.1 Dificoroethylene, Ethylene Diamine, Ethylene, Odeum, HClO1 Proplene Oxide.
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Hazardous Reaction Products	: Potentially dangerous reaction with Sulphuric Acid releases HCl Gas
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5. HEALTH HAZARD DATA

Routes of entry	: Inhalation, ingestion, eye & skin.
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Effects of Exposure/Symptoms	: Inhalation of fumes results in coughing choking, sensation, irritation to nose and lungs. Liquid causes burns can burn mouth and the digestive tract.
------------------------------	---

Emergency Treatment for	: Inhalation : Remove the victim to fresh air area, keep him warm, start artificial respiration if breathing stops. : Ingestion : Have the victim drink water or milk. Do not induce vomiting, eyes & skin flush with plenty of water 15 mins. Remove contaminated clothing. Seek Medical Aid Immediately.
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Permissible exposure limit TLV (ACGIH)	Not listed 5 (Coating) 5 (Coding)	Mg/kg. ppm 7 (Coating) mg/m ppm 7 (Coating) mg/m	STEL Odour Threshold 1.5	Not listed	ppm Not listed mg. m ppm 47.7 36 mg/m
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NFPA Hazard Signals	Health 3	Flammability 0	Reactivity 0	Special
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6. PREVENTIVE MEASURES

Personnel : void contact with liquid of vapours
 Protective Equipment : provide chemical protective suit with self contained breathing apparatus, air line mask rubber hand gloves
 : face shield and shoes

Handling & Storage Precautions : Store in a rubber lined of FRP coated steel tanks away from oxidizers, in a well ventilated are.

7. EMERGENCY/ FIRST AID MEASURES FIRE
 Fire extinguishing media : Not flammable

Special Procedure Unusual Hazards : Keep the containers cool by spraying water if exposed at fire
 Flammable gas may be produced on contact with metals.

EXPOSURE : First Aid Measures : Inhalation : Remove the victim to fresh air area, start artificial respiration if breathing stops, keep him warm and quiet ingestion, have the victim drink water and milk. Do not induce vomiting. Eyes & skin wash with plenty of water for 1 minutes. Seek Medical Aid immediately for all types of exposures
 : Antidotes/Dosages : Not Available

SPILLS : Steps to be taken : Shut off leaks if without risk drench with water do not use metal containers to spilled liquid.
 : Waste Disposal Method : Seal all waste in vapour tight plastic bags for eventual disposal.

8. ADDITIONAL INFORMATION / REFERENCES

A concentration of 35 ppm causes irritation of the throat after short exposure. Vigorous reaction with Aluminium Chloride + Dinitroaniline (evolves gas)

9. MANUFACTURERS / SUPPLIERS DATA

Name of Firms	1. The Andhra Sugars Ltd.	Contact person	Sri R. Subramanyam,	Sri P. Ramamohan Rao
Mailing Address	C&F Division	in Emergency	Adviser (Chemicals)	Gen. Manager (Tech)
Telephone/Telex Nos.	Kovvur 534350 (AP)		ASL	RAAC
Telegraphic Address	Telex : 0474-242	Local Bodies involved	Police, Fire	
	2. Sri Rayaseema Alkalies & Allied Chemicals Ltd.	Standard Packing	Rubber lined tanks	
	Gondlparta, Kamool 518004			
	Telex : 0615-216 RAAC	Trem Card Details/Ref.	available with carrier	

10. DISCLAIMER

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30.2 Sodium Hydroxide

1 CHEMICAL IDENTITY

Chemical Name SODIUM HYDROXIDE Chemical Classification Alkaline Inorganic Compound
Synonyms Munaltic Acid Soda Lye Lye Trade Name

Formula HCl : C.A.S. No. 1310-73-2 : U.N. No. 1823 / 11824

Regulated Identification : Shipping Name : Hydorxide, Solid/Solution : Hazchem Code 2
: Codes/Label : Corrosive, Class 8
: Hazardous Waste ID No. 16

HAZARDOUS INGREDIENTS : C.A.S. No. : HAZARDOUS INGREDIENTS C.A.S No.

1. Hydrochloric Acid : 1310-73-2 3
2 : 4

2 PHYSICAL /CHEMICAL DATA

Boiling Pt. Range 1390 C : Physical state Liquid: : Appearance colourless
Vapour Pressure : Odour Sharp Initiating Odour

Melthign /Freezing Pt . 1143 C : @35 C 3040 mm Hg at 730 C
Vapour Density Not Pertinent : Solubility : Others soluble in Ethyl alcohol
(Air = 1) : In water at 30 C Soluble : Methanol and Glycerol
Specific Gravity 1.19 at : pH 13 - 14
(Water = 1) 20 C (Liquid) :

3. FIRE/EXPLOSION HAZARD DATA

Flammability No : LEL Not Parthent % : Flash Point °C Not Perthent (°C)
TDG Flammability N.A. : UEL Not Perthent % : Flash Point °C Not Perthent (°C)

Autogntion Temperature oC : Not pertinent
Explosion sensitivity to Impact : Stable
Explosion sensitivity to static Electricity : Stable
Hazardous combustion products : Emits toxic fumes of Cl
Hazardous Polymerization : Will not Occur

Combustible Liquid No : Explosive Material No : Corrosive Material YES
Flammable Material No : Oxidiser No : Others
Pyrophoric Material No : Organic Peroxide No :

4. REACTIVITY DATA

Chemical Stability : Stable
Incompatibility : Water actide, flammable liquids, organic halles, metals, Al. Sn. Zn. Nitromethane and
with other material : Nitro Compounds

Reactivity : Violent reaction with Organic Halldes, Metals, Nitro compounds
Hazardous : Not Available
Reaction Products

5. HEALTH HAZARD DATA

Routes of entry : Inhalation, Skin, Ingestion & eyes

Effects of Exposure/
Symptoms : Inhalation : Causes small burns to upper respiratory tract and lungs, mild noseimitation.
: Ingstion : Causes severe damage to mucous membrane. Severe scaring or perforation
may occur : Eyes, Severe damage, Skin : Causes severe burns.

Emergency : Inhalation : Remove the victim to fresh air area, keep him warm, start artificial respiration if breathing

Permissible exposure limit	Not listed	Mg/kg.	STEEL	Not listed	ppm Not listed mg. m
TLV (ACGIH)	5 (Coading)	ppm 7 (Coading) mg/m	Odour Threshold 1.5		ppm 47.7 36 mg/m

NFPA Hazard Signals	Health 3	Flammability 0	Reactivity 0	Special
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6. PREVENTIVE MEASURES

Personnel : Avoid contact with solid or liquid
 Protective : Provide side covered safety goggles, faceshield, filter or dust-type respirator, rubber shoes and rubber hand gloves

Equipment

Handling & Storage : Keep in cool. Dry and well ventilated place.

Precautions

7. EMERGENCY/ FIRST AID MEASURES
 Fire extinguishing media : Not flammable

Special Procedure Unusual Hazards : Keep the containers cool by spraying water if expoed to heat or flame
 Toxic gases are produced.

EXPOSURE : First Aid Measures : If eyes are affected, flush with plenty of water for 15m. Skin
 Remove contaminated clothes & shoes. Wash the affected area with plenty of water. If inhaled, remove the victim to fresh air area. Support respiration
 Seek Medical Aid immediately for all types of exposures.
 : Antidotes/Dosages : Not Available

SPILLS : Steps to be taken : Sweep and collect without malting dust. Wash the surface with plenty of water and soap.
 : Waste Disposal Method : Seal all waste in vapour tight plastic bags for eventual disposal.

8. ADDITIONAL INFORMATION / REFERENCES

A strong base. Vigorous reaction with 1,2,4,5 - Tetrachlorobencanic has caused many industrial explosions and forms extremely toxic 2,3,7,8 Tetrachlorod ibenzodioxin. Under proper conditions of temperature, pressure and state of division if can required ignite violently with Acetic Acid. Acetaldehyde, Acali Anhydride, Acrolein, Acrylonitrite. Alyl Alcoho, Alyl Chlond.

9. MANUFACTURERS / SUPPLIERS DATA

Name of Firms	The Andhra Sugars Ltd.	Contact person	Sri R. Subramanyam,
Mailing Address	C&F Division	in Emrgency	Adviser (Chemicals)
Telephone/Telex Nos.	Kovvur 534350 (AP)	Local Bodies involved	Police, Fire
Telegraphic Address	Telex : 0474-242	Standard Packing	HDPE Bags
Grams : Chemicals		Trem Card Details/Ref.	available with carrier

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30.3 Ammonium Hydroxide

1 CHEMICAL IDENTITY

Chemical Name AMMONIUM HYDROXIDE Chemical Classification Inorganic Alkaline Compound
Synonyms Ammonia Aqueous, Ammonia Solution Trade Name

Formula HCl : C.A.S. No. 1336-21-6 : U.N. No. 2672

Regulated Identification : Shipping Name : Ammonium Hydroxide : Hazchem Code Not Listed
: Codes/Label : Corrosive, Class 8
: Hazardous Waste ID No. 16

HAZARDOUS INGREDIENTS : C.A.S. No. : HAZARDOUS INGREDIENTS C.A.S No.

1. Hydrochloric Acid : 1336-21-6 3
2 : 4

2 PHYSICAL /CHEMICAL DATA

Boiling Pt. Range Not Pertinent C : Physical state Liquid: : Appearance colourless watery
Vapour Pressure : Odour Ammoniacal Odour
Melting /Freezing Pt . 1143 C : @35 C Not available mm Hg C
Vapour Density Not Pertinent : Solubility : Others soluble in Ethyl alcohol
(Air = 1) : In water at 30 C Soluble
Specific Gravity 0.89 : pH Alkaline
(Water = 1) 20° C :

3. FIRE/EXPLOSION HAZARD DATA

Flammability No : LEL Not Parthent % : Flash Point °C Not Perthent (°C)
TDG Flammability N.A. : UEL Not Perthent % : Flash Point °C Not Perthent (°C)

Autoginition Temperature oC : Not pertinent
Explosion sensitivity to Impact : Stable
Explosion sensitivity to static Electricity : Stable
Hazardous combustion products : Emits toxic fumes of Ni-13 and NOx
Hazardous Polymerization : Will not Occur

Combustible Liquid No : Explosive Material No : Corrosive Material YES
Flammable Material No : Oxidiser No : Others
Pyrophoric Material No : Organic Peroxide No :

4. REACTIVITY DATA

Chemical Stability : Stable
Incompatibility : Acrolein, Nitromethane, Acrylic Acid, Chlorosulphonic Acid. Dimethyl sulphate, Halogens, HC1
with other material : HF HN03, AgNO3, Ag20

Reactivity : Reacts withH2SO4 strong mineral acids exothermically corrosive to copper copper Alloys Aluminium

Hazardous : Galvanised surfaces Mild liberation of heat on reaction withwater
Reaction Products : Not Available

5. HEALTH HAZARD DATA

Routes of entry : Inhalation, Skin, Ingestion & eyes

Effects of Exposure/
Symptoms : Causes burning pain in mouth,throat, stomach, constriction of throat and coughing followed by vomitting of blood. Severe eye and skin irritation.

Emergency
Treatment for : Inhalation : Remove the victim to fresh air area, give artificial respiration and oxygen if needed.
: Ingestion : Do not induce vomitting, lavage stomach with water or lemon juice, milk, delay may cause perforation of oephagus or stomach, swelling of glottis may necessitate trachsostomy. Eyes Wash with plenty of water for 15 mins. Skin wash the affected area with plenty of water. Seek Medical Aid Immediately.

Permissible exposure limit TLV (ACGIH)	Not listed 5 (Coading) 5 (Coding)	Mg/kg. ppm 7 (Coading) ppm 7 (Coading)	mg/m mg/m	STEEL Odour Threshold	Not listed 1.5	ppm ppm	Not listed 47.7	mg. 36	m mg/m
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NFPA Hazard Signals	Health Not Listed	Flemmability Not Listed	Reactivity Not Listed	Special
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6. PREVENTIVE MEASURES

Personnel : Avoid contact with solid or liquid
 Protective Equipment : Use rubber boots,gloves, apron, safety goggles. Use of protective oil will reduce skin limitation.

Handling & Storage : Keep in cool. strong glass,plastic or rubber stopened bottels and completely filled
 Precautions

7. EMERGENCY/ FIRST AID MEASURES
 Fire extinguishing media : Not flammable

Special Procedure Unusual Hazards : Keep the containers cool by spraying water if expoed to fire or heat
 Poisonous gases are produced in fire.

EXPOSURE : First Aid Measures : Inhalation: Remove the victim to fresh air area and provide artificial respiration ingestion : Do not induce vomitting, lavage stomach with water. lemon juice or milk. Eyes : Wash with plenty of water for 15 mins
 Skin : wash the affected area with plenty of water and soap. Seek medical support immediately
 : Antidotes/Dosages : Not Available

SPILLS : Steps to be taken : Shut off leaks if without risk. Drench with water.
 : Waste Disposal Method : Seal all waste in vapour tight plastic bags for eventual disposal.

8. ADDITIONAL INFORMATION / REFERENCES

Ammonia vapour 16 to 25% by volume is capable of forming flammeiable mixer with air contact of murcury, chlorine, iodine, bromine, etc. may from explosive compounds. Above 2000 ppm vapour concentration may be fattal after ashort exposure specific Gravity-0.903 at 25C. Vapour Density (Air=1) - 0.597 pH = 10. Apprx. Concentration - 25% in solution with water.

9. MANUFACTURERS / SUPPLIERS DATA

Name of Firms	M/s. Qualigens Fire Chemicals	Contact person
Mailing Address	Dr. Anniebasant Road, Bombay	in Emrgency
Telephone/Telex Nos.	74410, 71279 Glaxin	
Telegraphic Address		Local Bodies involved
Telegrams : Glaxoind, Bombay		Standard Packing
Fax : 022 4924023		Trem Card Details/Ref.

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30.2 Chlorine

1 CHEMICAL IDENTITY

Chemical Name CHLORINE : Chemical Classification Inorganic Gas or Liquid
Synonyms none : Trade Name

Formula HCl : C.A.S. No. 7782-50-5 : U.N. No. 1017

Regulated Identification : Shipping Name : Chlorine : Hazchem Code 2 XE
: Codes/Label : Non Flammable Gas, Poison, Class 2
: Hazardous Waste ID No. 17

HAZARDOUS INGREDIENTS : C.A.S. No. : HAZARDOUS INGREDIENTS C.A.S No.

1. Hydrochloric Acid : 7782-50-5 3
2 : 4

2 PHYSICAL /CHEMICAL DATA

Boiling Pt. Range . 34 C : Physical state Liquid: : Appearance colourless
Vapour Pressure : Odour Sharp initiating Odour
Melting /Freezing Pt . 1019 C : @35 C 3040 mm Hg at 17 8 C
Vapour Density 2.49 : Solubility : Others soluble in Ethyl alcohol
(Air = 1) : In water at 30 C Soluble & Ethyl ether
Specific Gravity 0.89 : pH > 1
(Water = 1) 20° C :

3. FIRE/EXPLOSION HAZARD DATA

Flammability No : LEL Not Parthent % : Flash Point °C Not Perthent (°C)
TDG Flammability N.A. : UEL Not Perthent % : Flash Point °C Not Perthent (°C)

Autoginition Temperature oC : Not pertinent
Explosion sensitivity to Impact : Stable
Explosion sensitivity to static Electricity : Stable
Hazardous combustion products : Toxic products are generated when combustibles burn in Cl.
Hazardous Polymerization : Will not Occur

Combustible Liquid No : Explosive Material No : Corrosive Material YES
Flammable Material No : Oxidiser No : Others
Pyrophoric Material No : Organic Peroxide No :

4. REACTIVITY DATA

Chemical Stability : Stable
Incompatibility with other material : Combustible substances, finally divided metals

Reactivity : Violent reaction with alcohols,explosive reaction with metals, potentially dangerous reaction with Hydrocar-Lewis acids, sulfides, trilakyl boranes.Alloys Aluminium
Hazardous : Toxic products are generated when combustibles burn in Cl.
Reaction Products :

5. HEALTH HAZARD DATA

Routes of entry : Inhalation, Ingestion Skin & eyes

Effects of Exposure/
Symptoms : Causes eye limitation,sneezing, coplous salivation, general excitment, restlessness. Hi
: concentration causes
Severe eye and skin irritation.
Respiratory distres and violent coughing, often with reaching, death may result from suffocation.

Emergency
Treatment for : Inhalation : Remove the victim to fresh air area, support respiration, give oxygen if.
: necessary Eyes : Flush with large amounts of water for at least 15 mins. Seek medicalaid
immediately for all types of exposures.

Permissible exposure limit	Not listed	Mg/kg.	STEEL	3 ppm	9 mg/m
TLV (ACGIH)	1	ppm	3 mg/m	Odour Threshold 3.5	10.16 mg/m
NFPA Hazard Signals		Health 3	Flammability 0	Reactivity 0	Special

6. PREVENTIVE MEASURES

Personnel : Avoid contact with liquid or vapours
 Protective Equipment : Provide PVC gloves, gumboots, rubber overcoat, head . ask self-contained breathing apparatus

Handling & Storage Precautions : Keep in cool dry and well ventilated place.

7. EMERGENCY/ FIRST AID MEASURES FIRE
 Fire extinguishing media : Not flammable

Special Procedure Unusual Hazards : Keep the containers cool by : spraying water if expoed to heat or flame
 Poisonous gases are produced in fire.

EXPOSURE : First Aid Measures : If inhaled move the victim to fresh air area.If chlorine comes in contact with eye or skin, wash with plenty of water under quick opening safety shower and eye wash fountain. Seek Medical Aid immediately for all types of exposures
 : Antidotes/Dosages : Not Available

SPILLS : Steps to be taken : Shut off leaks if without risk. Drench with water. Do not use metal containers to spilled liquid.
 : Waste Disposal Method : Seal all waste in vapour tight plastic bags for eventual disposal.

8. ADDITIONAL INFORMATION / REFERENCES

In charge of large gas escapes. The presence of cloud can be marked with Ammonia with which it will turn into a mist. Run away from the gas clouds in a direction perpendicular to the wind direction. Avoid liquid chlorine from leaking and body contact. Person with pulmonary diseases should avoid the exposure, concentration of 3.5 ppm produces a detectable odour 15 ppm causes immediate imtation of the throat. Concs. of 50 ppm are dangerous for even shor exposures.1000 ppm is fatal can react to cause fires/explosion on contact with Turpentine, illuminating gas, polypropylene, rubber,sulfuric acid, acetaldehyde, Alcohol bring the leading portion of the cylinder to the uppermost position, so that only the gas escapes and not the liquid.

9. MANUFACTURERS / SUPPLIERS DATA

Name of Firms	Shri Ravalaseema Alkalies & Allied Chemicals Ltd.	Contact person in Emrgency	Shri P. RamamohanRao Gen. Manager (Tech.) RAAC
Mailing Address	Gondlparta, Kamool 518004		Sri. R. Subramanyam, Adviser (Chemicals)
Telephone/Telex Nos.	0815-216 RAAC		ASL
Telegraphic Address	The Andhra Sugars Ltd. C&F Division, Lovvur-534350 (A) Telex : 0474-242	Local Bodies involved Standard Packing Trem Card Details/Ref.	Un 1017

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30.5 Hydrogen

1 CHEMICAL IDENTITY

Chemical Name HYDROGEN : Chemical Classification Inorganic Gas
Synonyms Liquid Hydrogen, Para Hydrogen
Hydrogen (Compressed) : Trade Name

Formula H₂ HCl : C.A.S. No. 1333-74-0 : U.N. No. 1049

Regulated Identification : Shipping Name : Hydrogen, Compressed : Hazchem Code 2 S R
: Codes/Label : Flammable Gas, Class 2
: Hazardous Waste ID No. 16

HAZARDOUS INGREDIENTS : C.A.S. No. : HAZARDOUS INGREDIENTS C.A.S No.

1. Hydrochloric Acid : 1333-74-0 3
2 : 4

2 PHYSICAL /CHEMICAL DATA

Boiling Pt. Range . 252.8 C : Physical state Liquid: : Appearance colourless
Vapour Pressure : Odour Odourness
Melting /Freezing Pt . 258.18 C : @35 C Not available mmHg
Vapour Density 0.069 : Solubility : Others not available
(Air = 1) : In water at 30 C Soluble
Specific Gravity 0.899 g/L : pH Not pertinent
(Water = 1) 20° C :

3. FIRE/EXPLOSION HAZARD DATA

Flammability No : LEL Not Parthent 4.1% : Flash Point °C Not Perthent (°C)
TDG Flammability 2 : UEL Not Perthent 74.2% : Flash Point °C Not Perthent (°C)

Autoginition Temperature oC : 400.0
Explosion sensitivity to Impact : Stable
Explosion sensitivity to static Electricity : Explodes
Hazardous combustion products : Not available
Hazardous Polymerization : Will not Occur

Combustible Liquid No : Explosive Material No : Corrosive Material
NO
Flammable Material No : Oxidiser No : Others
Pyrophoric Material No : Organic Peroxide No :

4. REACTIVITY DATA

Chemical Stability : Stable
Incompatibility : Water No Chemical reaction with common materials but low temperature causes most
with other material materials to become very

Reactivity : Violent reaction or ignition with air catalysis (Platinum and similar metals containing absorbed oxygen
or hydrogen bromine, iodine, dioxate + nickel, Lithium, nitorgen trissoride, nickel + oxygen dilluoride
Pd+Lsoprop

Hazardous : If form sonalitive explosive mixtures with bromine, chlorine, iodine he;lanfluoride, chlorine dioxide
Reaction Products : Dichlorine oxide, dinitrogen oxide.

5. HEALTH HAZARD DATA

Routes of entry : Skin Inhalation

Effects of Exposure/
Symptoms : If atmosphere does not contain enough oxygen, inhalation can cause dizziness.
unconsciousness or even death.

: Contact of liquid with eyes or skin causes freezing similar to burn.

Emergency : Inhalation : If victim is unconscious (due to oxygen deficiency), move him to fresh air area

Treatment for : and apply resuscitation methods. Eyes & Skin : Treat for frosibie, soak the skin in lukewarm water.
seek medical aid.

Permissible exposure limit TLV (ACGIH)	Not listed Mg/kg.		STEEL	Not listed ppm	Not listed mg. m
	ASPHYXIAN	ppm	Asphyxiant mg/m	Odour Threshold 1.5	ppm
	ASPHYXIAN	ppm	Asphyxiant mg/m		Odourness mg/m
NFPA Hazard Signals	Health 0		Flemmability 4	Reactivity 0	Special

6. PREVENTIVE MEASURES

Personnel : Avoid contact with liquid or gas
 Protective : Provide chemical goggles, face shield, insulated gloves and long sleeves, trousers worn outside boots or over high-top shoes to shed liquid, self-contained breathing apparatus containing air (never use oxygen).

Equipment : Store in a cool, FIRE-PROOF wellventilated area, separated from other cylinders, preferably in open air.

7. EMERGENCY/ FIRST AID MEASURES FIRE

Fire extinguishing Media : Stop flow of gas let fire burn under control

Special Procedure Unusual Hazards : Keep the containers cool by : spraying water if expoed to fire or flame flashbackalong vapour trail, may occur.

EXPOSURE : First Aid Measures : Inhalation : If victim is unconscious (due to oxygendeficiency), move him to fresh air area and apply resuscitation methods. Eyes & Skin : Treat frostbite soakthe skin in lukewarm water.Seek medical aid.
 : Antidotes/Dosages : Not Available

SPILLS : Steps to be taken : Shut off leaks if without risk. Warm every body, Explosion Hazard.
 : Waste Disposal Method : To be burnt under control condition.

8. ADDITIONAL INFORMATION / REFERENCES

Practically no toxicity, except that it is an Asphyxiant.Highly dangerous fire and severe explosion hazard when exposed toheat, flame and oxidisers flammable orexplosive when mixed withair, O₂, Cl₂.Vigorousoxothermic reactions with benzene + raney nickel catalysts, metal (like strontium, sodium potassium, barium-above 300C. Ventilate at highest points.

9. MANUFACTURERS / SUPPLIERS DATA

Name of Firms	M/s.NTPC/RSTPS	Contact person
Mailing Address	(Departmentally Produced)	in Emrgency
Telephone/Telex Nos.		
Telegraphic Address		Local Bodies involved Standard Packing Trem Card Details/Ref.

10. DISCLAIMER

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NATURAL GAS

1. CHEMICAL IDENTIFY

Chemical Name : NATURAL GAS : CHEMICAL CLASSIFICATION: Organic gaseous mixture.

Synonyms : Natural gas sweetened : Trade Name :

Formula : Noah : HI : C.A.S. No. 1310-73.2 Un No. 1823/1824

Regulated : Shipping Name : Natural Gas
: Codes/label : Flammable gas. Hazchem No.
: Hazardous Waste : I.D. No. : 17

HAZARDOUS : C.A.S. NO. HAZARDOUS INGREDIENTS : C.A.S NO.
INGREDIENTS

i) Methane iii) Propane
ii) Ethane iv) Butane

2. PHYSICAL / CHEMICAL DATA

Boiling Pt/Range : 162°C Physical state : Gaseous Appearance : Colorless
Melting/Freezing Pt: 182.°C Vapour Press : 35°C 40mmHg Odour : Odourless
Vapour Density : 0.6 Solubility in Water : 30°C Others : Not

Available

(Air=1) Not soluble

Specific Gravity : 0.68 pH Not pertinent

Water=1

3. FIRE / EXPLOSION HAZARD DATA

Flammability Y/N : yes LEL % Flash Pont °C : 18°C Autoignition : 450°C

5.0% by volume Temperature.

OTDG Flammability : UEL % Flash Point °C : 15% By volume.

Explosion Sensitivity to Impact : Explodes Hazardous : Not Hazardous

Explosion Sensitivity to Static Elect. : Explodes Combustion : Hazardous product.

Hazardous Polymerization : Will not occur

Combustible Liquid : NO Explosive : Yes Corrosive : No

Material

Flamable matl. : Yes Oxidiser : NO Others :

Pyrophoric Matl. : No Organic Periodide : No

4. REACTIVITY DATA

Chemical Stability : Stable

: Combustible substances

Incompatibility

With other material.

Reactivity : Violent reaction on ignition with air

Hazardous Reaction : No

Products.

5. HEALTH HAZARD DATA

Route of entry : Inhalation, Skin

Effects of Exposure- : Asphyxiation if atmospher does not contain

sure Symptoms : Enough oxygen.

TLV (ACGIH) 3000 ppm mg/m³ ppm mg/m³

Permissible

Explosive Limit 3000 ppm mg/m³ Odour Threshold ppm mg/m³
LD50

NFPA Hazard Signals	: Health	Flammability 4.7 to 15.0	Stability Yes	Special : Lethal does. 3 mgs/kg
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6. PREVENTIVE MEASURES

Personnel protective Equipment : Rubber gloves, Goggles, Canister Breathing Apparatus,
: Safety shoes, Industrial clothing.

jHandling & Storage precautions : Continuous ventilation.

EMERGENCY & FIEST AID :

FIRE EXTINGUISHING MEDIA : DCP Extinguisher

Special procedure : In case of fire in pipe, Maintain pressure in line and keep
Surrounding cool with water spray.

EXPOSURE :

First Aid Measure : Remove person to a ventilated area for fresh air and apply
Resuscitation methods.

SPILLS / LEAKAGE

Step to be taken : Inform central Control Room and fire Station (5444, 5644)

WASTE DISPOSAL METHOD : N.A

8. MANUFACTURERS / SUPPLIERS DATA

Name of Fire	: M/s. Gas Authority of India	Contract Persons : in emergency	GAIL. Dibiyapur Sh. S. Nath Sr. Manager (O&M)
Tel/Telex Nos. :	05683-----	Local Bodies :	-do-
Telegraphic/ :		Standard Packing :	Pipe line only.
Address	Terms Card Details / Ref.	: N.A	
Others			

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NAPHTHA

1.0 IDENTIFY OF MATERIAL :

Product Name : Naphtha, petroleum Naphtha solvent, Benzene, Mineral sprits, Light Argon UN NO : 1255
Trade Name : Naphtha, Label/Class: Red and white CAS NO: 8052-1-3
FLAMMABLE LIQUID/ 3.2 Group II
Formula : Complex mixture of Hydrocarbons HAZCHEM Code : 3Y.e

2.0 PHYSICAL AND CHEMICAL PROPERTIES :

Physical state : Liquid Boiling pt/Rage °C 35-205 Vapour Press : 0-65
Appearance : Colorless Melting/Freezing pt °C : >30 (at 38 deg. C, mm Hg.)
Odour : Gasoline Vapour density (air = 1) : 2.5-4.8 Evapn. Rate : 10 App
Solubility : Insoluble Sp. gravity 20°C : 0.69-0.78 (at 30 deg. C)
In Water : Dyn. Viscosity : Heat of Vap. : 293E+05
Calorific Value : 4.5 E = 07 (PA.S 30°C)
Molecular weight Sp. Heat liq. J/KG: 2.2E+03

3.0 FIRE / EXPLOSION HAZARD DATA :

Explosivity : Moderate Auto Ignition Temp. : 229-293 Flash Pt. C, CC/OC: 20-50
Flammability : Dangerous Explosive Limit % : 1.1-5.9 Burning rate : 4mm/mm
Extinguish Med. : Foam, CO₂, DCP, Water may be ineffective & cause fire to spread, May be used to cool fire exposed container.
Special Procedure : If leak or spill has not ignited use water spray to disperse vapour and To protect men attempting to stop leak. Water spray may be used to Flush spills away from exposures.
Unusual Hazards : Flashback may occur along vapour trail.

4.0 REACTIVITY DATA

Chemical Stability : Stable Condition to avoid : Keep away from heat & open flame
Hazardous Policy : Condition to avoid :-
Incompatibility : Oxidising agents :-
Hazardous Combustion / Decomposition products : Toxic gases / Vapour (CO)

5.0 HEALTH HAZARD DATA

Route of entry : Inhalation / Skin absorption
TLV, PPM mg/cu. m: 500 ppm/2000mg/m³ STEL, PPM mg/cu.m:
Ordour threshold PPM : 5 PEL, PPM mg/cu.m:
LD50 oral, Rat g/kg/: 0.5-5.0 LCLo, Rat, ppm: 1600ppm
Sign/Symptoms of Exposure: Delayed toxicity
LDLo, Mammal : 2.5 g/kg

INHILATION : In very high conc. causes loss of consciousness, coma and sudden death.
In less severe cases headache, nausea, mental confusion and depression
Occurs. Moderately toxic by inhalation.

INGESTION : Irritation of gastrointestinal tract with vomiting, colic and diarrhea. Fatal dose
dose for adult 350g and for children 10-15 gms.

CONTACT : Skin - dry and defect skin with dermatitis, Splash contact with eyes causes
pain and slight transient corneal epithet disturbances.

EMERGENCY TREAT :- (IMMEDIATE MEDICAL ATTENTION REQUIRED)

INHALATION : Remove victim to fresh air give artificial respiration not mouth. If breathing has stopped. Oxygen if breathing is laboured. Rescuers should take suitable precautions to prevent being over come by high vapour conc.

INGESTION : Give unconscious victim, water to drink, Do not induce vomiting. Liquid paraffin, olive oil or some vegetable oil is to be given orally to retard absorption of gasoline. Gastric leverage and induction of vomiting are not advisable.

CONTACT : Remove contaminated clothing and wash affected part (Skin / eyes) with plenty of water.

HAZARD SPECIFICATION :

NFPA RATING : Health : 1 Flammability : 3 Material Factor : 16
Stability : 0 Special : KNOWN HAZARDS :
Combustible Liquid : Flammable Matl. Flammable liquid. Pyrophric Matl.
Explosive Matl. : Unstable matl. :- Water reactive :
Oxidizer : Organic peroxide : Corrosive Matl. :
Compressed gas : Irritant : Sensitizer
Carcinogen : Metazoan : Others : Ferotoxicity.

6.0 SAFE USAGE DATA :

VENTILATION : Adequate ventilation.
PROTECTIVE EQUIPMENT :
EYES : Goggles and Face shield.
RESPIRATORY : Self contained breathing apparatus for containment/clean up Operation.
GLOVES : Rubber.
CLOTHING : Rubber.

7.0 PRECAUTIONS, HANDLING & STORAGE :

Naphtha should be stored in well ventilated, properly labeled and approved containers. Snaring, siphoning and use a solvent and cleaning agent should be avoided. Do not transfer to unlabelled, unsuitable or incorrectly labeled containers. All containers should be kept out of reach and kept fully closed when not in use. Cleaning & inspection / maintenance of storage tanks should be done accordingly to proper procedure and precautions (work permit system, gas freezing of tanks, using pipeline an dwearing air supplied breathing apparatus.

OTHERS :

EMERGENCY RESPONSE DATA :

RELEASE / SPILL : Avoid spillage, should they occur, sand or earth are useful means of Containment and absorption.

WASTE DISPOSAL :

Because of the vapours can travel along the ground for considerable distances, naked flames in surrounding areas should be extinguished. Any action which might cause ignition of gasoline / vapours should be avoided. Any body in the nearby low laying confined space should be evacuated immediately until the area has been thoroughly ventilated and checked as safe to re-enter. The sand / earth should be removed to safe area.

8.0 ADDITIONAL INFORMATION :

Gastric leverage should be done after endofrachod incubation. In view of the risk of aspiration which can chemical inhumanities for which antibiotic and corticoatoroid therapy may be indicated.

9.0 MANUFACTURERS / SUPPLIERS DATA

Name of Firm : M/s Indian Oil Corpn. Ltd. Contact Persons : Sr. Manager (I/C)
Kanpur (UP) in emergency KANPUR, LUCKNOW
M/s BPLC. Lucknow Local Bodies : -do-

Tel/Telex Nos. : 0510-246

Standard Packing : Tanks.

Telegraphic/ :

Address Terms Card Details / Ref. : N.A
Others

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1.0 DIESEL OIL GAS OIL

Product Name: Diesel oil, Gas oil
Trade Name : HSD : Label/Class: White- POISONOUS GAS: CLASS 2.3
Formula *HSD Complex mixture of Hydrocarbons* : UN No. : 1202 CAS NO: 7647-01-0 HAZCHEM Code: 3Y

2. PHYSICAL AND CHEMICAL PROPERTIES :

Physical State :	Liquid	boiling point/ Range C:	150-400	Vapour Pressure <1
Appearance:	Light brown	Melting/Freezing pt.C:	18 to -46	(at 138deg C,mm Hg)
Odour:	Diesel	Vapour density (Air=1):	3 to 5	Evaporation rate:
Solubility:	Insoluble (30 ppm)	Specific Gravity, 20 C:	0.81 to 0.19	(at 30 deg C)
In Water		Dyn. Viscosity	6.76E-05 Liq 25 C	Heat of vaporization: 2.71E+05
Calorific Value: (J/KG)	4.34E+07	(PA.S 30 deg C)		J/Kg
		Molecular weight:		Sp heat liq J/KG: 2.34E+03

3. FIRE AND EXPLOSIVE HAZARDS DATA

Explosivity	Moderate	Auto Ignition Temp C:	256.6	Flash Point, C, CC/OC:	32 to 96
Flammability:	Moderate	Explosive Limits %	0.7-5	Burning Rate:	4mm/mm
Extingsh. Media	Foam CO ₂ DCP Water may be ineffective and cause fire to spread may be used to cool fire exposed				
Special Procedures:					
Unusual Hazards:	Flashback may occur along vapour trail				

4. REACTIVE ;HAZARDS :

Stability :	Stable	Conditions to avoid:	Keep away from heat and open flame
Hazardous poly:		Conditions to avoid	
Incompatibility:	Oxidizing agents		
Hazardous Combustion/ Decomposition products :	Toxic gases/vapours(CO)		

5. HEALTH HAZARD DATA

Entry Route:	Inhalation /Skin absorption	Odour threshold PPM:	0.1
TLV, PPM mg/cu.m:	5ppm/mg/m ³ (Inhalation)	STEL PPM mg/cu.m	10 mg/m ³
PEL PPM mg/cu.m:		LD50 oral , Rat g/kg:	28
Sign/Symptoms of Exposure:	Delayed Toxicity:		
INHALATION:	Dizziness, headache. ASPIRATION Rapidly developing potential fatal chemical pneumonitis		
INGESTION:	Nausea, vomiting.		
CONTACT:	Skin-irritation:Eyes-irritation. Dermatitis may result on prolonged contact.		
Emergency Treatment:	(IMMEDIATE MEDICAL ATTENTION REQUIRED)		
INHALATION:	Remove victim to fresh air; give artificial respiration if necessary. If unconscious but breathing Place in the unconscious (recovery) position. Give external cardiac massage if necessary		
INGESTION:	Do not induce vomiting.		
CONTRACT:	Remove contaminated clothing and wash affected part (skin/yes) with plenty of water.		

6. HAZARD SPECIFICATION:

NFPA RATING	Health: 0	Flammability: 2	Material Factor -10
	Stability: 0	Special:	

7. KNOWN HAZARDS:

Combustible liquid:	Flammable material: Flammable liquid	Pyrophoric material:
Explosive material	Unstable material:	Water reactive mat:
Oxydizer:	Organic peroxide	Corrosive material:
Compressed gas:	Irritant:	Sensitizer:
Carcinogen	Mutagen:	Others:

8. SAFE USAGE DATA

VENTILATION:	Adequate ventilation
PROTECTIVE EQUIP:	
Eyes:	Goggles/face shields
Respiratory:	Self contained breathing apparatus for containment/cleanup operations.
Gloves:	Rubber
Clothing:	Rubber
Others:	

9. PRECAUTIONS:

Handling/Storage : Diesel should be stored in well ventilated properly labeled and approved containers. Sniffing siphoning and use as solvent and cleaning agent should be avoided. Do not transfer to unlabeled unsuitable or incorrectly labeled containers. All containers should be kept out of reach of children and kept fully closed when not in use cleaning and inspection/ maintenance of storage tanks should be done according to proper procedures and precautions (work permit system gas freeing of tanks, using lifeline and wearing air supplied breathing apparatus)

Others:

10. EMERGENCY RESPONSE DATA

Release/Spill: avoid spillage's should they occur sand or earth are useful means of containment and absorption
Waste Disposal

6. ADDITIONAL INFO

Gastric lavage should be done after endotracheal intubation in view of risk of aspiration which can cause chemical pneumonitis .

MANUFACTURER/SUPPLIER :

Name & Address:

Telephone No.:

Contact person:

Ref: Environment Canada: Chemical hazards of the work place OPHG for Chemical Hazards: CONCWE report 2/83

1.2 TRISODIUM PHOSPHATE

1. CHEMICAL IDENTITY

Chemical Name TRISODIUM PHOSPHATE : Trisodium orthophosphate. TSP Sodium phosphate
: Trade name : Sodium phosphate

Formula $Na_3PO_4 \cdot 12H_2O$: C.A.S.No. : U.N.No. NA9148 : Hazchem Code :

2. PHYSICAL AND CHEMICAL PROPERTIES

Physical State :	Solid	Boiling point/range C:	decomposes 73C-77C	Vapour Pressure:
Appearance:	Colourless	Melting/Freezing pt.C:	decomposes 73C-77C	(at 20 deg C,mm hg.)
Odour:	Odourless	Vapour density(Air=1):		Evaporation rate:
Solubility:	28.3g/100 ml (15 C)	Specific Gravity 20C	1.62	(at 30 deg. C)
In Water		Dyn. Viscosity:		Heat of vaporization:
Calorific Value:		(PAS 30 deg. C)		(Kcal/Kg)
(Kcal/Kg)		Molecular weight:	380.12	Cp/Cv:

3. FIRE AND EXPLOSIVE HAZARDS DATA

Explosively:	Not combustible	Auto Ignition Temp C:	Flash Point. C.CC/OC:
Flammability:	Not combustible	Explosive Limits %:	Burning Rate:
Extinguish. Media:	Most fire extinguishing agents may be used in fire involving this chemical		
Special Procedures:			
Unusual Hazards:	At high temperatures gives off toxic Pox fumes.		

4. REACTIVE HAZARDS:

Stability:	Stable	Conditions to avoid
Hazardous Poly :		Conditions to avoid:
Incompatibility:	Reacts violently with magnesium	
Hazardous Combustion/Decomposition products:		

5. HEALTH HAZARD DATA

Entry Route:				
TLV, PPM mg/cu.m:		STEL PPM mg/cu.m	Odour threshold PPM	
PEL PPM mg/cu.m:		LD50 oral , Rat g/kg:	74	LDL, Human, mg/kg
Sign/Symptoms of Exposure:		Delayed Toxicity:		
INHALATION:	Noes , eyes and throat irritation; sneezing, difficulty breathing, coughing.			
INGESTION:	Burning sensation in mouth, pain in swallowing , stomach cramps.			
CONTACT:	Skin- latching burning sensation, inflammation: Eye-Irritation and burning. Moderately toxic by ingestion and inhalation			
Emergency Treatment:	Obtain medical assistance.			
INHALATION:	Remove victim to fresh air; give artificial respiration, if breathing has stopped, Oxygen if Breathing is labored.			
INGESTION:	Give conscious victim water to drink; induce vomiting immediately.			
CONTACT : Eye:	Flush with water. Skin; Remove contaminated clothing. Flush immediately with plenty of water.			

6. HAZARD SPECIFICATION:

NFPA RATING	Health:	Flammability:	Material Factor
	Stability:	Special:	

7. KNOWN HAZARDS:

Combustible liquid:	Combustible	Flammable material:	Pyrophoric material:
Explosive material		Unstable material:	Water reactive mat:
Oxydizer:		Organic peroxide	Corrosive material:
Compressed gas:		Irritant:	Sensitizer:
Carcinogen		Mutagen:	Others:

8. SAFE USAGE DATA

VENTILATION

PROTECTIVE EQUIP:

Eyes: Safety goggles/face shields/dust mask
Respiratory: Self contained breathing apparatus in case of fires
Gloves: Rubber Gloves, Rubber Boots
Clothing: Use protective outer clothing as required.
Others:

9. PRECAUTIONS:

Handling/Storage :
Others:

10. EMERGENCY RESPONSE DATA

Release/Spill/
Waste Disposal

11. ADDITIONAL INFO

MANUFACTURER/SUPPLIER :

Name & Address: M/s Indian Rae Earths Ltd. Udyogmandal P() Kerala
Telephone No.: 30254-58 Cable : RAREEARTH
Contact person:
Ref: Environment Canada:

The Factories Act, 1948

Section 7-A. General duties of the occupier.

(1) Every occupier shall ensure, so far as is reasonably practicable, the health, safety and welfare of all workers while they are at work in the factory.

(2) Without prejudice to the generality of the provisions of sub-s. (1), the matters to which such duty extends, shall include-

(a) the provision and maintenance of plant and systems of work in the factory that are safe and without risks to health;

(b) the arrangements in the factory for ensuring safety and absence of risks to health in connection with the use, handling, storage and transport of articles and substances;

the provision of such information, instruction, training and supervision as are necessary to ensure the health and safety of all workers at work;

the maintenance of all places of work in the factory in a condition that is safe and without risks to health and the provision and maintenance of such means of access to, and egress from, such places as are safe and without such risks;

the provision, maintenance or monitoring of such working environment in the factory for the workers that is safe, without risks to health and adequate as regards facilities and arrangements for their welfare at work.

Except in such cases as may be prescribed, every occupier shall prepare, and, as often as may be appropriate, revise, a written statement of his general policy with respect to the health and safety of the workers at work and the organization and arrangements for the time being in force for carrying out that policy, and to bring the statement and any revision thereof to the notice of all the workers in such manner as may be prescribed.

40-B. Safety Officers (1) In every factory-

(i) Wherein one thousand or more workers are ordinarily employed; or

(ii) wherein, in the opinion of the State Government, any manufacturing process or operation is carried on, which process or operation involves any risk of bodily injury, poisoning or disease, or any other hazard to health, to the persons employed in the factory;

-
- iii) the occupier shall, if so required by the State Government by notification in the Official Gazette, employ such number of Safety Officers as may be specified in that notification.
 - (2) The duties, qualifications and conditions of service of Safety Officers shall be such as may be prescribed by the State Government.

Section 41 b - Compulsory disclosure of information by the occupier :

1. The occupier of every factory involving a hazardous process shall disclose in the manner prescribed all information regarding dangers, including health hazards and the measures to overcome such hazards arising from the exposure to or handling of the materials or substances in the manufacture, transportation, storage and other processes, to the workers employed in the factory, the Chief Inspector, the local authority within whose jurisdiction the factory is situated and the general public in the vicinity.
2. The occupier shall, at the time of registering the factory involving a hazardous process, lay down a detailed policy with respect to the health and safety of the workers employed therein and intimate such policy to the Chief Inspector and the local authority and, thereafter, at such intervals as may be prescribed, inform the Chief Inspector and the local authority of any change made in the said policy.
3. The information furnished under sub-s. 91) shall include accurate information as to the quantity specifications and other characteristics of wastes and the manner of their disposal.
4. Every occupier shall, with the approval of the Chief Inspector, draw up an on-site emergency plan and detailed disaster control measures for his factory and make known to the workers employed therein and to the general public living in the vicinity of the factory the safety measures required to be taken in the event of an accident taking place.
5. Every occupier of a factory shall-
 - a) If such factory proposes to engage in a hazardous process at any time after such commencement, within a period of thirty days before the commencement of such process, inform the Chief Inspector of the nature and details of the process in such form and in such manner as may be prescribed.
6. Where any occupier of a factory contravenes the provisions of sub-s. (5), the licence issued under s. 6 to such factory shall, notwithstanding any penalty to which the occupier or factory shall be subjected to under the provisions of this Act, be liable for cancellation.

-
7. The occupier of a factory involving a hazardous process shall, with the previous approval of the Chief Inspector, lay down measures for the handling, usage, transportation and storage of hazardous substances inside the factory premises and the disposal of such substances outside the factory premises and publicize them in the manner prescribed among the workers and the general public living in the vicinity.

Section 41-F. Permissible limits of exposure of chemical and toxic substances.

1. The maximum permissible threshold limits of exposure of chemical and toxic substances in manufacturing processes (whether hazardous or otherwise) in any factory shall be of the value indicated in the Second Schedule.
2. The Central Government may, at any time, for the purpose of giving effect to any scientific proof obtained from specialized institutions of experts in the field, by notification in the Official Gazette, make suitable changes in the said Schedule.

Section 41-G. workers' participation in Safety Management.

1. The occupier shall, in every factory where a hazardous process takes place, or where hazardous substances are used or handled, set up a Safety Committee consisting of equal number of representatives of workers and management to promote co-operation between the workers and the management in maintaining proper safety and health at work and to review periodically the measures taken in that behalf.

Provided that the State Government may, by order in writing and for reasons to be recorded, exempt the occupier of any factory or class of factories from setting up such committee.

2. The composition of the Safety Committee, the tenure of office of its members and their rights and duties shall be such as may be prescribed.

Section 41-H. Right of workers to warn about imminent danger

1. Where the workers employed in any factory engaged in a hazardous process have reasonable apprehension that there is a likelihood of imminent danger to their lives or health due to any accident, they may bring the same to the notice of the occupier, agent, manager or any other person who is in charge of the factory or the process concerned directly or through their representatives in the Safety Committee and simultaneously bring the same to the notice of the Inspector.
2. It shall be the duty of such occupier, agent, manager or the person in charge of the factory or process to take immediate remedial action if he is satisfied about the existence of such imminent danger and send a report forthwith of the action taken to the nearest Inspector.

3. If the occupier, agent, manager or the person incharge referred to in sub-s. (2) is not satisfied about the existence of any imminent danger as apprehended by the workers, he shall, nevertheless, refer the matter forthwith to the nearest Inspector whose decision on the question of the existence of such imminent danger shall be final.

Section 45 - First-aid appliances. (1) There shall in every factory be provided and maintained so as to be readily accessible during all working hours first-aid boxes or cupboards equipped with the prescribed contents, and the number of such boxes or cupboards to be provided and maintained shall not be less than one for every one hundred and fifty workers ordinarily employed (at any one time) in the factory.

1. Nothing except the prescribed contents shall be kept in a first-aid boxes or cupboards.
2. Each first-aid box or cupboard shall be kept in the charge of a separate responsible person (who holds a certificate in first-aid treatment recognized by the State Government) and who shall always be readily available during the working hours of the factory.
3. In every factory wherein more than five hundred workers are (ordinarily employed) there shall be provided and maintained and ambulance room of the prescribed size, containing the prescribed equipment and in the charge of such medical and nursing staff as may be prescribed (and those facilities shall always be made readily available during the working hours of the factory).

Section 88. Notice of certain accidents. (1) Where in any factory an accident occurs which causes death, or which causes any bodily injury by reason of which the person injured is prevented from working for a period of forty-eight hours or more immediately following the accident, or which his of such nature as may be prescribed in this behalf, the manager of the factory shall send notice thereof to such authorities, and in such form and within such time as may be prescribed.

4. Where a notice given under sub-s. (1) relates to an accident causing death, the authority to whom the notice is sent shall make an inquiry into the occurrence within one month of the receipt of the notice or, if such authority is not the Inspector, cause the Inspector to make an inquiry within the said period.
5. The State Government may make rules for regulating the procedure at inquiries under this section.

Section 88-A. Notice of certain dangerous occurrences. Where in a factory any dangerous occurrence of such nature as may be prescribed occurs, whether causing any bodily injury or disability or not, the manager of the factory shall send notice thereof to such authorities, and in such form and within such time, as may be prescribed.

Section 89. Notice of certain diseases. (1) Where any worker in a factory contracts any disease specified in the manager of the factory shall send notice thereof to such authorities, and in such form and within such time, as may be prescribed.

2. If any medical practitioner attends on a person who is or has been employed in a factory, and who is, or is believed by medical practitioner to be, suffering from any disease specified in the medical practitioner shall without delay send a report in writing to the office of the Chief Inspector stating-
 - a) the name and full postal address of the patient
 - b) the disease from which he believes the patient to be suffering, and
 - c) the name and address of the factory in which the patient is, or was last employed.
3. Where the report under sub-s. (2) is confirmed to the satisfaction of the Chief Inspector, by the certificate of a certifying surgeon or otherwise, that the person is suffering from a disease specified in the Third Schedule, he shall pay to the medical practitioner such fee as may be prescribed, and the fee so paid shall be recoverable as an arrear of land-revenue from the occupier of the factory in which the person contracted the disease.
4. If any medical practitioner fails to comply with the provisions of sub-s. (2), he shall be punishable with fine which may extend to one thousand rupees.
5. The Central Government may, by notification in the Official Gazette, add to or alter the Third Schedule and any such addition or alteration shall have effect as if it had been made by this Act.

PEPENALTIES AND PROCEDURE

Section 92. General Penalty for Offences. Save as is otherwise expressly provided in this Act and subject to the provisions of s. 93, if in, or in respect of, any factory there is any contravention of any of the provisions of this Act or of any rules made thereunder or of any order in writing given thereunder, the occupier and manager of the factory shall each be guilty of an offence and punishable with imprisonment for a term which may extend to (two years) or with fine which may extend to (one lakh rupees) or with both, and if the contravention is continued after conviction, with a further fine which may extend to (one thousand rupees) for each day on which the contravention is so continued .

(Provided that where contravention of any of the provisions of Chapter IV or any rule made thereunder or under s. 87 has resulted in an accident causing death of serious bodily injury, the fine shall not be less than (twenty five thousand rupees) in the case of an accident causing death, and (five thousand rupees) in the case of an accident causing serious bodily injury.

Section 94. Enhanced penalty after previous conviction. If any person who has been convicted of any offence punishable under s. 92 is again guilty of an offence involving a contravention of the same provision, he shall be punishable on a subsequent conviction with imprisonment for a term which may extend to (three years) or with fine (which shall not be less than (ten thousand rupees) but which he may extend to (two lakh rupees) or with both:

(Provided that the court may, for any adequate and special reasons to be mentioned in the judgement, impose a fine of less than (ten thousand rupees) :

Provided further that where contravention of any of the provisions of Chapter IV or any rule made thereunder or under s. 87 has resulted in an accident causing death or serious bodily injury, the fine shall not be less than (thirty-five thousand) in the case of an accident causing death and (ten thousand rupees) in the case of an accident causing serious bodily injury.)

1. For the purposes of sub-s. 91), no cognizance shall be taken of any conviction made more than two years before the commission of the offence for which the person is subsequently being convicted.)

Section 95. Penalty for obstructing Inspector. Whoever willfully obstructs an Inspector in the exercise of any power conferred on him by or under this Act, or fails to produce on demand by an Inspector any registers or other documents in his custody kept in pursuance of this Act or of any rules made thereunder, or conceals or prevents any worker in a factory from appearing before, or being examined by, an Inspector, shall be punishable with imprisonment for a term which may extend to (six months) or with fine which may extend to (ten thousand rupees) or with both.

Section 96. Penalty for wrongfully disclosing results of analysis under s. 91. Whoever, except in so far as it may be necessary for the purposes of a prosecution for any offence punishable under this Act, publishes or discloses to any person the results of an analysis made under s. 91, shall be punishable with imprisonment for a term which may extend to (six months) or with fine which may extend to (ten thousand rupees) or with both.

Section 96-A. Penalty for contravention of the provisions of ss. 41-B, 41-C and 41-H. (1) whoever fails to comply with or contravenes any of the provision of ss. 41-B, 41-C or 41-H or the rules made thereunder, shall, in respect of such failure or contravention, be punishable with imprisonment for a term which may extend to seven years and with fine which may extend to seven years and with fine which may extend to two lakh rupees, and in case the failure or contravention continues, with additional fine which may extend to five thousand rupees for every day during which such failure or contravention continues after the conviction for the first such failure or contravention.

2. If the failure or contravention referred to in sub-s. (1) continues beyond a period of one year after the date of conviction, the offender shall be punishable with imprisonment for a term which may extend to ten years).

Section 97. Offences by workers. (1) Subject to the provisions of s. 111, if any worker employed in a factory contravenes any provision of this Act or any rules or orders made thereunder, imposing any duty or liability on workers, he shall be punishable with fine which may extend to (five hundred rupees).

2. Where a worker is convicted of an offence punishable under sub-s. 91) the occupier or manager of the factory shall not be deemed to be guilty of an offence in respect of that contravention, unless it is proved that he failed to take all reasonable measures for its prevention.

Section 98. Penalty for using false certificate of fitness. Whoever knowingly uses or attempts to use, as a certificate of fitness granted to himself under section 70, a certificate granted to another person under that section, or who, having procured such a certificate, knowingly allows it to be used, or an attempt to use it to be made, by another person shall be punishable with imprisonment for a term which may extend to (two months) or with fine which may extend to (one thousand rupees) or with both.

Section 101. Exemption of occupier or manager from liability in certain cases. Where the occupier or manager of a factory is charged with an offence punishable under this Act, he shall be entitled, upon complaint duly made by him and on giving to the prosecutor not less than three clear days' notice in writing of his intention so to do, to have any other person whom he charges as the actual offender brought before the court at time appointed for hearing the charge; and if, after the commission of the offence has been proved, the occupier or manager of the factory, as the case may be, proves to the satisfaction of the court-

- a) that he has used due diligence to enforce the execution of this Act, and
- b) that the said other person committed the offence in question without his knowledge, consent or connivance -

That other person shall be convicted of the offence and shall be liable to the like punishment as if he were the occupier or manager of the factory, and the occupier or manager, as the case may be, shall be discharged from any liability under this Act in respect of such offence:

Provided that in seeking to prove as aforesaid, the occupier or manager of the factory, as the case may be, may be examined on oath, and his evidence and that of any witness whom he calls in his support shall be subject to cross-examination on behalf of the person he charges as the actual offender and by the prosecutor.

Provided further that, if the person charged as the actual offender by the occupier or manager cannot be brought before the court at the time appointed for hearing the charge, the court shall adjourn the hearing from time to time for a period not exceeding three months and if by the end of the said period the person charged as the actual offenders cannot still be brought before the court, the court shall proceed to hear the charge against the occupier or manager and shall, if the offence be proved, convict the occupier or manager.

Section 111. Obligations of workers. (1) No worker in factory-

- a) shall willfully interfere with or misuse any appliance, convenience or other thing provided in a factory for the purposes of securing the health, safety or welfare of the workers therein;
- b) shall willfully and without reasonable cause do anything likely to endanger himself or others; and

-
- (c) shall willfully neglect to make use of any appliance or other thing provided in the factory for the purposes of securing the health or safety of the workers therein.
2. If any worker employed in a factory contravenes any of the provisions of this section or of any rule or order made thereunder, he shall be punishable with imprisonment for a term which may extend to three months, or with fine which may extend to one hundred rupees, or with both.

Section 111-A. Right of workers, etc. Every worker shall have the right to-

- i) obtain from the occupier, information relating to workers' health and safety at work;
- ii) get trained within the factory wherever possible, or, to get himself sponsored by the occupier for getting trained at a training centre or institute, duly approved by the Chief Inspector, where training is imparted for workers' health and safety at work;
- iii) represent to the Inspector directly or through his representative in the matter of inadequate provision for protection of his health or safety in the factory.

72-A. Qualification of Safety Officer - (1) A person shall not be eligible for appointment as a Safety Officer unless he -

- (i) Possesses recognized degree in any branch of engineering or technology and has had practical experience of working in a factory in a supervisory capacity for a period of not less than 2 years; or

a recognized degree in physics or chemistry and has had practical experience of working in factory in a supervisory capacity for a period of not less than 5 years; or

a recognized diploma in any branch of engineering or technology and has had practical experience of working in a factory in a supervisory capacity for a period of not less than 6 years;

- (ii) Possesses a degree or diploma in the industrial safety recognized by the State Government in this behalf; and
 - iii) Has adequate knowledge of the language spoken by majority of the workers in the region in which the factory where he is to be appointed is situated.
2. Notwithstanding the provisions contained in clauses (i) and (ii) sub-rule (1), any person who possesses a recognized degree or diploma in engineering or technology and has had experience of not less than 5 years in a department of the Central or State Government which deals with the administration of the Factories Act, 1948 or Indian Dock Labour Act, 1934; or

Possesses a recognized degree or diploma in engineering or technology and has had experience of not less than 5 years, (full time) on training education consultancy or research in the field of accidents prevention in industry or in any institution, shall also be eligible for appointment as a Safety Officer :

Provided that the Chief Inspector may, subject to such conditions as he may specify, grant exemption from the requirements of this sub-rule, if in his opinion, a suitable person possessing the necessary qualifications and experience is not available for appointment :

Provided further that in the case of a person who has been working as a Safety Officer in administration of Safety and Health provisions for a period not less than 3 years on the date of commencement of this Rule, the Chief Inspector may subject to such condition as he may specify relax all or any of the above said qualifications.

72-B. Conditions of Service - (a) Where the number of Safety Officer to be appointed in a factory as required by a notification in the Official Gazette exceeds one, one of them shall be designated as a Chief Safety Officer and shall have a status higher than of the others. The Chief Safety Officer shall be in overall charge of the safety functions as envisaged in rule 72-C, the other Safety Officers shall work under his control.

- b) The Chief Safety Officer or the Safety Officer in the case of factories where only one Safety Officer is required to be appointed shall be given the status of a senior executive and he shall work directly under the control of the Chief Executive of the Factory. All other safety officers shall be given appropriate status to enable them to discharge their functions effectively.
- c) The scale of pay and the allowances to be granted to the safety officers including the Chief Safety Officer, and other conditions of their service shall be the same as those of other officers of corresponding status in the factory.
- d) In case of dismissal or discharge a Safety Officer including the Chief Safety Officer shall have a right to appeal to the State Government whose decision thereon shall be final.

72-C. Duties of Safety Officer (a) The duties of a Safety Officer shall be to advise and assist the factory management in the fulfillment of its obligations, statutory otherwise concerning prevention of personal injuries and maintaining a safe working environment. These duties shall include the following, namely:-

- i) to advise the concerned departments in planning and organising measures necessary for the effective control or personal injuries;
- ii) to advise on safety aspects in all job studies and to carry out detailed job safety of selected jobs;

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- iii) to check and evaluate the effectiveness of the action taken or proposed to be taken to prevent personal injuries;
 - iv) to advise the purchase and stores departments in ensuring high quality and availability of personal protective equipment;
 - v) to advise on matter related to carrying out plant safety inspections;
 - vi) to carry out plant safety inspections in order to observe the physical conditions of work and the work practices and procedures by workers and to render advise on measures to be adopted for removing unsafe physical conditions and preventing unsafe actions by workers;
 - vii) to render advise on matters related to reporting and investigation of industrial accidents diseases;
 - viii) to investigate selected accidents;
 - ix) to investigate the cases of industrial diseases contracted dangerous occurrence reportable under Rule 108;
 - x) to advise on the maintenance of such records as are necessary relating to accidents, dangerous occurrences and industrial diseases;
 - xi) to promote setting up of safety committees and act as advisor to such committees;
 - xii) to organise in association with the concerned departments, campaigns, contests and other activities will develop and maintain the interest of the workers in establishing and maintaining safe conditions of work and procedures; and
 - xiii) to design and conduct either independently or in collaboration with the training department suitable training and educational programmes for the prevention of personal injuries.

72-D. Facilities to be provided to Safety officers - An occupier of the factory shall provide each Safety Officer with such facilities, equipment and information as are necessary to enable him to discharge his duties effectively.

72-E. Prohibition of performance of other Duties - No Safety Officer shall be required or permitted to do any work, which is inconsistent with of department to the performance of the duties prescribed in rule 72-C.

Facilities to Safety Department

1.0 Transport

- 1.1 A jeep sharing with other Department to be provided to Safety Department at all Projects / Stations irrespective of the designation of Head of Safety. HOP is to decide the sharing department. However, it is to be ensured that at least the vehicle is available with the Safety Department either for half a day or half of the working hours in a day.
- 1.2 A separate vehicle is to be provided during the period in cases such as training programmes, conferences, safety audit etc. or as and when necessary.

2.0 Communication

- 2.1 Intercom, P&T phone and Satcom facilities to be provided for head of Safety at office irrespective of the designation at all Projects / Stations and Regional Offices.
- 2.2 Intercom Telephone is to be provided at the office and residence for all the Safety Officers of the Projects / Stations.

3.0 Computer

- 3.1 At least one Computer with a printer and other accessories to be provided to Safety Department. Any additional computer may be provided as per NTPC norms.

The type and model to be decided by the project / Purchase Department as per prevalent specifications.

4.0 Creating Safety Awareness

- 4.1 As and when required a TV, VCR, Slide projector. OHP with screen to be made available to Safety Department where the Department has the facility to conduct the Training programmes independently.
- 4.2 Safety Department may hire a Photographer empanelled with the project as and when required after approval of the Competent authority.

5.0 Safety Centre

- 5.1 A separate Safety Centre to be established in all the Projects / Stations.
- 5.2 If the Safety Center is suitable for establishing the Emergency Control Centre (ECC as required under Disaster Management Plan, necessary facilities be provided as envisaged therein.

Fencing of Machinery (Sec. 21) :

This makes it obligatory to provide fencing to all moving and dangerous parts. These fencing shall be provided and kept in position.

Work on or near machinery in motion (Sec. 22) :

This is to ensure that only specially trained adult male workers wearing tight fitting clothing are permitted to work on/near running machine. A Register of such persons should be maintained.

Employment of young persons on dangerous machines (Sec. 23) :

Only those young persons who had received sufficient training in such work should be allowed to work under this Section. Their work should be adequately supervised.

Striking gear and devices for cutting off power (Sec. 24) :

The provision relates to mechanical and electrical isolation, which should be provided, maintained and used for cutting off power in emergencies.

Self-acting machines (Sec. 25) :

Traversing part of a self-acting machines are not to be allowed to reach 45 cm. from any fixed structure to prevent any possible injury.

Casing of any new machinery (Sec. 26) :

Set screws, bolts or keys, gears, which do not require frequent adjustment should be completely encased. No one can sell or let on hire or procure the machine without above said encasing.

Prohibition of employment of women or children near cotton openers (Sec. 27) :

Women and children are prohibited to work on or near the cotton openers.

Hoists and lifts (Sec. 28) :

It should have safe construction, safely maintained and examined by a competent person atleast once in every six months. Safe working load (SWL) shall be marked and over-loading not allowed, hoist or lift used for carrying persons shall be fitted with a gate for access, which should not open except at the designed platforms.

Lifting machines, chains, ropes and lifting tackles (Sec. 29) :

Safe construction, safe maintenance, examination once in 12 months, safe working load to be marked and not to be over-loaded, are the main characters of this Section. Safe passage should be provided for employees to work on or near the wheel tracks.

Revolving machinery (Sec. 30) :

Measures should be undertaken to prevent over-speeding.

Pressure Plant (Sec. 31) :

In the pressure vessels, pressure should not be exceeded to the safe working pressure. The pressure vessels should be examined regularly as per State Factory Rules.

Floors, stairs and means of access (Sec. 32) :

All floors, stairs and means of access should be free from all obstructions. They should be fully safe.

Pits, sumps, opening in floors, etc. (Sec. 33) :

Pits, sumps, openings in floors, etc. should be either covered or fenced.

Excessive Weights (Sec. 34) :

The employees should not be allowed to carry excessive weight to their capacities.

Protection of eyes (Sec. 35) :

Effective means like screens or suitable goggles should be provided to prevent risk to eyes from particles/excessive light.

Precautions against dangerous fumes, gases, etc. (Sec. 36) :

No person should be allowed to work or enter in confined space till the dangerous vapour/gas/dust has been removed within permissible limit and tested by a competent person. Proper protective equipments should be provided for the employees going inside such space.

Precautions regarding the use of portable electric light (Sec. 36A) :

The light/electrical appliance beyond 24 volts should not be used in confined space unless adequate safety provisions are provided. For inflammable gases, flame proof equipment should be used.

Explosive or inflammable dust, gas, etc. (Sec. 37) :

Explosive or inflammable dust or gas plant should be effectively enclosed. Measures should be taken to prevent ignition.

Precautions in case of fire (Sec. 38) :

The means of escape, its familiarisation to the workers and necessary fire fighting facilities should be ensured.

Power to require specifications of defective parts or tests of stability (Sec. 39) :

Government empowers itself to ask drawing specification of defective parts, etc.

Safety of building and machines (Sec. 40 & 40A) :

Under the provisions of this Section, all the building and equipments, should be safe and should be maintained safely.

Power to make Rules to supplement this Chapter (Sec. 41) :

This provides special power to State Government for making other Safety Rules.

In May 1987, the President of India gave his assent to the amendments to the Factories Act which provides for stringent measures for ensuring industrial safety, especially in hazardous industries. The amendments seek to enlarge the scope and applicability of the Act to matters relating to the protection of the environment on the premises that the activity carried on inside the factory would have a potential to adversely affect the surrounding environment. The following important provisions which have been inserted through the amendments :

Site Appraisal Committee (Sec. 41A) :

A hazardous process has been defined, and 20 industries have been specified which involve hazardous processes. These industries before they are located in any particular area require appraisal of the conditions from the point of view of raw materials, used, intermediate or finished products, by-products, wastes and effluents produced by the manufacturing process. The amendment provides for the establishment of a Site Appraisal Committee by the State Government which will examine an application for the establishment of a factory involving hazardous processes and make its recommendations.

Disclosure of Information (Sec. 41B) :

A factory carrying on a hazardous process will have to disclose information on health hazards, and measures to overcome such hazards arising out of harmful exposure in the operations. Not only the workers employed in the factory are required to be informed, but also the local authority within whose jurisdiction the factory is situated, the general public in the vicinity of the factory and the Chief Inspector of Factories are also required to be informed of the hazards.

Medical Examination (Sec. 41C) :

Since exposure to dangerous substances can cause occupational diseases, the workers employed in a hazardous process should be subjected to medical examination before they are employed in the process. They should also be examined periodically to detect any deterioration in health. The Act requires the occupier to maintain accurate and up-to-date health records of workers employed in such hazardous processes. Further, such records should be made available to the workers, though some reasonable conditions may be

prescribed. The first schedule has listed 29 industries in which hazardous processes are carried out. For each type of process, there will be different medical tests and examinations involved, and those are to be prescribed in the Rules.

Occupiers of hazardous industries are required to appoint person desired qualifications and experience in handling hazardous substances who are competent to supervise, such operations in the factory. Such a person will be responsible for guiding workers and ensuring safe working conditions in the plant. He will be expected to know about the hazardous properties of the materials being used or produced.

Government Inquiry (Sec. 41D) :

The Central Government may, in the event of the occurrence of an extraordinary situation involving a factory engaged in a hazardous process, appoint an Inquiry Committee to enquire into the standards of health and safety observed in the factory with a view to finding out the causes of any failure or neglect in the adoption of any measures or standards prescribed for the health and safety of the workers employed in the factory or the general public affected, or likely to be affected, due to such failure or neglect and for the prevention and recurrence of such extraordinary situations in future in such factory or elsewhere.

Emergency Standards (Sec. 41E) :

Where the Central Government is satisfied that no standards of safety have been prescribed in respect of a hazardous process or class of hazardous processes or where the standards prescribed are inadequate, it may direct the Director General of Factory Advice Service and Labour Institute, or any Institution specialised in matters relating to standards of safety in hazardous processes to lay down emergency standards for enforcement of suitable standards in respect of such hazardous processes.

Prohibit work (Sec. 87A) :

In conditions in a factory pose serious hazard by way of injury or death to the workers or the general public in the vicinity, the Occupier may be prohibited from employed any person in the factory till the hazard is removed. It shall be the duty of the Occupier to provide alternative employment, and the workers shall be entitled to wages of stoppage of work.

**FACTORIES ACT
THE FIRST SCHEDULE
[See section 2 (cb)]**

List of Industries Involving Hazardous Processes

1. Ferrous Metallurgical Industries
 - Integrated Iron and Steel
 - Ferrow-alloys
 - Special Steels
2. Non-ferrous Metallurgical Industries
 - Primary Metallurgical industries, namely, zinc, lead, copper, manganese and aluminium.
3. Foundries (ferrous and non-ferrous)
 - Castings and forgins including cleaning or smoothening/roughening by sand and shot blasting.
4. Coal (including coke) industries
 - Coal, lignite, coke, etc.
 - Fuel gases (including coal gas, producer gas, water gas)
5. Power generating industries
6. Pulp and paper (including paper products) industries
7. Fertiliser Industries
 - Nitrogenous
 - Phosphatic
 - Mixed
8. Cement Industries
 - Portland Cement (including slag cement, puzzolona cement and their products)

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9. Petroleum Industries
 - Oil refining
 - Lubricating oils and greases
 10. Petro-chemical Industries
 11. Drugs and Pharmaceutical Industries
 - Narcotics, drugs and pharmaceuticals
 12. Fermentation Industries (Distilleries and Breweries)
 13. Rubber (Synthetic) Industries
 14. Paints and Pigment Industries
 15. Leather Tanning Industries
 16. Electro-plating Industries
 17. Chemical Industries
 - Coke oven by-products and coaltar distillation products.
 - Industrial gases (nitrogen, oxygen, acetylene, argon, carbondioxide, hydrogen, sulphur dioxide, nitrous oxide, halogenated hydrocarbon, ozone, etc.)
 - Industrial carbon
 - Alkalies and acids
 - Chromates and dischromates
- Leads and its compounds
- Electrochemicals (metallic sodium, potassium and magnesium, chlorates, perchlorates and peroxides)
 - Electrothermal produces (artificial abrasive, calcium carbide)
 - Nitrogenous compounds (cyanides, cyanamides, and other nitrogenous compounds)
 - Phosphorous and its compounds

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- Halogens and halogenated compounds (chlorine, fluorine, bromine and iodine)
 - Explosives (including industrial explosives and detonators and fuses)
18. Insecticides, Fungicides, Herbicides and other Pesticides Industries
 19. Synthetic Resin and Plastics
 20. Man-made Fibre (Cellulosic and non-cellulosic) Industry
 21. Manufacture and repair of electrical accumulators
 22. Glass and Ceramics
 23. Grinding or glazing of metals
 24. Manufacture, handling and processing of asbestos and its products
 25. Extraction of oils and fats from vegetable and animal sources
 26. manufacture, handling and use of benzene and substances containing benzene
 27. Manufacturing processes and operations involving carbon disulphide
 28. Dyes and Dyestuff including their intermediates
 29. Highly flammable liquids and gases

FACTORIES ACT
THE SECOND SCHEDULE
(See section 41-F)

Permissible Levels of Certain Chemical substances in work environment

Substances	Permissible limits of exposure			
	Time-Weighed average concentration (8 hrs)		Short-term exposure limit (15 min)*	
1.	2.	3.	4.	5.
Acetaldehyde	100	180	150	270
Acetic Acid	10	25	15	37
Acetone	750	1780	1000	2375
Acrolein	0.1	0.25	0.3	0.8
Acrylonitrile - skin	.2	4.5	--	--
Aldrin - skin	--	0.25	--	0.75
Allyl chloride	1	3	2	6
Ammonia	0.25	18	35	27
Aniline-skin	2	1-	5	20
Anisidine (Poisoners) - skin	0.1	0.5	--	--
Arsenic & compounds (as As)	--	0.2	--	--
Benzene	10	20	25	75
Beryllium	--	0.002	--	--
Boron Trifluoride	0.1	0.7	0.3	2
Bromine	0.1	0.7	0.3	2
Butane	800	1900	--	--
2 Butanon (Methylethyle Ketone-MEK)	200	590	300	885
n-Butylacetate	150	710	200	950
n-Bytylalcohol-skin	C50	C150	--	--
Sec/tert. Butylacetate	200	950	250	1190
Butyl Mercaptan	0.5	1.5	--	--
Cadmium-dust and salts (as Cd)	--	0.5	--	0.2
Calcium oxide	--	2	--	--
Carbaryl (seevin)	--	5	--	10
Carbofuran (Furadan)	--	01	--	--
Carbon disulphide-skin	10	30	--	--
Carbon monoxide	50	40	400	440
Carboa tetrachloride-skin	m5	30	20	125
Carbonyl Chloride (Phosgene)	0.1	0.4	--	--
Chlorobenzene (monochlorobenzene)	75	350	--	--
Chloridane-skin	--	0.5	--	2

1.	2.	3.	4.	5.
Chlorine	1	3	3	9
Chloroform	10	50	50	225
bis-Chloromethylether	0.001	0.005	--	--
Chromic acid and chromates (as Cr)	--	0.05	--	--
Chromous Salts (as Cr)	--	0.05	--	--
Copper fume	--	0.2	--	--
Cotton dust, raw	--	0.2	--	0.6
Cresol, all isomers-skin	5	22	--	--
Cyanides (as CN)-skin	--	5	--	--
Cyanogen	10	20	--	--
DDT (Dichloro-diphenyl Trichloro-ethene)	--	1	--	3
Demeton-skin	0.001	0.1	0.003	0.3
Diazinon-skin	--	0.1	--	0.3
Dibutyl Phythalate	--	5	--	10
Dichlorvos (DDVP)-skin	0.1	1	0.3	3
Dieldrin-skin	--	0.25	--	0.75
Dinitrobenzene (all isomers)-skin	0.15	1	0.5	3
Dinitrotolune-skin	--	1.5	--	4
Diophenyl	0.2	1.5	0.6	4
Endosulfan (Thiodan)-skin	--	0.1	--	0.4
Endrin-skin	--	0.1	--	0.3
Ethylacetate	400	1400	--	--
Ethylalcohol	1000	1900	--	--
Ethylamin	10	18	--	--
Flourides (as F)	--	2.5	--	--
Flourine	1	2	2	4
Formic Acid	5	9	--	--
Hydrazin-skin	0.1	0.1	--	--
Hydrogen Chloride	C5	C7	--	--
Hydrogen Cyanide-skin	C10	C10	--	--
Hydrogen Flouride (as F)	3	2.5	6	5
Hydrogen Peroxide	1	1.5	2	3
Hydrogen Sulphide	10	14	15	21
Gasoline	300	900	500	1500
Iodine	CO.1	C1	--	--
Iron Oxide Fume (Fe ₂ O ₃ (as Fe)	--	5	--	10
Isoamylacetate	100	525	125	655
Isoamylalcohol	100	300	125	450
Isoabutylalcohol	50	150	75	225
Lead, Inorg. fumes and dusts (as (Pb)	--	0.15	--	0.45
Lindance-skin	--	0.5	--	1.5
Malathion-skin	--	10	--	--

1.	2.	3.	4.	5.
Manganese (as Mn) dust and compounds	--	CO5	--	--
Fume	--	1	--	0.3
Mercury (as Hg)—skin Alkyl compounds	--	0.01	--	0.03
All forms except alkyl vapour	--	0.25	--	--
Aryl and inorganic compounds	--	0.1	--	--
Methylalcohol (methanol)-skin	200	260	250	310
Methylcellosolve-skin (2 methoxy ethanol)	5	16	--	--
Methyl isobutyl Ketone-skin	50	205	75	300
Methyl Isocyanate	0.02	0.05	--	--
Naphthalene	10	50	15	75
Nickel carbonyl (as Ni)	0.05	0.35	--	--
Nitric acid	2	5	4	10
Nitric oxide	25	30	35	45
Nitrobenzene-skin	1	5	2	10
Nitrogen dioxide	3	6	5	10
Oil mist, minerals	--	5	--	10
Oxone	0.1	0.2	0.3	0.6
Parathion-skin	--	0.1	--	0.3
Phenol-skin		5	19	10
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Phorate (Thimet)-skin	--	0.05	--	0.2
Phosgene (Carbonyl chloride)	0.1	0.4	--	--
Phosphine	0.3	0.4	1	1
Phosphorous (yellow)	--	0.1	--	0.3
Phosphorus pentachloride	0.1	1	--	--
Phosphorus trichloride	0.2	1.5	0.5	3
Picric acid-skin	--	0.1	--	0.3
Pyridine	5	15	10	30
Sodium hydroxide	--	C2	--	--
Syrene, monomer (phanylethylene)	50	215	100	425
Sulphur dioxide	2	5	5	10
Sulphur hexafluoride	100	6000	1250	7500
Sulphuric acid	--	1	--	--
Toluene (Tuluol)	100	375	150	560
O-Tuluidine-skin	2	9	--	--
Tributyl phosphate	0.2	2.5	0.4	5
Trichloroethylene	50	270	200	1080
Uranium, natural (as U)	--	0.2	--	0.5
Vinyl chloride	5	10	--	--
Welding fumes	--	5	--	--

1.	2.	3.	4.	5.
Xylene (o-, m-, P-Isomers)	100	435	150	655
Zirconium compounds (as Zr)	--	5	--	10

C denotes ceiling limit.

*Not more than 4 times a day with at least 60 min. interval between successive exposures.

Substance	Permissible time-weighted average (8 hours) concentration
(i) Silica	
a) Crystalline	
b) Quartz	
(1) In term of dust count	$\frac{10600}{\% \text{ Quartz} + 10}$ mg/m ³
(2) In term of count dust	$\frac{10}{\% \text{ respirable quartz} + 2}$ mg/m ³
(3) In term of total dust	$\frac{10}{\% \text{ Quartz} + 3}$ mg/m ³
(ii) Cristobalite	-- Half the limits given against quartz.
(iii) Tridymite	-- Half the limits given against quartz.
(iv) Silica fused	-- Same limit as for quartz.
(v) (a) Tripoli	-- Same limit as in formula in time 2 given against quartz.
(b) Amorphous	-- 705 mpcm.

FACTORIES ACT
THE THIRD SCHEDULE
[See section 89 and 90] - List of Notifiable Diseases

1. Lead poisoning including poisoning by an preparation or compound of lead or their sequelae.
2. Lead tetra-ethyl poisoning.
3. Phosphorus poisoning or its sequelae.
4. Mercury poisoning or its sequelae.
5. Manganese poisoning or its sequelae.
6. Arsenic poisoning or its sequelae.
7. Poisoning by nitrous fumes.
8. Carbon bisulphide poisoning
9. Benzene poisoning, including poisoning by any of its homologues, their nitro or amido derivatives or its sequelae.
10. Chrome ulceration or its sequelae.
11. Anthrax.
12. Silicosis.
13. Poisoning by halogens or halogen derivatives of the hydrocarbons of the aliphatic series.
14. Pathological manifestation due to -
 - a) radium or other radio-active substances;
 - b) X-rays
15. Primary epitheliomatous cancer of the skin
16. Toxic anaemia
17. Toxic jaundice due to poisonous substances.
18. Oil lacne or dermatitis due to mineral oils and compounds containing mineral oil base.

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19. Byssionosis.
 20. Asbestosis.
 21. Occupational or contact dermatitis caused by direct contact with chemicals and paints. These are of two types, that is, primary irritants and allergic sensitizers.
 22. Noise induced hearing loss (exposure to high noise levels).
 23. Beryllium poisoning
 24. Carbon monoxide
 25. Coal miners' pneumoconiosis
 26. Phosgene poisoning
 27. Occupational cancer
 28. Isocyanates poisoning
 29. Toxic nephritis.

**THE BUILDING AND OTHER CONSTRUCTION WORKERS (REGULATION
OF
EMPLOYMENT AND CONDITIONS OF SERVICE ACT, 1996**

Safety and Health Measures

Section 38, Safety Committee and Safety Officers (1) In every establishment wherein five hundred or more building workers are ordinarily employed, the employer shall constitute a Safety Committee consisting of such number of representatives of the employer and the building workers as may be prescribed by the State Government.

Provided that the number of persons representing the workers, shall, in no case, be less than the persons representing the employer.

- (1) In every establishment referred to in sub-section (1), the employer shall also appoint a safety officer who shall possess such qualifications and perform such duties as may be prescribed.

Section 39. Notice of certain accidents - (1) Where in any establishment an accident occurs which causes death or which causes any bodily injury by reason of which the person injured is prevented from working for a period of forty-eight hours or more immediately following the accident, or which is of such a nature as may be prescribed, the employer shall give notice thereof to such authority, in such form and within such time as may be prescribed.

- (2) On receipt of a notice under sub-section (1) the authority referred to in that sub-section may make such investigation or inquiry as it considers necessary.
- (3) Where a notice given under sub-section (1) relates to an accident causing death of five or more persons, the authority shall make an inquiry into such accident within one month of the receipt of the notice.

SPECIAL PROVISIONS

Section 44. Responsibility of employers - An employer shall be responsible for providing constant and adequate supervision of any building or other construction work in his establishment as to ensure compliance with the provisions of this act relating to safety and for taking all practical steps necessary to prevent accidents.

Section 46. Notice of commencement of building or other construction work - (1) An employer shall, at least thirty days before the commencement of any building or other construction work, send or cause to be sent to the Inspector having jurisdiction in the area where the proposed building or other construction work is to be executed, a written notice containing -

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- (a) the name and situation of the place where the building or other construction work is proposed to be carried on;
 - (b) the name and address of the person who is undertaking the building or other construction work;
 - (c) the address to which communications relating to the building or other construction work may be sent;
 - (d) the nature of the work involved and the facilities, including any plant and machinery, provided;
 - (e) the arrangements for the storage of explosives, if any, to be used in the building or other construction work;
 - (f) the number of workers likely to be employed during the various stages of building or other construction work;
 - (g) the name and designation of the person who will be in overall charge of the building or other construction work at the site;
 - (h) the approximate duration of the work;
 - (i) such other matters as may be prescribed.
- (2) Where any change occurs in any of the particulars furnished under sub-section (1), the employer shall intimate the change to the Inspector within two days of such change.
- (3) Nothing contained in sub-section (1) shall apply in case of such class of building or other construction work as the appropriate Government may by notification specify to be emergent works.

Duties and responsibilities of workers - (1) It shall be the duty of every building worker to comply with the requirements of such of these rules as relate to him, and act and co-operate in carrying out the requirements of these rules as relate to him, and act and co-operate in carrying out the requirements of these rules and if he discovers any defects in the lifting appliance, lifting gear, lifting device, concerning any transport equipment or other equipment, to report such defects without unreasonable delay to his employer or for man or other person in authority.

- (2) No building workers, shall unless duly authorised or except in case of necessity, remove or interfere with any fencing, gangway, gear, ladder, hatch covering, life saving appliances, lighting or other things whatsoever required by the Act and these rules to be provided. If any of aforesaid things is removed, such thing shall be restored at the end of the period during which its removal was necessary, by the persons engaged in that work.

- (3) Every building worker, shall use only means of access provided in accordance with these rules and no person shall authorize or order another to use means of access other than such means of access.
- (4) It shall be the duty of a building worker to keep the latrines, urinals, washing points, canteen and other facilities provided by the employer for securing his welfare in a clean and hygienic condition.

The Building and other Construction Workers (Regulation of Employment and Conditions of Service) Central Rules, 1998

Rule 34. Excessive noise, vibration etc. - An employer shall ensure at a construction site of a building or other construction work that adequate measures are taken to protect building workers against the harmful effects of excessive noise or vibration at such construction site and the noise level in no case exceeds the limits laid down in Schedule - VI annexed to these rules.

Rule 35. Fire protection - An employer shall ensure at a construction site of a building or other construction work that,

- (a) such construction site is provided with -
- i. fire extinguishing equipment sufficient to extinguish any probable fire at such construction site;
 - ii. an adequate water supply at ample pressure as per national standards;
 - iii. number of trained persons required to operate the fire extinguishing equipment provided under sub clause (i);
- (b) fire extinguishing equipment provided under sub clause (i) of clause (a) is properly maintained and inspected at regular intervals of not less than once in a year by the responsible person and a record of such inspections is maintained;
- (c) in case of every launch or boat or other craft used for transport of building workers and the cabin of every lifting appliance including mobile crane, adequate number of portable fire-extinguishing equipment of suitable type shall be provided at each of such launch or boat or craft or lifting appliance.

Rule 36. Emergency action plans - An employer shall ensure at a construction site of a building or other construction work that in case more than five hundred building workers are employed at such construction site emergency action plan to handle the emergencies life-

- a) fire and explosion,
- b) collapse of lifting appliances and transport equipment,

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- c) collapse of building, sheds or structures etc.,
 - d) gas leakage or spillage of dangerous goods or chemicals,
 - e) drowning of building workers, sinking of vessels, and
 - f) land slides getting building worker buried, floods, storms and other natural calamities, is prepared and submitted for the approval of the Director General.

Rule 37. Fencing of motors, etc. - An employer shall ensure at a construction site of a building or other construction work that -

- a. all motors, cogwheels, chains, and friction gearing, flywheels, shafting, dangerous and moving parts of machinery (whether or not driven by mechanical power) and steam pipes are securely fenced or lagged.
- b. The fencing of dangerous parts of machinery is not removed while such machinery is in motion or in use;
- c. No part of any machinery which is in motion and which is not securely fenced is examined, lubricated, adjusted or repaired except by a person skilled for such examination, lubrication, adjustment or repairs;
- d. Machine parts are cleaned when such machinery is stopped;
- e. When a machine is stopped for servicing or repairs, adequate measures are taken to ensure that such machine does not re-start inadvertently.

Rule 38. Lifting and carrying of excessive weight - An employer shall ensure at a construction site of a building or other construction work that -

- a. no building workers lift by hand or carry overhead or over his back or shoulders any material, article, tool or appliances exceeding in weight the maximum limits set out in the following table:

Person	Maximum Weight Load
Adult - man	56 kg
Adult - woman	30 kg
Adolescent - male	30 kg
Adolescent - female	20 kg

unless aided by any other building worker or a mechanical device

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- b. no building workers aided by the other building workers, lift by hand or carry overhead of over their back or shoulders, any material, article, tool or appliance exceeding in weight the sum total or maximum limits set out for each building worker separately under clause (a) unless aided by a mechanical device.

Rule 39. Health and safety policy - (1) (a) Every establishment employing fifty or more building workers shall prepare a written statement of policy in respect of safety and health of building workers and submit the same for the approval of the Director General;

- b. the policy referred to in clause (a) shall contain the following, namely :-
 - i. the intentions and commitments of the establishment regarding health, safety and environmental protection of building workers;
 - ii. organizational arrangements made to carry out the policy referred to in clause (a) specifying the responsibility at different levels of hierarchy;
 - iii. responsibilities of the principal employer, contractor, sub-contractor, transporter or other agencies involved in the building or other construction work;
 - iv. techniques and methods for assessment of risk to safety, health and environmental and remedial measures therefore;
 - v. arrangements for training of building workers, trainers, supervisors or other persons engaged in the construction work;
 - vi. other arrangements for making the policy referred to in clause (a), effective;
 - c) the intention and commitment referred to sub-clause n (i) of clause (b) shall be taken into account in making decisions relating to plant, machinery, equipment, materials and placement of building workers.
- 2) A copy of the policy referred to in clause (a) sub-rule (1), signed by an authorised signatory shall be sent to the Central Government.
- (3) The establishment shall revise the policy referred to in clause (a) of sub-rule (1) as often as necessary under the following circumstances, namely :-
- i. whenever any expansion or modification having implication on safety and health of the building workers is made in such building or other construction work; or
 - ii. whenever any new building or other construction work, substances, articles or techniques are introduced having implication on health and safety of building workers.

- (3) A copy of the policy referred to in sub-clause (a) of sub-rule (1) shall be displayed at the conspicuous places in Hindi and a local language understood by the majority of building workers at a construction site.

Rule 40. Dangerous and harmful environment - An employer shall ensure at a construction site of a building or other construction work that -

- a) When an internal combustion engine exhausts into a confined space or excavation or tunnel or any other work place where neither natural ventilation nor artificial ventilation system is adequate to keep the carbon monoxide content of the atmosphere below fifty parts per million, adequate and suitable measures are taken at such work place in order to avoid exposure of building workers to health hazards;
- b) No building worker is allowed to enter any confined space or tank or trench or excavation wherein there is given off any dust, fumes or other impurities of such nature and to such extent as is likely to be injurious or offensive to the building worker or in which explosives, poisonous, noxious or gaseous material or other harmful articles have been carried or stored or in which dry ice has been used a refrigerant, or which has been fumigated or in which there is a possibility of oxygen deficiency, unless all practical steps have been taken to remove such dust, fumes, or other impurities and dangers which may be present and to prevent any further ingress thereof, and such work place or tank or trench or excavation is certified by the responsible person to be safe and fit for the entry of such building workers.

Rule 41. Overhead protection - (1) The employer shall ensure at the building or other construction work that overhead protection is erected along the periphery of every building under construction, which shall be of fifteen metres or more in height when completed.

- (2) Overhead protection referred to in sub-rule (1) shall not be less than two metres wide and shall be erected at a height not more than five metres above the base of the building and the outer edge of such overhead protection shall be one hundred fifty millimetres higher than the inner edge thereof or shall be erected at an angle of not more than twenty degrees to its horizontal sloping into the building.
- (3) The employer shall ensure at the building and other construction work that any area exposed to risk of falling material, articles or objects is roped off or cordoned off or otherwise suitably guarded from inadvertent entry of persons other than building workers at work in such area.

Rule 42. Slipping, tripping, cutting, drowning and falling hazards - (1) All passageways, platforms and other places of construction work at the building or other construction work shall be kept by the employer free from accumulations of dust, debris or similar material and from other obstructions that may cause tripping.

- (2) Any sharp projections or protruding nails or similar projections that may cause a cutting hazard to a building worker at the building or other construction shall be removed or otherwise made safe by taking suitable measures by the employer.
- (3) No employer shall allow any building worker at the building or other construction work to use the passageway, or a scaffold, platform or any other elevated working surface which is in a slippery and dangerous condition and shall ensure that water, grease, oil or other similar substances which may cause the surface slippery, be removed or sanded, saw dusted or covered with suitable material to make it safe from slipping hazard at a building or other construction work.
- (4) Wherever building workers at a building or other construction work are exposed to the hazard of falling into water, they shall be provided by the employer with adequate equipment for saving themselves from drowning and rescuing from such hazard and if the Director General considers necessary, well-equipped boat or launch manned with trained personnel shall be provided by the employer at the site of such work.
- (5) Every open side or opening into or through which a building worker, vehicle or lifting appliance or other equipments may fall at a building or other construction work shall be covered or guarded suitably by the employer to prevent such fall except where free access is necessary by reasons of the nature of the work.
- (6) Wherever building workers at a building or other construction work are exposed to the hazard of falling from height while employed on such work, they shall be provided by the employer with adequate equipment or means for saving them from such hazards. Such equipment or means shall be in accordance with the national standards.
- (7) Whenever there is a possibility of falling of any material, equipment or building worker at a construction site relating to a building or other construction work, adequate and suitable safety net shall be provided by the employer in accordance with the national standards.

Rule 43, Dust, gases, fumes etc. - An employer shall prevent concentration of dust, gases fumes by providing suitable means to control their concentration within the permissible limit so that they may not cause injury or pose health hazard to a building workers at a building or other construction work.

Rule 44. Corrosive Substances - The employee shall ensure that corrosive substances including alkalis and acids shall be stored and used by a person dealing with such substances at a building or other construction work in such a manner that it does not endanger the building worker and suitable protective equipment shall be provided by the employer to a building worker during handling or use of such substances at a building or other construction work and in case of spillage of such substances on the building worker immediate remedial measures shall be taken by the employer.

Rule 45. Eye Protection - Suitable personal protective equipment for the protection of eyes shall be provided by an employer and used by the building worker engaged in operations like welding, cutting chipping, grinding or similar operations which may cause hazard to his eyes at a building or other construction work.

Rule 46. Head protection and other protective apparel - (1) Every building worker required to pass through or work within the areas building workers at building or other construction work where there is hazard of his being struck by falling objects or materials shall be provided by the employer with Safety helmets of type and tested in accordance with the national standards.

- (2) Every building worker required to work in water or in wet concrete or in other similar work at building or other construction work, shall be provided with suitable water-proof boots by the employer.
- (3) Every building worker required to work in rain or in similar wet condition at building or other construction work, shall be provided with suitable water-proof coat with hat by the employer.
- (4) Every building worker required to use or handle, acid or other similar corrosive substances at a building or other construction work shall be provided with appropriate protective equipment by the employer, in accordance with the national standards.
- (5) every building worker engaged in handling sharp objects or materials at a building or other construction work which may cause hand injury, shall be provided with suitable hand-gloves by the employer, in accordance with the national standards.

Rule 47. Electrical Hazards - (1) Before commencement of any building or other construction work, the employer shall take adequate measures to prevent any worker from coming into physical contact with any electrical equipment or apparatus, machines or live electrical circuit which may cause electrical hazard during the course of his employment at a building or other construction work.

- (2) The employer shall display and maintain suitable warning signs at conspicuous places at a building or other construction work in Hindi and in local language understood by the majority of the building workers.
- (3) In workplaces at a building or other construction work where the exact location of underground electric power line is not known, the building workers using jack hammers, crow bars or other hand-tools which may come in contact with a live electrical line, shall be provided by the employer with insulated protective gloves and foot-wear of the type in accordance with the national standards.
- (4) The employer shall ensure that, as far as practicable, no wiring, which may come in contact with water or which may be mechanically damaged, is left on ground or floor at a building or other construction work.
- (5) The employer shall ensure that all electrical appliances and current carrying equipment used at a building or other construction work are made of sound material and are properly and adequately earthed.
- (6) The employer shall ensure that all temporary electrical installations at a building or other construction work are provided with earth-leakage circuit breakers.

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- (7) The employer shall ensure that all electrical installations at a building or other construction work comply with the requirements of any law for the time being in force.

Rule 48. Vehicular Traffic - (1) Whenever any building or other construction work is being carried on, or is located in close proximity to a road or any other place where any vehicular traffic may cause danger to building workers, the employer shall ensure that such building or other construction work is barricaded and suitable warning signs and lights displayed or erected to prevent such danger and if necessary, he may make a request in writing to the concerned authorities to control such traffic.

- (2) The employer shall ensure that all vehicles used at construction site of a building or other construction work comply with the requirements of the Motor Vehicles Act, 1988 (59 of 1988) and the rules made thereunder.

- (3) The employer shall ensure that a driver of a vehicle of any class or description operating at a construction of a building or other construction work holds a valid driving licence under the Motor Vehicles Act, 1988 (59 of 1988).

Rule 49. Stability of structures - The employer shall ensure that no wall, chimney or other structure or part of a structure is left unguarded in such condition that it may fall, collapse or weaken due to wind pressure, vibration or due to any other reason at a site of a building or other construction work.

Rule 50. Illumination of passageways, etc. - The employer shall ensure that illumination sufficient for maintaining safe working conditions at a site of a building or other construction work is provided where building workers are required to work or pass and for passage ways, stairways and landing, such illumination is not less than that provided in the relevant national standards.

Rule 51. Stacking of materials - The employer shall ensure, at a construction site of a building or other construction work that -

- a. all building materials are stored or stacked in a safe and orderly manner to avoid obstruction of any passageway or place of work;
- b. material piles are stored or stacked in such a manner as to ensure stability;
- c. material or equipment is not stored upon any floor or platform in such quantity as to exceed its safe carrying capacity;
- d. material or equipment is not stored or placed so close to any edge of a floor or platform as to endanger the safety of persons below or working in the vicinity.

Rule 52. Disposal of debris - The employer shall ensure, at a construction site of a building or other construction work that -

- a. debris are handled and disposed of by a method which does not cause danger to the safety of a person;

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- b. debris are not allowed to accumulate so as to constitute a hazard;
 - c. debris are kept sufficiently moist to bring down the dust within the permissible limit;
 - d. debris are not thrown inside or outside from any height of such building or other construction work;
 - e. on completion of work, left over building material, article or other substance or debris are disposed of as soon as possible to avoid any hazard to any traffic or person.

Rule 53. Numbering and marking of floors - The employer shall ensure that each floor or level of a building or other construction work is appropriately numbered or marked at the landing of such floor or level.

Rule 54. Use of safety helmets and shoes - The employer shall ensure that all persons who are performing any work or services at a building or other construction work, wear safety shoes and helmets conforming to the national standards.

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SAFETY ORGANISATION

Rule 208. Safety Committees - (1) Every establishment wherein five hundred or more building workers are ordinarily employed, there shall be a safety committee constituted by the employer which shall be represented by equal number of representatives of employer and building workers employed in such establishment. In no case the number of representatives of the employer shall exceed the representatives of building workers. The Committee shall be represented by representatives of the recognized unions wherever such unions exist.

(2) The main functions of the Safety Committee shall be -

- a. to identify probable causes of accident and unsafe practices in building or other construction work and to suggest remedial measures;
- b. to stimulate interest of employer and building workers in safety by organising safety weeks, safety competition, talks and film shows on safety, preparing posters or taking similar other measures as and when required or as necessary;
- c. to go round the construction site with a view to check unsafe practices and detect unsafe conditions and to recommend remedial measures for the rectification including First Aid Medical and Welfare Facilities;

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- d. to look into the health hazards associated with handling different types of explosives, chemicals and other construction material and to suggest remedial measures including use of proper personal protective equipment;
 - e. to suggest measures for improving welfare amenities in the construction site and other miscellaneous aspects of safety, health and welfare in building or other construction work;
 - f. to bring to the notice of the employer the hazards associated with use, handling and maintenance of the equipment used during the course of building and other construction work.
- (3) The safety committee shall meet at regular intervals at least once in a month and it shall be chaired by the senior person having overall control over the affairs of the construction site.
 - (4) The agenda and minutes of the meeting shall be circulated to all concerned and it shall be in the language understood by majority of the building workers and shall be produced to the inspector on demand for inspection.
 - (5) The decision and recommendations of the safety committee shall be complied with by the employer within reasonable time limits.

Rule 209, Safety Officer

1. In every establishment wherein five hundred or more building workers are ordinarily employed, the employer shall appoint safety officers as per the scale laid down in Schedule-VIII annexed to these rules. Such safety officers may be assisted by suitable and adequate staff.
2. Duties, qualifications and the condition of service of safety officers appointed under sub-rule (1) shall be as provided in Schedule-VIII annexed to these rules.
3. Wherever number of workers employed by single employer is less than five hundred, such employers may form a group and appoint a common safety officer for such group of employers with prior permission of Director General.

Rule 210. Reporting of accidents - (1) Notice of any accident on the construction site which either -

- a. causes loss of life; or
- b. disables a building worker from working for a period of forty eight hours or more immediately following the accident, shall forthwith be sent by telegram, telephone, fax or similar other means including special messenger within four hours in case of fatal accidents and seventy two hours, in case of other accidents involving building worker, to -

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- i. the Regional Labour Commissioner (Central), having jurisdiction in the area in which the establishment in which such accident or dangerous occurrence took place is located. Such Regional Labour Commissioner (Central) shall be the authority appointed under section 39 of the Act;
 - ii. Board with which the building worker involved in accident was registered as a beneficiary ;
 - iii. Director General; and
 - iv. The next in kin or other relative of building worker involved in accident.
- (2) Notice of any accident at a construction site of a building or other construction work which -
- a. causes loss of life; or
 - b. disables such building worker from work for more than ten days following the accident, shall also be sent to -
 - i. the officer incharge of the nearest station;
 - ii. The District Magistrate or if the District Magistrate by order so desires to the Sub-Divisional Magistrate.
- (3) In the case of an accident falling under clause (b) or sub-rule (1) or clause (b) of sub-rule (2). the injured building worker shall be given first-aid and immediately thereafter be transferred to a hospital or other place for medical treatment.
- (4) Where any accident causing disablement subsequently results in death of a building worker, notice in writing of such death shall be communicated to the authorities as mentioned in sub-rule (1) and sub-rule (2) within seventy two hours of such death.
- (5) The following classes of dangerous occurrences shall be reported to the Inspector having jurisdiction, whether or not any death or disablement is caused to a building worker, in the manner prescribed in sub-rule (1), namely :-
- a. collapse or failure of lifting appliances or hoist or conveyors or other similar equipment for handling building or construction material or breakage or failure of rope, chain or loose gears; over turning of cranes used in building or other construction work; falling of objects from height;
 - b. collapse or subsidence of soil, any wall, floor, gallery, roof or any other part of any structure, platform, staging, scaffolding or any means of access including formwork;
 - c. contract work, excavation, collapse of transmission;

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- d. explosion of receiver or vessel used for storage at a pressure greater than atmospheric pressure of any gas or gases or any liquid or solid used as building material;
 - e. fire and explosion causing damage to any place on construction site where building workers are employed;
 - f. spillage or leakage of hazardous substances and damage to their container;
 - g. collapse, capsizing, toppling or collision of transport equipment;
 - h. leakage or release of harmful toxic gases at the construction site.
- (6) In case of failure of a lifting appliance, loose gear, hoist or building and other construction work machinery and transport equipment at a construction site of a building or other construction work, such appliances, gear, hoist, machinery or equipment and the site of such occurrence shall, as far as practicable, be kept undisturbed until inspected by the inspector having jurisdiction.
- (7) Every notice given under sub-rule (1), sub-rule (2) or sub-rule (4) shall be followed by a written report to the Inspector, authority under Section 39 of the act, the Board and the Director General in Form XIV under proper acknowledgement.

MEDICAL FACILITIES

Rule 223. Medical examination of building workers, etc. - The employer shall ensure at a construction site of a building or other construction work that -

- a.
 - i. a building worker who is employed for a work involving such risk or hazards, inherent in such work as the Director General considers appropriate for the periodical medical examination of such worker, is medically examined at such intervals as the Director General may direct from time to time;
 - ii. every operator of a crane, which or other lifting appliance, transport equipment or vehicle, is medically examined before employing such operator and again periodically, at such intervals as the Director General may direct from time to time;
 - iii. the medical examination referred to in sub-clause (i) and sub-clause (ii) is in accordance with Schedule VII, annexed to these rules and is conducted by such medical officers or at such hospitals as are approved by the Central Government for the purpose from time to time;

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- iv. in case of a building worker who is exposed to special occupational health hazard owing to job or work assigned to such workers, the periodical medical examination referred to in sub-clause (i) or sub-clause (ii) includes such special investigations as may be deemed necessary by the construction medical officer examining such building worker for the diagnosis of occupational disease;
 - b. no building worker is charged for the medical examination referred to in sub-clause (i) or sub-clause (ii) of clause (a) and the cost of such examination is borne by the employer employing such building worker;
 - c. certificate of medical examination referred to in sub-clause (i) or sub-clause (ii) of clause (a) is issued in Form XI annexed to these rules;
 - d. the record of the medical examination referred to in sub-clause (i) or sub-clause (ii) of clause (a) of every building worker employed by him is maintained in a register in Form-XII annexed to these rules and such register shall be made available to the inspector having jurisdiction, on demand;
 - e. in case a construction medical officer examining a building worker under sub-clause (i) or sub-clause (ii) of clause (a) is of the opinion that such building worker so examined is required to be taken away from the building or other construction work at which he is employed for health protection, such medical officer shall inform the employer of such building worker accordingly and such employer of such building worker accordingly and such employer shall inform such opinion to the Board where such worker is registered as a beneficiary.

Rule 224. Duties of construction medical officers - (1) The medical examination referred to in sub-clause (i) or sub-clause (ii) of clause (a) of rule 223 shall be carried out by a construction medical officer.

- (2) The duties and responsibilities of such construction medical officer shall be as given below, namely :-
- a. medical examination of building workers;
 - b. first-aid care including emergency medical treatment;
 - c. notification of occupational diseases to the concerned authorities in accordance with these rules;
 - d. immunization services;
 - e. medical record upkeep and maintenance;
 - f. health education including advisory services on family planning, personal hygiene, environmental sanitation and safety;
 - g. referral services.

Rule 225. Occupational health centres - The employer shall ensure at a construction site of a building or other construction work involving hazardous processes specified under Schedule-IX annexed to these rules that -

- a. an occupational health centre, mobile or static, is provided and maintained in good order at such site;
- b. services and facilities as per the scale laid down in Schedule-X, annexed to these rules are provided at the occupational health centre referred to in clause (a);
- c. a construction medical officer appointed at a occupational health centre possesses the qualification as laid down in Schedule-XI, annexed to these rules.

Rule 226. Ambulance Room - The employer shall ensure at a construction site of a building or other construction work that -

- a. in case five hundred or less workers are employed at such construction site there is an ambulance room at such construction site or an arrangement with a nearby hospital for providing an ambulance room and such ambulance room is in the charge of a qualified nurse and the service of such ambulance room is available to building worker employed at such construction site at every time when he is at work;
- b. in case more than five hundred building workers are employed at such construction site there is an ambulance room with effective communication system and such ambulance room is in the charge of a qualified nurse and the service of such ambulance room is available to a building worker employed at such construction site at every time when he is at work, and such ambulance room is in overall charge of a construction medical officer;
- c. an ambulance room referred to in clause (a) or clause (b) is equipped with the articles specified in Schedule IV, annexed to these rules;
- d. record of all cases of accidents and sickness treated at the ambulance room referred to in clause (a) or clause (b) is maintained and produced to the inspector having jurisdiction on demand.

Rule 227. Ambulance van - The employer shall ensure at a construction site of a building or other construction work that an ambulance van is provided at such construction site or an arrangement is made with a nearby hospital for providing such ambulance van for transportation of serious cases of accident or sickness of the building workers to the hospital promptly and such ambulance van is maintained in good repair and is equipped with standard facilities specified in Schedule V annexed to these rules.

Rule 228. Stretchers - The employer shall ensure at a construction site of a building or other construction work that sufficient number of stretchers is provided at such construction site so as to be readily available in an emergency.

Rule 229. Occupational health services for the building workers - (1) The employer shall ensure at a construction site of a building or other construction work, where more than five hundred building workers are employed that -

- (a) a special medical service or an occupational health service is available at such construction site at all times and such service shall -
 - i. provide first-aid and emergency treatment.
 - ii. conduct special medical examination for occupational hazards to such building workers before their employment and thereafter at such intervals as may be specified by the Director General from time to time;
 - iii. conduct training of first-aid personnel of such medical service;
 - iv. render advice to such employer on conditions of work and improvement required to avoid hazards to the health of such building worker;
 - v. promote health education, including family welfare among such building workers;
 - vi. co-operate with the Inspector having jurisdiction in the detection, measurement and evaluation of chemical, physical or biological factors suspected of being harmful to such building workers;
 - vii. undertake immunization for all such building workers against tetanus, typhoid, cholera and other infectious diseases;
- b. the special medical service referred to in clause (a) collaborates with the labour department or any other concerned department or service of the Government of India in matters of treatment, job placement, accident prevention and welfare of such building workers;
- c. the special medical service referred to in clause (a) is headed by a construction medical officer and is provided with adequate staff, laboratory and other equipments;
- d. the premises of the special medical service referred to in clause (a) are conveniently accessible, comprise at least a waiting room, a consulting room, a treatment room, a laboratory and suitable accommodation for nurses and other staff of such service;
- e. the special medical service referred to in clause (a) maintains records pertaining to its activities referred to in sub-clause (i) to (vii) of clause (a) and sends to the Director General, once in every three months, information in writing on -
 - i. the state of health of such building workers; and

-
- ii. the nature and causes of occupational injuries or disease suffered by any of such building workers, treatment provided to such worker and measures taken to prevent recurrence of such injury or disease.

Rule 230. Notice of poisoning or occupational diseases - The employer shall ensure at a construction site of a building or other construction work that -

- a. when a building worker contracts any disease specified in Schedule II annexed to these rules, a notice in Form XIII annexed to these rules is sent without delay to the Inspector, having jurisdiction and to the Board with which such building worker is registered as a beneficiary;
- b. if any medical practitioner or construction medical officer attends on a building worker suffering from any disease referred to in clause (a), such medical practitioner or construction medical officer sends information regarding the name and full particulars of such building worker and the disease suffered by him, to the Director General without delay.

Rule 231. First aid boxes - The employer shall ensure at a construction site of a building or other construction work that -

- a. sufficient number of first aid boxes or cupboards are provided and maintained for providing first-aid to the building workers;
- b. every first-aid box or cupboard is distinctly marked "First-Aid" and is equipped with the articles specified in Schedule III annexed to these rules;
- c. nothing except appliances or requisites for first-aid is kept in a first-aid box or cupboard and such box or cupboard is so kept as to protect it against contamination by dust or other foreign matter and against penetration of moisture and such box or cupboard is kept in the charge of a person trained in first-aid and is always readily available during working hours.

Rule 232. Emergency care services of emergency treatment - The employer shall ensure at a construction site of a building or other construction work that -

- a. essential life saving aids and appliances required to handle -
 - i. head injuries and spinal injuries;
 - ii. bleeding;
 - iii. fractures and dislocations of bones and joints;
 - iv. crush injuries;
 - v. shock, including electric shock;

-
- vi. dehydration due to any cause;
 - vii. snake bite, insect bite, scorpion and bee stings;
 - viii. burns, including chemical burn;
 - ix. bends or divers paralysis;
 - x. other surgical, gynecological, obstetric, or pediatric emergencies;
 - xi. drowning;
 - xii. sunstroke and frost bite to building workers

are provided and properly maintained under the supervision of a construction medical officer;

- b. the essential life saving aids for any emergent situation referred to in sub-clause (i) to (xii) of clause (a) are provided to an injured or a sick building worker during his transportation from such building site to a hospital and till such building worker is attended by a doctor in such hospital;
- c. any other equipment or facilities required for emergency care or treatment to the building workers arising from special local conditions and construction processes at such building site, as specified by the Central Government from time to time are provided.

SCHEDULE - II

NOTIFIABLE OCCUPATIONAL DISEASES IN BUILDING AND OTHER CONSTRUCTION WORK

[See rule 230(a)]

- 1. Occupational dermatitis
- 2. Occupational cancer
- 3. Asbestosis
- 4. Silicosis
- 5. Lead poisoning including poisoning by any preparation or compound of lead or their sequelae.
- 6. Benzene poisoning, including poisoning by any of its homologues, their nitro or amino derivatives or its sequelae.

-
7. Occupational asthma
 8. Pesticide poisoning
 9. Carbon monoxide poisoning
 10. Toxic jaundice
 11. Toxic anemia
 12. Compressed air illness (Caissons disease)
 13. Noise induced hearing loss
 14. Isocyanates poisoning
 15. Toxic nephritis.

SCHEDULE - VII

PERIODICITY OF MEDICAL EXAMINATION OF BUILDING WORKERS

[See rule 81(iv) and 223(a)(iii)(a)]

1. The employer shall arrange a medical examination of all the building workers employed as drivers, operators of lifting appliances and transport equipment before employing, after illness or injury, if it appears that the illness or injury might have affected his fitness and, thereafter, once in every two years upto the age of forty and once in a year, thereafter.
2. Complete and confidential records of medical examination shall be maintained by the employer or the physician authorised by the employer.
3. The medical examination shall include -
 - a. full medical and occupational history.
 - b. Clinical examination with particular reference to -
 - i. General Physique
 - ii. Vision - Total visual performance using standard orthorator like Titus Vision Tester should be estimated and suitability for placement ascertained in accordance with the prescribed job standards.

-
- iii. Hearing - Persons with normal hearing must be able to hear a forced whisper at twenty four feet. Person using hearing aids must be able to hear a warning shout under noisy working conditions.
 - iv. Breathing - Peak flow rate using standard peak flow meter and the average peak flow rate determined out of these readings of the test performed. The results recorded at pre-placement medical examination could be used as a standard for the same individual at the same altitude for reference during subsequent examination.
 - v. Upper limbs - Adequate arm function and grip (both arms).
 - vi. Lower Limbs - Adequate leg and foot function.
 - vii. Spine - Adequately flexible for the job concerned
 - viii. General - Mental alertness and stability with good eye, hand and foot co-ordination.
- c. Any other tests which the examining doctor considers necessary.

SCHEDULE - VIII

[See rule 209(1) & 209(2)]

Appointment of Safety Officers

Number of Safety Officers - Within six months of coming into operation of these rules, every establishment employing more than five hundred building workers and every other employer of building worker shall appoint safety officers, as laid down in the scale given below :-

- | | | | |
|----|--|---|-----------------------|
| 1. | Upto 1000 building workers | - | one safety officer. |
| 2. | Upto 2000 building workers | - | two safety officer. |
| 3. | Upto 5000 building workers | - | three safety officer. |
| 4. | Upto 10000 building workers | - | four safety officer. |
| | For every additional 5000 building workers or part thereof | - | one safety officer. |

Any appointment, when made shall be notified to the inspector having jurisdiction in the area, giving full details of the qualifications, terms and conditions of service of such safety officer.

Qualification -

- a) A person shall not be eligible for appointment as a safety officer unless he :
 - i. possesses a recognized degree in any branch of engineering or technology or architecture and had a practical experience of working in a building or other construction work in a supervisory capacity for a period of not less than two years or possesses a recognized diploms in any branch of engineering or technology and has had practical experience of building or other construction work in a supervisory capacity for a period of not less than five years;
 - ii. possesses a recognized degree or diploma in industrial safety with at least one paper in construction safety (as an elective subject);
 - iii. has adequate knowledge of the language spoken by majority of building workers from the construction site in which he is to be appointed.
- b) Notwithstanding the provision contained in clause (a), any person who -
 - i. possesses a recognized degree or diploma in engineering or technology or architecture and has had experience of not less than five years in the field, dealing with the administration of Factories Act 1948 or the Dock Workers (Safety, Health and Welfare) Act, 1986 or the building and other Construction Workers (Regulation of employment and Conditions of Service) Act, 1996.

-
- ii. possesses a recognized degree or diploma in engineering or technology and has had experience of not less than five years or has undergone training in education, consultancy or research in the field or accident prevention in industry, port, or in any institution or an establishment dealing with building or other construction work.

shall also be eligible for appointment as a safety officer.

Provided that, in case of person who has been working as safety officer in industry or port, institution or an establishment dealing with building building or other construction work for a period of-not less than three years on the date of commencement of these rules, the Director General may, subject to such conditions that he may specify, relax all or any of the above said qualification.

Condition of Service -

- a) where number of safety officers appointed exceeds one, one of them shall be designated as Chief Safety Officer and shall have the status higher than the others. The Chief Safety Officer shall be in overall charge of the safety functions as envisaged in sub-clause (iv) and also other safety officers working under his control.
- b) the Chief Safety Officer or Safety Officer, where only one safety officer is appointed, shall be given the status of a Senior Executive and he shall work directly under the control of his Chief Executive. All other safety officers shall be given appropriate status to enable them to discharge their functions effectively.
- c) The scale of pay and allowances to be granted to the safety officers including the Chief Safety Officer and the other conditions of their service shall be the same as those of the officers of corresponding status of the establishment in which they are employed.

Duties of Safety officer -

- a) The duties of a safety officer shall be to advise and assist the employer in the fulfillment of his obligations, statutory or otherwise concerning prevention of personal injuries and maintaining a safe working environment. These duties shall include the following, namely :-
 - i. to advise the building workers in planning and organising measures necessary for effective control of personal injuries;
 - ii. to advise on safety aspects in a building or other construction work and to carry out detailed safety studies of selected activities ;
 - iii. to check and evaluate the effectiveness of action taken or proposed to be taken to prevent personal injuries;

-
- iv. to advise purchasing and ensuring quality of personal protective equipment conforming to national standards;
 - v. to carry out safety inspections of building or other construction work in order to observe the physical conditions of work and the work practices and procedures followed by building workers and to render advice on measures to be adopted for removing unsafe physical conditions and preventing unsafe actions by building workers;
 - vi. to investigate all fatal and other selected accidents;
 - vii. to investigate the cases of occupational diseases contracted and reportable dangerous occurrences;
 - viii. to advise on the maintenance of such records as are necessary with regard to accidents, dangerous occurrences and occupational diseases;
 - ix. to promote the working of safety committees and to act as an advisor to such committees;
 - x. to organise in association with concerned departments, campaigns, competitions, contests and other activities which will develop and maintain the interest of building workers in establishing and maintaining safe conditions of work and procedures;
 - xi. to design and conduct, either independently or in collaboration with other agencies, suitable training and education programmes for prevention of accidents to building workers;
 - xii. to frame safe rules and safe working practices in consultation with senior officials of the establishment;
 - xiii. supervise and guide safety precautions to be taken in building and other construction work of the establishment.

Facilities to be provided to safety officers - The employer shall provide each safety officer with such facilities, equipment and information that are necessary to enable him to dispatch his duties effectively.

Prohibition of performance of other duties - No safety officer shall be required or permitted to do any work, which is unconnected to, inconsistent with or detrimental to the performance of the duties prescribed in this Schedule.

Exemptions - Director General may, in writing, exempt any employer or group of employers from any or all of the provisions of these rules subject to compliance with such alternative arrangements as may be approved and notified by him in the order or such exemption.

FORM - XIII

[See rule 230(a)]

NOTICE OF POISONING OR OCCUPATIONAL NOTIFIABLE DISEASES

1. Name and address of the employer
2. Name of the building workers and his work No. if any
3. Address of the building worker
4. Sex and Age
5. Occupation
6. State exactly what the patient was doing at the time of contracting the disease.
7. Nature of poisoning or disease from which the building worker is suffering from.

Signature of the employer/CMO

Date :

Note : When a building worker contracts any disease specified in Schedule XII, a notice in this form shall be sent forthwith to the Director General.

FORM - XIV

[See rule 210(7)]

REPORT OF ACCIDENTS AND DANGEROUS OCCURRENCES

1. Name of the project / work
2. Location of project / work
3. Stage of construction work
4. Particulars of Employer
 - a) Main contractor firm/Co. :
Name
Address
Phone Nos
Nature of Business
 - b) Sub contractor's particulars;
Name
Address
Phone Nos
Nature of Business
5. Particulars of injured person
 - a) Name
(First) (Middle) (Surname)
 - b) Home Address
 - c) Occupation
 - d) Status of the worker
Casual
Prmanent
 - e) Sex : Male Female
 - (f) Age
 - g) Experience
 - h) Marital status : Married / Unmarried / Divorced
6. Particulars of Accident
 - a) Exact place where accident occurred

-
- b) Date
 - c) Time
 - d) What the injured person was doing at the time of accident ?
 - e) Weather condition
 - f) How long employed by you for this particular job?
 - g) Particulars of equipment / machine / tool involved & condition of the same after the accident occurred.
 - h) Brief description of the accident.

7. Nature of injuries

- a) Fatal
- b) Non-fatal
- c) If non-fatal, state precisely the nature of injuries (Describe in detail the nature of injury, for instance fracture of right arm, sprain etc.)
- d) First Aid : Given : Not given :
- e) If not, given the reasons
- f) Name and designation of the person by whom first aid was given
- g) If admitted to hospital
Name of the hospital : Address of the hospital
Phone No. Name of the Doctor

8. Mode of transport used

Ambulance Truck Tempo Taxi Private Car

9. How much time was taken to shift the injured person ?

If very late, state the reasons

- c) How the reporting was made ?
Telephone Telegram Special Messenger Letter
- d) Who visited the accident site first and what action was proposed by him ?

-
- e) What are the actions taken for the investigation of the Accident by the employer ? (Describe about photographs/ Video film/measurements taken etc.)

11. Particulars of the persons given witness :

- | (a) | Name | Address | Occupation |
|-----|------|---------|------------|
| 1. | | | |
| 2. | | | |
| 3. | | | |
| 4. | | | |
-
- | (b) | Whether | Temporary | Permanent |
|-----|---------|-----------|-----------|
|-----|---------|-----------|-----------|

11. Particulars in case of fatal :

- | Date | Time |
|--|-----------------------|
| Whether registered with building and other
Construction Workers Welfare Board | If yes, give Reg. No. |

12. Dangerous Occurrences as covered under the Regulation No. (Give details)

- a) collapse or failure of lifting appliances, hoist, conveyors etc.
- b) collapse or subsidence of soil, any wall, floor, gallery etc.
- c) collapse of transmission towers, pipeline, bridges etc.
- d) explosion of receiver, vessel etc.
- e) fire and explosion
- f) spillage or leakage of hazardous substances
- g) collapse, capsizing, toppling or collision of transport equipment
- h) leakage or release of harmful toxic gases at the construction site

-
- i) failure of lifting appliance, loose gear, hoist or building and other construction work machinery, transport equipment etc.

13. Certificate from the Employer or authorised signatory.

I certify that to the best of my knowledge and belief, the above particulars are correct in every respect.

Place : Signature

Date : Designation

cc : forwarded for information and follow-up action :

- 1.
- 2.
- 3.

Note : If more than one person is involved, then for each person, information is to be filled-up in separate forms.

The Electricity Act, 2003

Section 53. Provision relating to safety and electricity supply - The Authority may in consultation with the State Government specify suitable measures for -

- a. Protecting the public (including the persons engaged in the generation, transmission or distribution or trading) from dangers arising from the generation, transmission or distribution or trading or electricity, or use of electricity supplied or installation, maintenance or use of any electric line or electrical plant;
- b. Eliminating or reducing the risks of personal injury to any person, or damage to property or any person or interference with use of such property;
- c. Prohibiting the supply or transmission of electricity except by means of a system which conforms to the specifications as may be specified;
- d. Giving notice in the specified form to the Appropriate Commission and the Electrical Inspector, of accidents and failures of supplies or transmissions of electricity;
- e. Keeping by generating company or licensee the maps, plans and sections relating to supply or transmission of electricity;
- f. Inspection of maps, plans and sections by any person authorized by it or by Electrical Inspector or by any person on payment or specified fee;
- g. Specifying action to be taken in relation to any electric line or electrical plant, or any electrical appliance under the control of a consumer for the purpose of eliminating or reducing the risk of personal injury or damage to property or interference with its use.

Section 161. Notice of accidents and inquiries : (1) If any accident occurs in connection with the generation, transmission, distribution, supply or use of electricity in or in connection with, any part of the electric lines or electrical plant of any person and the accident results or is likely to have resulted in loss of human or animal life or in any injury to a human being or an animal, such person shall give notice of the occurrence and of any such loss or injury actually caused by the accident, in such form and within such time as may be prescribed, to the Electrical Inspector or such other person as aforesaid and to such other authorities as the Appropriate Government may by general or special order, direct.

- (2) The Appropriate Government may, if it thinks fit, require any Electrical Inspector, or any other person appointed by it in this behalf, to inquire and report -
 - a) as to the cause of any accident affecting the safety of the public, which may have been occasioned by or in connection with, the generation, transmission, distribution, supply or use of electricity, or

-
- b) as to the manner in and extent to, which the provision of this Act or rules and regulations made thereunder or of any licence, so far as those provisions affect the safety of any person, have been complied with.
- (3) Every Electrical Inspector or other person holding an inquiry under sub-section (2) shall have all the powers of a Civil Court under the Code of Civil Procedure, 1908 for the purpose of enforcing the attendance of witnesses and compelling the production of documents and material objects, and every person required by an Electrical Inspector be legally bound to do so within the meaning of section 176 of the Indian Penal Code.

**SOME OF THE IMPORTANT PROVISIONS OF
THE INDIAN ELECTRICITY RULES, 1956**

CHAPTER 1

3. Authorisation

- 1) A supplier or a consumer, or the owner, agent or manager of a mine, or the agent of any company operating in an oil-field or the owner of a drilled well in an oil-field or a contractor for the time being under contract with a supplier or a consumer to carry out duties incidental to the generation, transformation, transmission, conversion, distribution or use of energy may authorise any person for the purpose of any of the following, namely:

Sub rule (2) of rule 36, clause (a) sub-rule (1) of rule 51, clause (a) of sub-rule (1) and clause (e) and (f) of sub-rule (2) of rule 64, sub-rule (2) of rule 110, sub-rules (1) and (4) of rule 121, sub-rule (4) of rule 123, rule 124 and sub-rule (8) of rule 125.

- 2) No. person shall be authorised under sub-rule (1) unless he is competent to perform the duties assigned to him and possess either an appropriate certificate of competency or permit to work.

- 2(A) a) No. person shall be authorised to operate or undertake maintenance of any part of whole of a generating station of capacity 100 KW and above together with the associated sub-station unless he is adequately qualified and has successfully undergone the type of training specified in Annexure-XIV :

Provided that the provisions contained in this sub-rule shall have effect in respect of the persons already authorised to operate or undertake maintenance of any part of whole of a generating station as aforesaid from the date to be specified by the appropriate Government, but such a date shall not be later than a period of 6 years, 2 months from the date this rule comes into force.

- b) The appropriate Government may, on the recommendations of the owner of such generating station, relax the conditions stipulated in clause (a) of this sub-rule for any engineer and such other person who have already sufficient experience in the operation and maintenance of a generating station.
- c) The owner of a generation station, in consultation with Central Electricity Authority may after the duration and manner of training in respect of those persons who have been already engaged in the operation and maintenance of a generation station or a sub-station.

The provisions contained in rule (3A) will also be applicable in respect of other sub-station or 132 KV and above from a date to be specified by the appropriate Government but such a date shall not be later than 3 years from which this rule comes into force.

- 3) No person shall be deemed to be authorised under sub-rule (1) unless his name entered in a list maintained at the office or premises of the person authorizing him, and giving the purpose for which such person is authorised and the entry has been attested by the authorise person and the person authorising him.
- 4) Every list maintained under sub-rule(3) shall be produced Inspector or any officer of a specified rank and class appointed the Inspector) when required.
- 5) An Inspector may cancel or amend, in such manner as he considers necessary, any authorisation, made under sub-rule (1).
- 6) In every registered factory, where more than 250 KW of electrical load is connected, there shall be person authorised by the management of the factory for ensuring the observance of the safety provisions laid under the Act and the rules made therunder, who shall periodically inspect such installation, get them tested and keep a record thereof and such records shall be made available to the Inspector (or any officer of a specified rank and class appointed to assist the Inspector), if and when required.

GENERAL SAFETY REQUIREMENTS

CHAPTER 1

29. Construction, installation, protection operation and maintenance of electric supply lines and apparatus

- 1) All electric supply lines and apparatus shall be sufficient ratings for power, installation and estimated fault current and of sufficient mechanical strength, for the duty which they may be required to perform under the environmental conditions of installation, and shall be constructed, installed, protected, worked and maintained in such a manner as to ensure safety of human beings, animals, and property.
- 2) Save as otherwise provided in these rules, the relevant code of practice of the Bureau of Indian Standards including National Electrical Code if any may be followed to carry out the purposes of this rule and in the event of any inconsistency, the provision of these rules shall prevail.
- 3) The material and apparatus used shall conform to the relevant specifications of the Bureau of Indian Standards where such specifications have already been laid down.

30. Service Line and apparatus consumer's premises

- 1) The supplier shall ensure that all electric supply lines, wires, fittings and apparatus belonging to him or under his control, which are on a consumer's premises, are in a safe condition and in all respects fit for supplying energy and the supplier shall take due precautions to avoid danger arising on such premises from such supply lines, wires, fittings and apparatus.
- 2) Service-lines by the supplier on the premises of a consumer which are underground or which are accessible shall be so insulated and protected by the supplier as to be secured under all ordinary conditions against electrical, mechanical, chemical or other injury to the installation.
- 3) The consumer shall, as far as circumstances permit, take precautions for the safe custody of the equipment on his premises belonging to the supplier.
- 4) The consumer shall also ensure that the installation under his control is maintained in a safe condition.

31. Cut-out on Consumer's Premises

- 1) The supplier shall provide a suitable cut-out in each conductor of every service-line other than an earthed or earthed neutral conductor or the earthed external conductor of a concentric cable within a consumer's premises, in an accessible position. Such cut-out shall be contained within an adequately enclosed fire proof receptable.

Where more than one consumer is supplied through a common service-line, each such consumer shall be provided with an independent cut-out at the point of junction to the common service.

- 2) Every electric supply line other than the earth or earthed neutral conductor or any system or the earthed external conductor of a concentric cable shall be protected by a suitable cut-out by its owner.

32. Identification of earthed and earthed neutral conductors and positions of switches and cut-outs therein

Where the conductors include an earthed conductor of a two-wire systems or an earthed neutral conductor of a multi-wire system or a conductor which is to be connected thereto, the following conditions shall be complied with :-

- 1) An indication of a permanent shall be provided by the owner of the earthed or earthed neutral conductor, or the conductor which is to be connected thereto, to enable such conductor to be distinguished from any live conductor. Such indication shall be provided :
 - a) where the earthed or earthed neutral conductor is the property of the supplier, at or near the point of commencement of supply
 - b) where a conductor forming part of a consumer's system is to be connected to the supplier's earthed or earthed neutral conductor, at the point where such connection is to be made.
 - c) in all other cases, at a point corresponding to the point of commencement of supply or at such other point as may be approved by an Inspector or any officer appointed to assist the Inspector and authorised under sub-rule (2) of rule-4A.
- 2) No cut-out, line or switch other than a linked switch arranged to operate simultaneously on the earthed or earthed neutral conductor and live conductors shall be inserted or remain inserted in any earthed or earthed neutral conductor of a two wire-system or in any earthed or earthed neutral conductor of a multi-wire system or in any conductor connected thereto with the following exceptions:
 - a) A link for testing purposes, or
 - b) A switch for use in controlling a generator or transformer.

33. Earthed terminal on consumer's premises :

- 1) The supplier shall provide and maintain on the consumer's premises for the consumer's use a suitable earthed terminal in an accessible position or near the point of commencement of supply as defined under rule 58.

Provided that in the case of medium, high or extra-high voltage installation the consumer shall, in addition to the aforementioned earthing arrangement, provide his own earthing system with an independent electrode :

Provided further that the supplier may not provide any earthed terminal in the case of installations already connected to his system on or before the date to be specified by the State Government in this behalf if he is satisfied that the consumer's earthing arrangement is efficient.

- 2) The consumer shall take all reasonable precautions to prevent mechanical damage to the earthed terminal and its lead belonging to the supplier.
- 3) The supplier may recover from the consumer the cost of installation on the basis of schedule of charges notified in advance and where such schedule of charges is not notified, and procedure prescribed, in sub-rule (5) or rule 82 will apply.

34. Accessibility of Bare Conductors

Where bare conductors are used in a building, the owner of such conductors shall

- a) ensure that they are inaccessible
- b) provide in readily accessible position switches for rendering them dead whenever necessary; and
- e) take such other safety measures as are considered necessary by the Inspector.

35. Danger Notices

The owner of every medium high and extra-high voltage installation shall affix permanently in a conspicuous position a danger notice in Hindi or English and the local language of the district, with a sign of skull and bones of a design as per the relevant ISS No. 2551 on -

- a) every motor, generator, transformer and other electrical plant and equipment together with apparatus used for controlling or regulating the same;
- b) all supports of high and extra-high voltage overhead line which can be easily climb-upon without the aid of ladder or special appliances.

Explanation Rails, tubular, poles, wooden supports, reinforced cement concrete poles without steps. I-sections and channels, shall be deemed as supports which cannot be easily climbed upon for the purposes of this clause.

- c) Luminous tube requiring high voltage supply, X-ray and similar high-frequency installations :

Provided that where it is possible to affix such notices on any generator, motor, transformer or other apparatus, they shall be affixed as near as possible thereto or the word 'danger' and the voltage of the apparatus concerned shall be permanently painted on it.

Provided further that where the generator, motor, transformer of other apparatus is within an enclosure one notice affixed to the said enclosure shall be sufficient for the purposes of this rule.

36. Handling of Electric Supply Lines and Apparatus

- 1) Before any conductor or apparatus is handled adequate precautions shall be taken by earthing or other suitable means, to discharge electrically such conductor or apparatus, and any adjacent conductor or apparatus if there is danger therefrom, and to prevent any conductor or apparatus from being accidentally or inadvertently electrically charged when persons are working thereon.

Every person who is working on an electric supply line or apparatus or both shall be provided with tools and devices such as gloves, rubber shoes, safety belts, ladders, earthing devices, helmets, line testers, hand lines and the like for protecting him from mechanical and electrical injury. Such tools and devices shall always be maintained in sound and efficient working conditions.

- 2) No persons shall work on any live electric supply line or apparatus and no person shall assist such person on such work, unless he is authorised in that behalf, and takes the safety measures approved by the Inspector.
- 3) Every telecommunication line on supports carrying a high or extra-high voltage line shall, for the purpose of working thereon, be deemed to be a high voltage line.

37. Supply of Vehicles, Cranes, etc.

Every person owning a vehicle, travelling crane or the like to which energy is supplied from an external source shall ensure that it is efficiently controlled by a suitable switch enabling all voltage to be cut off in one operation and, where such vehicle, travelling crane or the like runs on metal rails, the owner shall ensure that the rails are electrically continuous and earthed.

38. Cables for portable or transportable apparatus

- 1) Flexible cables shall not be used for portable or transportable motors, generators, transformer, rectifiers, electric drills, electric sprayers, welding sets or any other portable or transportable apparatus unless they are heavily insulated and adequately protected from mechanical injury.
- 2) Where the protection is by means of metallic covering the shall be in metallic connection with the frame of any such apparatus and earth.
- 3) The cables shall be three core type and four core type for portable and transportable apparatus working on single phase and three phase supply respectively and the wire meant to be used for ground connection shall be easily identifiable.

39. Cables Protected by Bituminous Materials

- a) Where the supplier or the owner has brought into use an electric supply line (other than an overhead line) which is not completely enclosed in a continuous metallic covering connected with earth and is insulated or protected in situ by composition or material of a bituminous character.
 - i) any pipe, conduit or the like into which such electric supply line may have been drawn or placed shall, unless other arrangements are approved by the Inspector in any particular case, be effectively sealed at its point of entry into street box so as to prevent any flow of gas to or from the street box; and
 - ii) such electric supply line shall be periodically inspected and tested where accessible, and the result of each such inspections and test shall be duly recorded by the supplier or the owner.
- b) It shall not be permissible for the supplier or the owner after the coming into force of these rules, to bring into use any further electric supply line as aforesaid which is insulated or protected in situ by any composition or material known to be liable to produce noxious or explosive gases on excessive heating.

40. Street Boxes

- 1) Street boxes shall not contain gas pipes, and precautions shall be taken to prevent, as far as reasonably possible any influx of water or gas.
- 2) Where electric supply lines forming part of different systems pass through the same street box, they shall be readily distinguishable from one another and all electric supply lines at high or extra high voltage in street boxes shall be adequately supported and protected so as to prevent risk of damage or danger from adjacent electric supply lines.

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- 3) All street boxes shall be regularly inspected for the purpose of detecting the presence of gas and if any influx or accumulation is discovered, the owner shall give immediate notice to any authority or company who have has mains in the neighbourhood of the stree box and in cases where a street box is large enough to admit the entrance of a person, after the electric suply lines or apparatus therein have been placed in position provision shall be made --
 - a) to ensure that any gas which may bne accident have obtained access to the box shall escape before a person is allowed to enter and
 - b) for the prevention of danger from sparking.
 - 4) The owners of all street boxes or pillars containing circuits or apparatus shall ensure that their covers and doors are so provided that they can be opened only be means of a key or a special appliance.

41. Distinction of different circuits

The owner of every gennerating station, sub-station, junction-box or pillar in which that are any circuits or apparatus, whether intended for operation at different voltages or at the same voltage, shall ensure by the means of indication of a permanent nature that the respective circuits are readily distinguishable from one another.

41A. Distinction of the Installation having more than one feed

The owner of the every installation including sub-station, double pole structure, four pole structure or any other structure having more than one feed, shall ensure by means of indicationof a permanent nature, that the installation is readily distinguishable from other installations.

42. Accidental Charges

The owners of all circuits and apparatus shall so arrange them that there shall be no danger of any part thereof becoming acidentally charged to any voltage beyond the limits of voltage for which they are intended.

Where A. C. and D.C. circuits are installed on the same support they shall be so arranged and protected that they shall not come into contact with each other when live.

43. Provision applicable to protective equipment

- 1) Fire buckets filled with clean dry sand and ready for immediate use for extinguishing fires, in addition to fire extinguishers suitable for dealing with electric fires, shall be conspicuously marked and kept in all generating stations, enclosed sub-stations and switch stations in convenient situation. The fire extinguishers shall be tested for satisfactory operation at least once a year and record of such tests shall be maintained.

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- 2) First-Aid boxes for cupboards, conspicuously marked and equipped with such contents as the State Government may specify, shall be provided and maintained in every generating station, enclosed sub-station and enclosed switch stations so as to be readily accessible during all working hours. All such boxes and cupboards shall, except in the case of unattended sub-stations and switch stations, be kept in charge of responsible persons who are trained in first - aid treatment and one of such person shall be available during working hours.
 - 3) Two or more gas masks shall be provided conspicuously and installed and maintained at accessible places in every generating station with capacity of 5 MW and above and enclosed sub-station with transmission capacity of 5 MVA and above for use in the event of fire smoke :

provided further that adequate number of gas masks would be provided by the owner of every generating stations and enclosed sub-station with capacity less than 5MW and 5 MVA respectively, it was desired by the Inspector.

44. Instructions for restoration of persons suffering from electric shock

- 1) Instructions, in English or Hindi and the local language of the district and where hindi is the local language, in english and hindi for the restoration of persons suffering from electric shock, shall be affixed by the owner in a conspicuous place in every generating station, enclosed sub-stations, enclosed switch-stations and in every factory as defined in clause (m) of section 2 of the Factories Act, 1948 (63 of 1948) in which electricity is used and in such other premises where electricity is used as the Inspector or any officer appointed to assist the Inspector may, by notice in writing served on the owner, direct.
- 2) Copies of the instructions shall be supplied on demand by an officer or officers appointed by the Central or the State Government in this behalf at a price to be fixed by the Central or the State Government.
- 3) The owner of every generating station, enclosed sub-station, enclosed switch-station and every factory or other premises to which this rule applies, shall ensure that all authorised persons employed by him are acquainted with and are competent to apply the instructions referred to in sub-rule (1).
- 4) In every manned high voltage or extra-high generating station, sub-station or switch station, an artificial respirator shall be provided and good working conditions.

44A. Intimation of Accident

If any accident occurs in connection with the generation, transmission, supply or use of energy in or in connection with, any part of the electric supply lines or other works of any person and the accident results in or is likely to have resulted in loss of human or animal life or in any injury results in or is or an animal, such person or any authorised

person of the State Electricity Board/Supplier, not below the rank of a Junior Engineer or equivalent shall send to the Inspector a telegraphic report within 24 hours of knowledge of the occurrence of the fatal accident and a written report in the form set out in Annexure XIII within 48 hours of the knowledge of occurrence of fatal and all other accidents. Where practicable a telephonic message should also be given to the Inspector immediately the accident comes to the knowledge of the authorised officer of the State Electricity Board/Supplier or other person concerned.

45. Precautions to be adopted by consumers, owners

- 1) No electrical installation work, including additions, alterations, repairs and adjustments to existing installations, except such replacement of lamps, fans, fuses, switches, low voltage domestic appliances and fittings as in no way alters its capacity or character, shall be carried out upon the premises of or on behalf of any consumer, owner or for the purpose of supply to such consumer, supplier, owner or occupier except by an electrical contractor licensed in this behalf by the State Government and under the direct supervision of a person holding a certificate of competency and by a person holding a permit issued or recognised by the State Government.

Provided that in the case of works executed for or on behalf of the Central Government and in the case of installation in mines fields and railways, the Central Government and in other cases the State Government may, by notification in the Official Gazette, exempt, on such conditions as it may impose, any such work described therein either generally or in the case of any specified class of (consumers, suppliers, owners or occupiers) from so much of this sub-rule as required such work to be carried out by an electrical contractor licensed by the State Government in this behalf.

- 2) No electrical installation work which has been carried out in contravention of sub-rule (1) shall either be energised or connected to the works of any supplier.

46. Periodical Inspection and Testing of Consumer's Installation

- 1) a. Where an installation is already connected to the supply system of the supplier every such installation shall be periodically inspected and tested in intervals not exceeding five years either by the Inspector or any officer appointed to assist the Inspector or by the Supplier as may be directed by the State Government in this behalf or in the case of installations belonging to, or under the control of the Central Government, and in the case of installation in mines, oil fields and railways by the Central Government.
- b. Where the supplier is directed by the Central or the State Government as the case may be to inspect and test the installation he shall report on the condition of the installation to the consumer concerned in a form approved by the Inspector and shall submit a copy of such report to the Inspector or to any officer appointed to assist the Inspector and authorised under sub-rule (2) of rule-4A.

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- c) Subject to the approval of the Inspector, the forms of inspection report contained in Annexure-IX-A may, with such variations as the circumstances of each case require, be used for the purposes of this sub-rule.
- 2) a) The fees for such inspection and test shall be determined by the Central or the State Government, as the case may be, in the case of each class of consumers and shall be payable by the consumer in advance.
- b) In the event of the failure of any consumer to pay the fees on or before the date specified in the fee-notice, supply to the installation of such consumer shall be liable to be disconnected under the direction of the Inspector. Such disconnection, however, shall not be made by the supplier without giving to the consumer seven clear days notice in writing of his intention so to do.
- c) In the event of the failure of the owner of any installation to rectify the defects in his installation pointed out by the Inspector or by any officer appointed to assist him and authorised under sub-rule (2) of rule 4A in the form set out in Annexure IX and within the time indicated therein, such installation shall be liable to be disconnected under the directions of the Inspector after serving the owner of such installation with a notice.

Provided that the installation shall not be disconnected in case an appeal is made under rule 6 and the appellate authority has stayed the orders of disconnection :

Provided further that the time indicated in the notice shall not be less than 48 hours in any case.

Provided also that nothing contained in this clause shall have any effect on the application or rule 49.

- 3) Notwithstanding the provisions of this rule, the consumers shall at all times be solely responsible for the maintenance of his installation in such conditions as to be free from danger.

ELECTRIC SUPPLY LINES, SYSTEMS AND APPARATUS FOR LOW AND MEDIUM VOLTAGES

CHAPTER VI

60. Test for resistance of insulation

- 1) Where any electric supply line for use at low or medium voltage has been disconnected from system for the purpose of addition, alteration or repair, such electric supply line shall not be reconnected to the system until the supplier or the owner has applied the test prescribed under rule 48.
- 2) The provision of sub-rule (1) shall not apply to overhead lines except overhead insulated cables unless the Inspector otherwise directs in any particular case.

61. Connections with earth

- 1) The following provisions shall apply to the connection with earth of systems at low voltage in cases before the voltage normally exceeds 125 volts and of systems of medium voltage :
 - a) Neutral conductor of a phase, 4 wire system and the middle conductor of 2 phase, 3-wire system shall be earthed by not less than two separate and distinct connections with a minimum of two different earth electrodes of such large number as may be necessary of two different earth resistance to a satisfactory value both at the generating station and at the sub-station. The earth electrodes so provided, may be inter-connected to reduce earth resistance. It may also be earthed at one or more points along the distribution system or service line in addition to any connection with earth which may be at the consumer's premises.
 - b) In the case of a system comprising supply lines having concentric cables, the external conductor of such cables shall be earthed by two separate and distinct connections with earth.
 - c) The connection with earth may include a link by means of which the connection may be temporarily interrupted for the purpose of testing or for locating a fault.
 - i) In a direct current three wire system the middle conductor shall be earthed at the generating station only, and the current from the middle conductor to earth shall be continuously recorded by means of a recording ammeter, and if any time to current exceeds one thousandth part of the maximum supply-current immediate steps shall be taken to improve the insulation of the system.

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- ii) Where the middle conductor is earthed by means of a circuit-breaker with a resistance connected in parallel, the resistance shall not exceed 10 ohms and on the opening of the circuit-breaker, immediate steps shall be taken to improve the insulation of the system, and the circuit-breaker shall be reclosed as soon as possible.
 - iii) The resistance shall be used only as a protection for the ammeter in case of earths on the system and until such earths are removed immediate steps shall be taken to locate and remove the earth.
 - e) In the case of an alternating current system, there shall not be inserted in the connection with earth any impedance (other than that required solely for the operation of switch-gear or instruments) cut-out or circuit breaker, and the result of any test made to ascertain whether the current (if any) passing through the connection with earth is normal, shall be duly recorded by the supplier.
 - f) No person shall make connection with earth by the aid of, nor shall he keep it in contact with, any water main not belonging to him except with the consent of the owner thereof and of the Inspector.
 - g) Alternating current systems which are connected with earth as aforesaid may be electrically interconnected.

Provided that each connection with earth is bonded to the metal sheathing and metallic armouring (if any) of the electric supply lines concerned.

- 2) The frame of every generator, stationary motor, portable motor, and the metallic parts (not intended as conductors) of all transformers and any other apparatus used for regulating or controlling energy and all medium voltage energy consuming apparatus across all junction boxes and other openings as to make good mechanical and electrical connection throughout their whole length :
- 3) Provided that where the supply is at low voltage, this shall not apply to isolated wall tubes or to brackets, electrofiers, switches ceiling fans or other fittings (other than portable hand and portable lamps and portable and transportable apparatus) unless provided with earth terminal and to class-II apparatus/appliances :

Provided further that where the supply is at low voltage and where the installation are either new or renovated all plug sockets shall be of the three-pin type, and the third pin shall be permanently and efficiently earthed.

Explanation The words "class-II apparatus/appliance" will have the same meaning as assigned to these words in the relevant ISS.

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- 4) All earthing systems shall
- a) consist of equipotential bonding conductors capable at carrying the prospective earth fault current and a group of pipe/rod/plate electrodes for dissipating the current to the general mass of earth without exceeding the allowable temperature limits as per relevant Indian Standards in order to maintain all non-current carrying metal works reasonably at earth potential and to avoid dangerous contact potentials being developed on such metal works :
 - b) limit earth resistance sufficiently low to permit adequate fault current for the operation of protective devices in time and to reduce neutral shifting.
 - c) be mechanically strong, withstand corrosion and retain electrical continuity during the life of the installation. All earthing systems shall be tested to ensure efficient earthing, before the electric supply lines or apparatus are energised.
5. All earthing systems belonging to the supplier shall in addition, be tested for resistance on dry day during the dry season not less than once every two years.
6. A record of every earth test made and the result thereof shall be kept by the supplier for a period of not less than two years after the day of testing and shall be available to the Inspector any officer appointed to assist the Inspector and authorised under sub-rule (2) of rule 4A when required.

61A Earth leakage protective device

The supply of Energy to every electrical installation other than low voltage installation below 5 KW and those low voltage installations which do not attract provisions of section 30 of the Indian Electricity Act, 1910, shall be controlled by an earth leakage protective device so as to disconnect the supply instantly on the occurrence of earth fault or leakage of current.

Provided that the above shall not apply to overhead supply lines having protective devices which are effectively bonded to the neutral of supply transformers and conforming to rule 91 of I.E. Rules, 1956.

62. Systems at medium voltage

Where a medium voltage supply systems is employed the voltage between earth and any conductor forming part of the same system shall not under normal conditions, exceed low voltage.

**ELECTRIC SUPPLY LINES, SYSTEM AND
APPARATUS FOR HIGH AND EXTRA HIGH VOLTAGES**

CHAPTER VII

63. Approval by Inspector

- 1) Before making an application to the Inspector for permission to commence or recommence supply after an installation has been disconnected for one year and above at high or extra-high voltage electric supply lines or apparatus belonging to him are placed in position, properly, and duly completed and examined. The supply of energy shall not be commenced by the supplier unless and until the Inspector is satisfied that the provisions of rules 65 to 69 both inclusive have been complied with and the approval in writing of the Inspector has been provided by him.

Provided that the supplier may energise the aforesaid electric supply lines or apparatus for the purpose of tests specified in rule 65.

- 2) The owner of any high or extra-high voltage installation shall, before making application to the Inspector for approval of his installation or additions thereto, test every high or extra-high voltage circuit or additions thereto, other than an overhead line, and satisfy himself that they withstanding the application of the testing voltage set out in sub rule (1) of rule 65 and shall duly record the results of such tests and forward them to the Inspector.

Provided that the Inspector may direct such owner to carry out such tests as he deems necessary or, if he thinks fit, accept the manufacturer's certified tests in respect of any particular apparatus in place of the tests required by this sub-rule.

- 3) The owner of any high or extra-high voltage installation who make any additions or alterations to his installation shall not connect to the supply his apparatus or electric supply lines, comprising the said alterations or additions unless and until such alterations or additions unless and until such alterations or additions have been approved in writing by the Inspector.

64. Use of energy at high and extra-high voltage

- 1) The Inspector shall not authorise the supplier to commence supply or where the supply has been discontinued for a period of one year and above, to commence the supply at high or extra-high voltage to any consumer unless
 - a) all conductors and apparatus situated on the premises of the consumer are so placed as to be inaccessible except to an authorised person and all operations in connection with the said conductors and apparatus are carried out by an authorised person.

- b) the consumer has provided and agrees to maintain a separate building or a locked weather-proof and fire-proof enclosure of agreed design and location, to which the supplier at all times have access for the purpose of housing his apparatus and metering equipment, or where the provision a separate building or enclosure is impracticable, the consumer has segregated the aforesaid apparatus of the supplier from any other part of his own apparatus.

Provided that such segregation shall be by the provision of fire proof walls, if the Inspector considers it to be necessary.

Provided further that in the case of an out-door installation consumer shall suitably segregate the aforesaid apparatus belonging to the supplier from his own to the satisfaction of the Inspector.

- c) all pole type sub-stations are constructed and maintained in accordance with rule 69.
- 2) The following provisions shall be observed where energy at high or extra-high voltage is supplied, converted, transformed or used :
- a) i) clearances as per Indian Standard Code shall be provided for electrical apparatus so that sufficient space is available for easy operation and maintenance without any hazard to the operating and maintenance personnel working near the equipment and for ensuring adequate ventilation.
- ii) the following minimum clearances shall be maintained to bare conductors or live parts of any apparatus in out-door sub-stations, excluding overhead lines, of HV and EHV installations :-

Voltage	Ground clearance (Metres)	Sectional clearance (Metres)
Not exceeding	11 KV	2.75
-do-	33 KV	3.7
-do-	66 KV	4.0
-do-	132 KV	4.6
-do-	220 KV	5.5
-do-	400 KV	8.0

- b) The windings of motors or other apparatus within reach from any position in which a person may require to be shall be suitably protected so as to prevent danger.

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- c) Where transformer or transformers are used suitable provision shall be made, either by connecting with earth a point of the circuit at the lower voltage or otherwise, to guard against danger by reason of the said circuit becoming accidentally charged above its normal voltage by leakage from or contact with the circuit at the higher voltage.
 - d) A sub-station or a switch station with apparatus having more than 2000 litres of oil shall not be located in the basement where proper oil draining arrangement cannot be provided.
 - e) Where a sub-station or a station with apparatus having more than 2000 litres of oil installed, whether indoor or out-doors, the following measures shall be taken, namely :
 - i) The baffle walls of 4 hours fire rating shall be provided between the apparatus in the following cases :
 - A) single phase banks in the switch-yard of generating stations and sub-stations;
 - B) on the consumer premises;
 - C) where adequate clearance between the units is not available.
 - ii) Provisions shall be made for suitable oil soakpit and where use of more than 9000 litres of oil in any one oil tank, receptacle or chamber is involved, provision shall be made for the draining away or removal of any oil which may leak or escape from the tanks receptacles or chambers containing the same, special precautions shall be taken to prevent the spread of any fire resulting from the ignition of the oil from any cause and adequate provision shall be made for extinguishing any fire which may occur. Spare oil shall not be stored in any such sub-station or switch station.
 - f)
 - i) Without prejudice to the above measures, adequate, fire protection arrangement shall be provided for quenching the fire in the apparatus.
 - ii) Where it is necessary to locate the sub-stations/switch station in the basement following measures shall be taken :
 - a) The room shall necessarily be in the first basement at the periphery of the basement;
 - b) The entrances to the room shall be provided with fire resisting doors of 2 hours fire rating. A curb (sill) of a suitable height shall be provided at the entrance in order to prevent the flow of oil from a ruptured transformer into other parts of the basement. Direct access to the transformer room shall be provided from outside.

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- iii) Oil filled transformers installed indoors shall not be on any floor above the ground or below the first basement.
 - g) Cable trenches inside the sub-stations and switch stations containing cables shall be filled with sand, pebbles or similar non-inflammable materials or completely cover with non-inflammable slabs.
 - h) Unless the conditions are such that all the conductors and apparatus maybe made dead at the same time for the purpose of cleaning or for other work, the said conductors and apparatus shall be so arranged that these may be made dead in sections, and that work on any such section may be carried on by an authorised person without danger.
 - i) Only person authorised under sub-rule (1) of rule 3, shall carry out the work on live lines and apparatus.
- 3) All EHV apparatus shall be protected against lightning as well as against switching over voltages. The equipment used for protection and switching shall be adequately co-ordinated with the protected apparatus to ensure safe operation as well as to maintain the stability of the inter-connected units of the power system.

64A. Additional provisions for use of energy at high and extra-high voltage

The following additional provisions shall be observed where energy at high or extra-high voltage is supplied, converted, transferred or used, namely :

- 1) Inter-locks - Suitable inter-locks shall be provided in the following cases :
 - a) Isolators and the controlling circuit breakers shall be inter locked so that the isolators cannot be operated unless the corresponding breaker is in open position.
 - b) Isolators and the controlling earthing switches shall be inter-locked so that no earthing switch can be closed unless and until the corresponding isolator is in open position;
 - c) Where two or more supplies are not intended to be operated in parallel, the respective circuit breakers or linked switches controlling the supplies shall be inter-locked to prevent possibility of any inadvertent paralleling or feedback;
 - d) When two or more transformers are operated in parallel, the system shall be so arranged as to trip the secondary breaker of a transformer in case the primary breaker of that transformer trips.

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- e) All gates or door which give access to live parts of an installation shall be inter-locked in such a way that these cannot be opened unless the live parts are made dead. Proper discharging and earthing of these parts should be ensured before any person comes in close proximity of such parts.
 - f) Where two or more generators operate in parallel and neutral switching is adopted, inter-lock shall be provided to ensure that generator breaker cannot be closed unless one of the neutrals is connected to the earthing system;
- 2) Protection - All systems and circuits shall be so protected as to automatically disconnect and supply under abnormal conditions.

The following protection shall be provided, namely

- a) Over current protection to disconnect the supply automatically if the rated current of the equipment, cable or supply line is exceeded for a time which the equipment, cable or supply line is not designed to withstand.
- b) Earth-fault/earth leakage protection to disconnect the supply automatically if the earth fault current exceeds the limit of current for keeping the contact potential with the reasonable values;
- c) Gas pressure type protection to give alarm and tripping shall be provided on all transformers of ratings 1000 KVA and above.
- d) Transformers of capacity 10 MVA and above shall be protected against
- e) All generators with rating of 100 KVA and above shall be protected against earth fault/leakage. All generators of rating 1000 KVA and above shall be protected against faults within the generators winding using restricted earth fault protection or differential protection or by both.

65. Testing, Operation and Maintenance

- 1) Before approval is accorded by the Inspector under rule 63, the manufacturer's test for all the routine tests as required under certificates shall, if required, be produced for all the routine tests as required under the relevant Indian Standard.
- 2) No new HV or EHV apparatus, cable or supply line shall be commissioned unless such apparatus, cable or supply line are subjected to site tests as per relevant code of practice of (Bureau of Indian Standards).
- 3) No HV or EHV apparatus, cable or supply line which has been kept disconnected, for a period of 6 months or more, from the system for alterations or repair shall be connected to the system until such apparatus, cable or supply line are subjected to the relevant tests as per code of practice of (Bureau of Indian Standards).

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- 4) Notwithstanding the provisions of sub-rules (1) to (3) (both inclusive) the Inspector may require certain additional tests to be carried out before charging the installations or subsequently.
 - 5) All apparatus, cables and supply lines shall be maintained in healthy conditions and tests shall be carried out periodically as per the relevant codes of practice of the Bureau of Indian Standards).

67. Connection with earth

- 1) All non-current carrying metal associated with HV/EHV installation shall be effectively earthed to a grounding system or mat which will be
 - a) limit the touch and step potential to tolerable values;
 - b) limit the ground potential rise to tolerable values so as to prevent danger due to transformer of potential through ground earth wires, cable sheath fences, pipe lines, etc;
 - c) maintain the resistance of the earth connection to such a value as to make operation of the protective device effective.

1A) In the case of star-connected system with earthed neutrals or delta connected system with earthed artificial neutral point :-

- a) The neutral point of every generator and transformer shall be earthed by connecting it to the earthing system as defined in rule 61 (4) and hereinabove by not less than two separate and distinct connections :

Provided that the neutral point of a generator may be connected to the earthing system through an impedance to limit the fault current to the earth;

Provided further that in the case of multi-machine system neutral switching may be resorted to, for limiting the injurious effect of harmonic current circulation in the system;

- b) In the event of an appreciable harmonic current flowing in the neutral connection so as to cause interference, with communication circuits, the generator or transformer neutral, shall be earthed through a suitable impedance;
- c) In case of delta connected system the neutral point shall be obtained by the insertion of a grounding transformer and current limiting resistance or impedance wherever considered necessary at the commencement of such a system.

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- 2) Single-phase high or extra-high voltage systems shall be earthed in a manner approved by the Inspector.
 - 3) In the case of a system comprising electric supply lines having concentric cables, the external conductor shall be the one to be connected with earth.
 - 4) Where a supplier proposes to connect with earth an existing system for use at high or extra-high voltage which has not been so connected with earth he shall give not less than fourteen days notice in writing together with particulars to the telegraph-authority of the proposed connected with earth.
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 - a) Where the earthing lead and earth connection are used only in connection with earthing guards erected under high or extra-high voltage over head lines where they cross a telecommunication line or a railway line, and where such lines are equipped with earth leakage relays of a type and setting approved by the Inspector the resistance shall not exceed 25 ohms.
 - b) Every earthing system belonging to either the supplier or the consumer shall be tested for its resistance to earth to a dry season not less than once a year..... tests shall be maintained and shall be produced, the Inspector or any officer appointed to assist him and authorised under sub-rule (2) of rule - 4A.
 - 6) In so far as the provisions of rule 61 are consistent with the provisions of this rule, all connections with earth shall also comply with the provisions of that rule.

68. General conditions as to transformation and control of energy.

- 1) Where energy at high or extra-high voltage is transformer, converted, regulated or otherwise controlled in sub-stations or switch-stations (including outdoor sub-stations and outdoor switch-stations) or in street boxes constructed underground, the following provisions shall have effect :-
 - a) Sub-stations and switch-stations shall preferably be erected above ground, but where necessarily constructed underground due provisions for ventilation and drainage shall be made and any space housing switchgear shall not be used for storage of any materials especially inflammable and combustible materials or refuse.
 - b) Outdoor sub-stations except pole type sub-stations and outdoor switch-stations shall (unless the apparatus is completely enclosed in a metal covering connected cables) be efficiently protected by fencing not less than 1.8 metres in height or other means so as to prevent access to the electric-supply lines and apparatus therein by an unauthorised person.
 - c) Underground street boxes (other than sub-stations) which contain transformers shall not contain switches or other apparatus, and switches, cut-outs or other apparatus required or controlling or other purposes shall be fixed in separate receptacles above ground wherever practicable.

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- 2) Where energy is transformed, suitable provisions shall be made either by connecting with earth a point of the system at the voltage or otherwise to guard against danger by reason of the said system becoming accidentally charged above its normal voltage by leakage from a contact with the system at the higher voltage.

69. Pole type sub-stations

Where platform type construction is used for a pole type sub-station and sufficient space for a person to stand on the platform is provided a shall be built around the said platform and if the hand rail is metal shall be connected with earth

provided that in the case of pole type sub-stations on wooden supports and wooden platform the metal hand-rail shall not be connected with earth.

70. Condensers

Suitable provision shall be made for immediate and automatic discharge of every static condenser on disconnection of supply.

**NATIONAL THERMAL POWER CORPN. LTD.
CORPORATE SAFETY SECTION**

Sub : Authorisation to work on Electrical Lines and IE Rules

The provisions of authorisation to work on electrical equipments/apparatus are laid down in the Indian Electricity Rules 1956. The list of requirements are given below :

- 1.0. Under Rule 3, a supplier or a consumer or a owner to carry out duties or generation/transmission/distribution or use of any energy is required to authorise the persons for the purpose of any work, namely, to work on live electric supply line or apparatus, accessibility and to carry out operation of conductors and apparatus etc.
- 2.0 Under Sub-rule - 2 of Rule 3 no person shall be authorised unless she is competent to perform the duties assigned to him and possesses either an appropriate certificate of competency or permit to work.
- 3.0 Under Clause (a) of Sub-rule (2A) of Rule 3, No person shall be authorised to operate or undertake maintenance of any part of whole or a generating station of capacity 100 MW and above together with the associated sub-station unless he is adequately qualified and has successfully undergone the type of training specified in Annexure XIV.
- 3.1 The training may be arranged in the Institute of own Generating Station recognised by Central Electricity Authority. The creation of the Institute are detailed at Para 4 of Annexure XIV.
- 3.2 The minimum qualification for the operating and supervisory staff shall preferably be a high second class diploma in mechanical or electrical engineering or a degree from a recognised institute or university. The minimum qualifications for the persons to assist the operating and supervisory staff shall be certificate from a recognised Industrial Training Institute in appropriate trade.
- 3.3 Training Courses are to be arranged for operating supervisory & other skilled persons. The mode of training, duration no. of lectures. Syllabus etc. are given at Para 2(1), 2(2) and 3(3) & appendix I to IV of Annexure XIV.
- 3.4 The persons who are expected to be engaged in O&M of the sub-station associated with the generation station shall be given training as given in Para 2(4) & Appendix VI of Annexure XIV.
- 3.5 A Refresher course shall be arranged periodically for the persons who have already undergone training as above to familiarise with modern practice of operation and maintenance (Para 3 of Annexure XIV.)

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- 4.0 The persons who are already having sufficient experience in the operation and maintenance of generation stations for declaring authorisation the owner may apply to Electrical Inspector for relaxation in training as mentioned at oint no. 3.
- 5.0 A list of all Authorised persons is to be maintained at Projects and shall be produced before Electrical Inspector when required.

**MANUFACTURE, STORAGE AND IMPORT OF HAZARDOUS CHEMICALS
RULES, 1989**

GUIDE FOR THE OCCUPIER

Application of Rules

- 1.0 The rules do not apply to hazardous chemicals transported in a vehicle or vessel to or from the site of an industrial activity. Nuclear and defence installations, explosives, mines and dock have not been exempted from the scope of the rules. However, the responsibility for the enforcement of the rules has been placed with the concerned administrative authorities in Atomic Energy, Defence, Controller of Explosives, Mines Safety and Dock Safety Directorate respectively. The Central Pollution Control Board/ State Pollution Control Boards and the Chief Inspector of Factories are the concerned authorities for isolated storages and Factories respectively as set out in Rules 3 and specified in Column 3 of Schedule-5.

Industries Activities as Defined in the Rules

- 2.0 The industrial activities are divided into two categories. The first category defines industrial process operations (Schedule-4) whereas the second defines storages (referred to as isolated storages). The process operations listed in Schedule-4 are typical of operations carried out in chemicals and petrochemical industries. However, in order to come within the scope of the Rules, they must involve a hazardous chemical which is either listed in Part-II Schedule 1 and Schedule 3 or fall within the criteria of Part-I Schedule 1 (for details please see Part-IV).

Isolated storages cover sites, which are separate tank farms or warehouses. Others, which fall within this category, are, for example, LPG depots Horton sphere and storages away from factory premises etc.

Levels of Control and application of Rules

- 3.0 The division of industrial activities into process activities and isolated storages is important for a clear understanding of the application of various levels of controls in the Rules. These controls are at three levels.
- (i) Low-level Controls;
 - (ii) Medium-Level Controls; and
 - (iii) High-Level Controls

At low-level Controls, there are five general requirements.

- (i) proof of safe operation (rule 4).

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- (ii) reporting of major accidents (rule 5)
 - (iii) preparation of MSDS
 - (iv) proper labeling of containers (rule 17); and

At the medium level controls, there are specific requirements, which are applicable to hazardous installations as laid down in rule 6. These include:

- (i) notification of sites and updating of site information (rule 7 to 9).
- (ii) preparation of on-site and off-site emergency plans (rule 13 & 14), and
- (iii) informing people likely to be affected (rule 15).

The highlevel controls are for potentially more hazardous installations with the threshold quantity at and above listed in column 4 of schedule 2 & 3. These installations are required to prepare a safety report and to keep it updated (rules 10 to 12) on their industrial activity.

In the case of process activities, rule 4 applies to any process using a hazardous chemical which is either toxic, corrosive, explosive or flammable in accordance with the indicative criteria given in Part I Schedule 1. The number of hazardous chemicals covered by Part I and Part II of Schedule-1, is therefore large. However no threshold quantity is indicated here. For isolated storages, there is only a short list of chemicals or classes of chemicals with the threshold quantity indicated in column 3 of Schedule-2.

Rule 5 (Notification of major Accidents) applies both to process activities and isolated storages involving any of the hazardous chemicals listed in Part II of Schedule 1, Schedule 2 or 3 or come within the indicative criteria of Part-I Schedule-1. There is no threshold quantity for the application of Rule-5.

For the specific requirements, there are two lists of hazardous chemicals. Part-I of Schedule-3 lists 179 chemicals and Part-II of Schedule 3 lists three classes of chemicals. Rules 7 to 8 and 13 to 15 apply if the threshold quantity, given in column 3 of Schedule 3, of a chemical is involved or it exceeds in a process activity at a site.

Out of the 179 chemicals indicated in Part-I of Schedule-3, rules 10 to 12 apply to 17 chemicals if the threshold quantity or more of the chemical given in column 4 is involved. Schedule-2 lists 8 of the 179 chemicals of Part-II, Schedule 3 plus one additional substance (liquid oxygen) and two classes of chemicals of Part-II, Schedule 3. Rule 7 to 9 apply to these chemicals when they are in isolated storages above certain threshold quantities given at (column 3 of Schedule-2) and rule 10 to 15, if they are above the quantities indicated at column 4 of Schedule-2.

Enforcement

- 4.0 Schedule 5 lists various implementing/enforcing authorities. Flow chart (Fig. 2) gives the statutory provisions, concerned authorities and reporting channels as

envisaged in the rules. This will help the occupier in effectively complying with the rules. As far industrial installations are concerned, the factory inspectorate will be the enforcement authority. In respect of activities which apart from being regulated by the Factory Inspectorate are also governed by the other regulations like the Dock Workers Safety, Health and Welfare Act, 1986, the Mines Act, 1952 and the Indian Explosives Act and Rules 1983, the authorities responsible for enforcement of the specific regulations would also be responsible for the enforcement of the regulation on hazardous chemicals (figure-2). In case of isolated storages, the Central Pollution Control Board/the State Pollution Control Boards will enforce the regulations in the Union Territory and the States respectively.

Duties Placed on the occupier

5.0 Both the general and specific requirements of the Rules that place certain responsibilities on the Occupier are as follows :

- (i) **Demonstration of Safe Operations** :- Under Rule 4 the occupier is required to be able to demonstrate to the concerned authorities at any time that -
 - a. he has identified the hazards arising from his activities, and
 - b. he has taken adequate steps to ensure the safety of the people at the site.
- (ii) **Reporting of Major Accidents** :- Rule 5 requires the occupier to report any major accident that may occur on their sites to the concerned Inspectorate/pollution Control Boards as per Schedule 6. Rule 5 also requires that the occupier shall furnish a report and the Factory Inspectorate in turn after analysis shall make available a copy of the report to the Ministry of Environment and Forests through the Ministry of Labour.
- (iii) **Notification of Site** :- Under Rules 7 to 9, the occupier is required to submit a written report and keep it updated to the concerned Inspectorate/Pollution Control Board containing the particulars specified in Schedule-7 to show that he is carrying on an industrial activity safely at a particular site.
- (iv) **Preparation of Safety Report** :- The safety report is a written report (Rule 10 to 12) which occupier is required to send to the concerned Inspectorate/Pollution Control Board to show that his industrial activity is being carried out safely. The report shall include a description of the hazards arising out of the activity together with an account of the controls that are in operation and prepared on the lines indicated in Schedule-8.
- (v) **Preparation of On-site Emergency Plan** : Rule 13 requires an occupier to prepare an on-site emergency plan and provide it for consultation and make available a copy to the concerned Inspectorate / pollution Control Board and the local District Collector to enable him to prepare an off-site plan.
- (vi) **Preparation of Off-site Emergency Plan** : The occupier is not responsible for the preparation of an off-site emergency plan as this is the duty placed on the local

authority (the District Collector) as per Eule 14. However, the occupiers are required to provide information to the local authority to enable them to draw up an off-site emergency plan. This information will cover major accident hazards, possible consequences and any special emergency measures required. The on-site and the off-site emergency plans should, of course, have to dovetail with each other.

- (vii) **Informing Members of the Public** : Rule 15 requires that the members of the public living in the vicinity of an industrial activity should be informed about the activity and the associated hazards as they could be at a risk in the event of a major accident. The responsibility for providing this information is placed on the occupier who is required to disseminate the information.
- (viii) **Disclosure of Information** : Rule 16 requires that information which an occupier makes available to the factory inspectorate/pollution control board and the local authorities under the regulations, shall be kept confidential. However, information required for the public in case of a major accident, if required, shall be disseminated. This has particular relevance to the information from the occupier supplied to the local authorities for the preparation of the off-site emergency plan for informing the public.
- (ix) **Collection, Development and Dissemination of Information** : Rule 17 requires that the occupier shall collect, collate and prepare a material safety data sheet (MSDS) as per schedule 9 for all hazardous chemicals listed in Part II Schedule 1 and falling under the criteria listed in Part I Schedule 1 if handled. He shall also label all containers properly.
- (x) **Import of Hazardous Chemicals** : Rule 18 requires that the occupier inform the concerned authority of imports of hazardous chemicals and maintain records of such imports of as per schedule 10.

WORKMEN'S COMPENSATION ACT, 1923

CHAPTER II

3. Employer's Liability for Compensation

- 1) If personal injury is caused to a workman by accident arising out of and in the course of his employment, his employer shall be liable to pay compensation in accordance with the provisions of this Chapter.

Provided that the employer shall not be so liable -

- a) In respect of any injury does not result in the total or partial disablement of the workman for a period exceeding three days.
 - b) In respect of any (injury, not resulting in death or permanent total disablement cause by an accident which is directly attributable to :
 - i) the workman having been at the time thereof under the influence of drink or drugs, or
 - ii) the wilful disobedience of the workman to an order expressly given, or to a rule expressly framed, for the purpose of securing the safety of workmen, or
 - iii) the wilful removal or disregard by the workman of any safety guard or other device which he knew to have been provided for the purpose of securing the safety of workman.
- 2) If a workman employed in any employment specified in Part A of Schedule III contracts any disease specified therein as an occupational disease peculiar to that employment, or if a workman, whilst in the service of an employer in whose service he has been employed for a continuous period not less than six months (which period shall not include a period of service under any other employer in the same kind of employment) in any employment specified in Part B of Schedule III, contracts any disease specified therein as an occupational disease peculiar to that employment, or if a workman whilst in the service of one or more employers in any employment specified in a Part C of Schedule III for such continuous period as the Central Government may specify in respect of each such employment, contracts any disease specified therein as an occupational disease peculiar within the meaning of this section and, unless the contrary is provided, the accident shall be deemed to have arisen out of and in the course of the employment :

Provided that if it is proved

- a) that a workman whilst in the service of one or more employers in any employment specified in Part C of Schedule III has contracted a disease specified therein as an occupational disease peculiar to that employment during a continuous period which is less than the period specified under this sub-section for that employment and
- b) that the disease has arisen out of and in the course of the employment, the contracting of such disease shall be deemed to be an injury by accident within the meaning of this section.

Provided further that if it is proved that workman who having served under any employer in any employment specified in Part B of Schedule III or who having served under one or more employers in any employers specified in Part C of that Schedule, for a continuous period specified under this sub section for that employment and he has after the cessation of such service contracted any disease arose out of the employment, the contracting of the disease shall be deemed to be an injury by accident within the meaning of this section.

- 2A) If a workman employed in any employment specified in Part C of Schedule III contracts any occupational peculiar to that employment, the contracting where of is deemed to be an injury by accident within the meaning of this section and such employment was user more than one employer, all such employers shall be liable for the payment of the compensation in such proportion as the Commissioner may, in the circumstances, deem just.
- 3) The Central Government or the State Government, after giving, by notification in the Official Gazette, not less than three months, notice of its intention so to do, may, by a like notification, add any description of employment to the emploments specified in Schedule III and shall specify in the case of employments so added the diseases which shall be deemed for the purposes of this section to be occupational diseases peculiar to those employments respectively, and thereupon the provisions of sub-section (2) shall apply (in the case of a notification by the Central Government, within the territories to which this Act extends, or, in case of a notification by the State Government, within the State as if such disease had been declared by this Act to be occupational disease peculiar to those employments.
- 4) Save as provided by (sub-section (2), (2A) and (3), no compensation shall be payable to a workman in respect of any disease unless the disease is directly attributable to a specified injury by accident arising out of and in the course of his employment.

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- 5) Nothing herein contained shall be deemed to confer any right to compensation on a workman in respect of any injury if he has instituted in a Civil Court a suit for damages in respect of the injury against the employer or any other person; and no suit for damages shall be maintainable by a workman in any court of law in respect of any injury.
- a) if he has instituted a claim to compensation in respect of the injury before a Commissioner; or
- b) if an agreement has been come to between the workman and his employer providing for the payment of compensation in respect of the injury in accordance with the provision of this Act.

4. Amount of Compensation

- 1) Subject to the provisions of this Act, the amount of compensation shall be as follows namely :-
- a) Where death results from the injury
- an amount equal to fifty percent of the monthly wages of the deceased workman multiplied by the relevant factor;
- OR
- an amount of fifty thousand rupees whichever is more;
- a) Where permanent total disablement results from the injury
- an amount equal to sixty percent of the monthly wages of the injured workman multiplied by the relevant factor;
- OR
- an amount of sixty thousand rupees whichever is more;
- 1) Notwithstanding anything contained in sub-section (1) while fixing the amount of compensation payable to a workman in respect of an accident outside India, the Commissioner shall take into account the compensation, if any, awarded to such workman in accordance with the law of the country in which the accident occurred and shall reduce the amount fixed by him by the amount of compensation awarded to the workman in accordance with the law of that country.

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- 2) The half-monthly payment referred to in clause (d) of sub-section (1) shall be payable on the sixteenth day
 - i) from the date of disablement where such disablement lasts for a period of twenty-eight days or more or
 - ii) after the expiry of a waiting period of three days from the date of disablement where such disablement lasts for a period of less than twenty-eight days and thereafter half monthly during the disablement or during a period of five years, whichever is more.

Provided that

- a) there shall be deducted from any lump sum or half-monthly payments to which the workman is entitled the amount of any payment or allowance which the workman has received from the employer by way of compensation during the period of disablement prior to the receipt of such lump sum or of the first half-monthly payment, as the case may be and
- b) no half-monthly payment shall in any case exceed the amount, if any by which half the amount of the monthly wages of the workman before the accident exceeds half the amount of such wages which he is earning after the accident.

4A. Compensation to be paid when due and penalty for default

- 1) Compensation under section 4 shall be paid as soon as it falls due.
- 2) In cases where the employer does not accept the liability for compensation to the extent claimed, he shall be bound to make provisional payment based on the extent of liability which he accepts, and, such payment shall be deposited with the Commissioner or made to the workman as the case may be, without prejudice to the right of the workman to make any further claim.
- 3) Where any employer is in default in paying the compensation due under this Act within one month from the date it fell due, the Commissioner shall :
 - a) direct that the employer shall, in addition to the amount of the arrears, pay simple interest thereon at the rate of twelve percent per annum or at such higher rate not exceeding the maximum of the lending rates of any scheduled bank as may be specified by the Central Government, by notification in the Official Gazette, on the amount due; and

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- b) if, in his opinion there is no justification for the delay, direct that the employer shall, in addition to the amount of the arrears, and interest thereon pay a further sum not exceeding fifty percent of such amount by way of penalty.

Provided that in order for the payment of penalty shall not be passed under clause (b) without giving as reasonable opportunity to the employer to show cause only it should not be passed.

Explanation - For the purposes of this sub-section, "schedule bank" means a bank for the time being included in the Second Schedule to the Reserve Bank of India Act, 1934 (2 of 1934).

- 3A) The interest payable under sub-section (3) shall be paid to the workman or his dependant, as the case may be and the penalty shall be credited to the State Government.

5. **Method of calculating wages**

In this Act and for the purposes thereof the expression "monthly wages" means the amount of wages deemed to be payable for a month's service (whether the wages be payable by the month or by whatever other period or at piece rates), and calculated as follows, namely :-

- a) where the workman has, during a continuous period of not less than twelve months immediately preceding the accident, been in the service of the employer who is liable to pay compensation, the monthly wages of the workman shall be one-twelfth of the total wages which have fallen due for payment to him by the employer in the last twelve months of that period ;
- b) where the whole of the continuous period of service immediately preceding the accident during which the workman was in the service of the employer who is liable to pay the compensation was less than one month, the monthly wages of the workman shall be the average monthly amount which, during the twelve months immediately preceding the accident, was being earned by a workman employed on the same work by the same employer, or, if there was no workman so employed, by a workman employed on similar work in the same locality.
- c) in other cases (including cases in which it is not possible for want of necessary information to calculate the monthly wages under clause (b) the monthly wages shall be thirty times the total wages earned in respect of the last continuous period of service immediately preceding the accident from the employer who is liable to pay compensation, divided by the number of days comprising such period.

Explanation - A period of service shall, for the purpose of (this section) be deemed to be continuous which has not been interrupted by a period of absence from work exceeding fourteen days.

6. Review

- 1) Any half-monthly payment payable under this Act, either under an agreement between the parties or under of a Commissioner, may be reviewed by the Commissioner, on the application either of the employer or of the workman accompanied by the certificate of a qualified medical practitioner that there has been a change in the condition of the workman or subject to rules under this Act, on application made without such certificate.
- 2) Any half-monthly payment may, on review under this section, subject to the provisions of this Act, be continued, increased, decreased or ended, or, if the accident is found to have resulted in permanent disablement, be converted to the lumpsum to which the workman is entitled less any amount which he has already received by way of half-monthly payments.

7. Commutation of half-monthly payments

Any right to receive half-monthly payments may, be agreement between the parties, or, if the parties cannot agree and the payments have been continued for not less than six, months, on the application of either party to the Commissioner be redeemed by the payment of a lumpsum of such amount as may be agreed to by the parties or determined by the Commissioner, as the case may be.

8. Distribution of compensation

- 1) No right of compensation in respect of a workman whose injury has resulted in death, and no payment of a lumpsum as compensation to a woman or a person under a legal disability, shall be made otherwise than by deposit with the Commissioner, and no such payment made directly by an employer shall be deemed to be a payment of compensation.

Provided that, in the case of a deceased workman an employer may make to any dependant advances on account of such amount as does not exceed the compensation payable to that dependant shall be deducted by the Commissioner from such compensation and repaid to the employer.

- 2) Any other sum amounting to not less than ten rupees which is payable as compensation may be deposited with the Commissioner on behalf of the person entitled thereto.
- 3) The receipt of the Commissioner shall be a sufficient discharge in respect of any compensation deposited with him.

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- 4) On the deposit of any money under sub-section (1), as compensation in respect of a deceased workman the Commissioner and shall, if he thinks necessary, cause notice to be published or to be served on each dependant in such manner as he thinks fit, calling upon the dependants to appear before him on such date as he may fix for determining the distribution of the compensation. If the Commissioner is satisfied after any inquiry which he may deem necessary, that no dependant exists, he shall repay the balance of the money to the employer by whom it was paid. The Commissioner shall, on application by the Employer furnish a statement showing in detail all disbursements made.
 - 5) Compensation deposited in respect of a deceased workman shall, subject to any deduction made under sub-section (4) be apportioned among the dependant of the deceased workman or any of them in such proportion as the Commissioner thinks fit, or may, in the discretion of the Commissioner, be allotted to any one dependant.
 - 6) Where any compensation deposited with the Commissioner is payable to any person, the Commissioner shall, if the person to whom the compensation is payable is not a woman or a person under a legal disability, and may, in other cases, pay the money to the person entitled thereto.
 - 7) Where any lump sum deposited with the Commissioner is payable to a woman or a person under a legal disability, such sum may be invested, applied or otherwise dealt with for the benefit of the woman or of such person during his disability, in such manner as the Commissioner may direct; and where a half-monthly payment is payable to any person under a legal disability, the Commissioner may, of his own motion or on an application made to him in this behalf, the Commissioner may, of his own motion or on an application made to him in this behalf, order that the payment be made during the disability to any dependant of the workman or to any other person, whom the Commissioner thinks best fitted to provide for the welfare of the workman.

10A Power to require from employers statements regarding fatal accidents

- 1) Where a Commissioner receives information from any source that a workman has died as a result of an accident arising out of and in the course of his employment, he may send by registered post a notice to the workman's employer requiring him to submit, within thirty days of the service of the notice, a statement, in the prescribed form, giving the circumstances attending the death of the workman, and indicating whether, in the opinion of the employer, he is or is not liable to deposit compensation on account of the death.
- 2) If the employer is of opinion that he is liable to deposit compensation, he shall make the deposit within thirty days of the service of the notice.

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- 3) If the employer is of opinion that he is not liable to deposit compensation, he shall in his statement indicate the grounds on which he disclaims liability.
 - 4) Where the employer has so disclaimed liability, the Commissioner, after such inquiry as he may think fit may inform any of the dependants of the deceased workman that it is open to the dependants to prefer a claim for compensation and may give them such other further information as he may think fit.

10B. Reports of fatal accidents and serious bodily injuries

- 1) Where, by any law for the time being in force, notice is required to be given to any authority, by or on behalf of an employer, of any accident occurring on his premises which results in death or serious bodily injury the person required to give the notice shall, within seven days of the death or serious bodily injury send a report to the Commissioner giving the circumstances attending the death or serious bodily injury.

Explanation "Serious bodily injury" means an injury which involves, or in all probability will involve the permanent loss of the use of, or permanent injury to any limb or the permanent loss of or injury to the sight or hearing, or the fracture of any limb, or the enforced absence of the injured person from work for a period exceeding twenty days.

- 2) The State Government may, by notification in the Official Gazette, extend the provisions of sub-section (1) to any class of premises other than those coming within the scope of the sub-section, and may such notification, specify the persons who shall send the report to the Commissioner.
- 3) Nothing in this section shall apply to factories to which the Employers State Insurance Act, 1948 (34 of 1948), applies.

11. Medical Examination

- 1) Where a workman has given notice of an accident he shall, if the employer, before the expiry of three days from the time at which service of the notice has been effected offers to have him examined free of charge by a qualified medical practitioner, submit himself to such examinations, and any workman who is in receipt of half-monthly payment under this Act shall, if so required, submit himself for such examination from time to time.

Provided that a workman shall not be required to submit himself for examination by a medical practitioner otherwise than in accordance with rules made under this Act, or at more frequent intervals than may be prescribed.

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- 2) If a workman, on being required to do so by the employer under sub-section (1) or by the Commissioner at any time, refuses to submit himself for examination by a qualified medical practitioner or in any way obstructs the same, his right to compensation shall be suspended during the continuance of such refusal or obstruction unless, in the case of refusal, he was prevented by any sufficient cause from so submitting himself.
 - 3) If a workman, before the expiry of the period within which he is liable under sub-section (1) to be required to submit himself for medical examination, voluntarily leaves without having been so examined the vicinity of the place in which he was employed, his right to compensation shall be suspended until he returns and offers himself for such examination.
 - 4) Where a workman, whose right to compensation has been suspended under sub-section (2) or sub-section (3) dies without having submitted himself for medical examination as required by either of sub-section the Commissioner may, if he thinks fit, direct the payment of compensation to the dependants of the deceased workman.
 - 5) Where under sub-section (2) or sub-section (3) a right to compensation is suspended, no compensation shall be payable in respect of the period of suspension, and, if the period of suspension commences before the expiry of the waiting period referred to in clause (d) of sub-section (1) of section 4, the waiting period shall be increased by the period during which the suspension continues.
 - 6) Where an injured workman has refused to be attended by a qualified medical practitioner whom services have been offered to him by the employer free of charge or having accepted such offer has deliberately disregarded the instructions of such medical practitioner, then, (if it is proved that the workman has not thereafter has deliberately failed to follow his instructions and that such refusal, disregard or failure was unreasonable) in the circumstances of the case and that the injury has been aggravated thereby, the injury and resulting disablement shall be deemed to be of the same nature and duration as they might reasonable have been expected to be if the workman had been regularly attended by a qualified medical practitioner (whose instructions he had followed) and compensation, if any, shall be payable accordingly.

12. Contracting

- 1) Where any person (hereinafter in this section referred to as the principal) in the course of or for the purpose of his trade or business contract with any other person (hereinafter in this section referred to as the contractor for the execution by or under the contractor of the whole or any part of the work which is ordinarily part of the trade or business of the principal, the principal shall be liable to pay to any workman employed in the execution of the work any compensation which he

would have been liable to pay if that workman had been immediately employed by him; and where compensation is claimed for references to the employer except that the amount of compensation shall be calculated with reference to the wages of the workman under the employer by whom he is immediately employed.

- 2) Where the principal is liable to pay compensation under this action, he shall be entitled to be indemnified by the contractor (or any other person from whom the workman could have recovered compensation and where a contractor who is himself a principal is liable to pay compensation or to indemnify a principal under this section he shall be entitled to be indemnified by any person standing to him in the relation of all contractor from whom the workman could have recovered compensation) and all questions as to the right to and the amount of any such indemnify shall, in default of agreement, be settled by the Commissioner.
- 3) Nothing in this section shall be construed as preventing a workman from recovering compensation from the contractor instead of the principal.
- 4) This section shall not apply in any case where the accident occurred elsewhere than on, in or about the premises on which the principal has undertaken or usually undertakes, as the case may be, to execute the work or which are otherwise under this control or management.

SCHEDULE 1
[See Section 2 (1) and (4)]

Serial No.	Description of injury	Percentage of loss of earning capacity
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PART I

**LIST OF INJURIES DEEMED TO RESULT
IN PERMANENT TOTAL DISABLEMENT**

1)	Loss of both hands or amputation at higher sites	100
2)	Loss of hand and a foot	100
3)	Double amputation through leg or thigh, or amputation through leg or thighs on one side and loss of other foot	100
4)	Loss of sight to such an extent as to render the claimant unable to perform any work for which eye-sight is essential	100
5)	Very severe facial disfigurement	100
6)	Absolute deafness	100

PART II

**LIST OF INJURIES DEEMED TO RESULT
IN PERMANENT TOTAL DISABLEMENT**

Amputation cases upper limbs (either arm)

1)	Amputation through shoulder joint	90
2)	Amputation below shoulder with stump less than (20.32 cms)	80

Serial No.	Description of injury	Percentage of loss of earing capacity
16)	Amputation at tip	90
17)	Amputation below hip with stump exceeding 12.70 cms. in length measured from tip of greats trenchanter	80
18)	Amputation below hip with stump exeeding 12.70 cms. in length measured from tip of greats trenchanter but not beyond middle thigh	70
19)	Amputation below middle thigh to 8.99 cms below knee	60
20)	Amputation below knee with stump exceeding 8.99 cms. but not exceeding 12.70 cms	50
21)	Amputation below knee with stump exceeding 12.70 cms.	50
22)	Amputation of one foot resulting in end bearing	50
23)	Amputation through onfoot proximal to the metatarsophalangeal joint	50
24)	Loss of all toes of one foot through the metatarsophalangeal joint	20
Other injuries		
25)	Loss of one eye, without complication, the other being normal	40
26)	Loss of vision of one eye, without complication or disfigurement of eye-ball, the other being normal	30
26A)	Loss of partial vision of one eye	10

Serial No.	Description of injury	Percentage of loss of earing capacity
A	Fingers of right or left hand index inger	
27)	Whole	14
28)	Two phalanges	11
29)	One phalanx	9
30)	Guilotine amputation of time without loss of bone	5
	Middle Finger	
31)	Whole	12
32)	Two phalanges	9
33)	One phalanx	7
34)	Guilotine amputation of time without loss of bone	4
	Ring or Little Finger	
35)	Whole	7
36)	Two phalanges	6
37)	One phalanx	5
38)	Guilotine amputation of time without loss of bone	2

Serial No.	Description of injury	Percentage of loss of earning capacity
B. Toes of Right or Left Foot Great Toe		
39)	Through metatarso-phalangeal joint	14
40)	Part with some loss of bone	3
Any Other Toe		
41)	Through metatarso-phalangeal joint	3
42)	Part with some loss of bone	1
Two toes of one foot, excluding great toe		
43)	Through metatarso-phalangeal joint	5
44)	Part with some loss of bone	2
Four toes of one foot, excluding Great Toe		
45)	Through metatarso-phalangeal joint	6
46)	Part with some loss of bone	3
Four toes of one foot, excluding Great Toe		
47)	Through metatarso-phalangeal joint	9
48)	Part with some loss of bone	3

Note : Complete and permanent loss of the use of the any limb or member referred to in the Schedule shall be deemed to be the equivalent of the loss of that limb or member.

SCHEDULE II
[See section 2 (1) (n)]

**LIST OF PERSONS WHO, SUBJECT TO THE
PROVISIONS OF SECTION 2(1) (n), ARE
INCLUDED IN THE DEFINITION OF WORKMEN**

The following persons are workmen within the meaning of section 2 (1) (n) and subject to the provisions of that section, that is to say, any person who is

- i) employed, otherwise than in a clerical capacity or on a railway, in connection with the operation or maintenance of a lift or a vehicle propelled by steam or other mechanical power or by electricity or in connection with the loading or unloading of any muchvehicle,or
 - ii) employed, otherwise than in a clerical capacity in any premises wherein or within the precincts whereof manufacturing process as defined in clause 2 of section 2 of the Factories Act 1948 (63 of 1948), is being carried on, any kind of work whatsoever incidental to or connected with any such manufacturing process or with the article made (whether or not employment in any such work is within such premises or precincts) and steam, water or other mechanical power or electrical power is used, or
 - iii) employed for the purpose of making, altering, repairing, ornamenting, finishing or otherwise adapting for use, transport or sale any article or part of an article in any premises wherein or within the precincts whereof twenty or more persons are so employed.
- Explanation** For the purposes of this clause, person employed outside such premises but in any work incidental to, or connected, with, the work relating to making altering, repairing, ornamenting,finishing or otherwise adapting for use, transport or sale of any article or part of an article shallbe deemed to be employed within such premises or precincts; or)
- iv) employed in the manufacture or handling of explosives in connection with the employer's trade orbusiness; or
 - v) employed, in any mine as defined in clause (f) of section 2 of the Mines Act, 1952 (35 of 1952), in any mining operation or in any kind of work other than clerical work, incidental to or connected with any mining operation or with the mineral obtained, orin any kind of work whatsoever below ground; or
 - vi) employed as the master or as a seaman of
 - a) any ship which is propelled wholly or in part by steam or other mechaical power or by electricy or which is towed or intended to be towed by a show so propelled; or

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- b) any ship not included in sub-clause (a), of twenty-five tons net tonnage or over; or
 - c) any sea going ship not included in sub-clause (a) or sub-clause (b) provided with sufficient area for navigation under sails alone; or
- vii) employed for the purpose of
- a) loading, unloading, fuelling, construction, repairing, demolishing, cleaning or painting any ship of which he is not the master or a member of the crew, or handling or transport within the limits of any port subject to (the Indian Ports Act, 1908 (15 of 1908), or the major Port Trusts Act, 1963 (38 of 1963), of goods which have been discharged from or are to be loaded into any vessel; or
 - b) warping a ship through the lock; or
 - c) mooring or unmooring ships at harbour wall berths or in pier; or
 - d) removing or replacing dry dock caissons when vessels are entering or leaving dry docks; or
 - e) the docking or undocking of any vessel during an emergency; or
 - f) preparing splicing coir springs and check wires, painting depth marks on lock sides, removing or replacing fenders whenever necessary, landing of gangways, maintaining lifebuoys up to standard or any other maintenance work of a like nature; or
 - g) any work on jolly-boats for bringing a ship's line to the wharf; or
- viii) employed in the construction, maintenance, repair or demolition of
- a) any building which is designed to be or is or has been more than one storey in height above the ground or twelve feet or more from the ground level to the apex of the roof; or
 - b) any dam or embankment which is twelve feet or more in height from its lowest to its highest point; or
 - c) any road, bridge, tunnel or canal; or
 - d) any wharf, quay, sea wall or other marine work including any moorings of ships; or

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- ix) employed in setting up, maintaining repairing or taking down any telegraph or telephone line or post or any overhead electric line or cable or standard or fittings and fixtures for the same; or
 - x) employed, otherwise than in a clerical capacity, in the construction, working, repair or demolition of any aerial ropeway, canal, pipeline or sewer; or
 - xi) employed in the service of any fire brigade; or
 - xii) employed upon a railway as defined in (clause 31 of section 2 and sub-section 1 of section 197 of the Railway Act, 1989) (24 of 1989), either directly or through a sub-contractor, by a person fulfilling a contract with the railway administration; or;
 - xiii) employed as an inspector, mail guard, sorter or van peon in the Railway mail Service (or as a telegraphist or as a postal or railway signaller), or employer in any occupation ordinarily involving outdoor work in the Indian Posts and Telegraphs Department; or
 - xiv) employed, otherwise than in a clerical capacity, in connection with operations for winning natural petroleum or natural gas; or
 - xi) employed in any occupation involving blasting operations; or
 - xvi) employed in the making of any excavation in which on any way of the preceeding twelve months more than (twenty-five) persons have been employed or explosives have been used, or whose depth from its highest to its lowest point exceeds twelve feet; or
 - xvii) employed in the operation of any ferry boat capable of carrying more than ten persons; or
 - xviii) employed, otherwise than in clerical, on any estate which is maintained for the purpose of growing cardamom, cinchona, coffee, rubber or tea, and on which on any one day in the preceeding twelve months twenty-five or more persons have been so employed; or
 - xix) employed, otherwise than in a clerical capacity, in the generating, transforming transmitting or distribution of electrical engery or in generation or supply of gas; or
 - xx) employed in a lighthouse as defined in clause (d) of section 2 of Indian Lighthouse, Act 1927 (17 of 1927); or
 - xxi) employed in producing cinematograph pictures intended for public exhibition or in exhibiting such pictures; or
 - xxii) employed in the training, keeping or working of elephants or wild animals; or

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- xxiii) employed in the tapping of palm-trees or the felling or logging of trees, or the transport of timber by inland walters, or the control or extinguishing of forests fires; or
 - xxiv) employed in operations for the catching or hunting of elephants or other wild animals; or
 - xxv) employed as a driver; or
 - xxvi) employed in the handling or transport of goods in or within the precincts of
 - a) any warehouse of other place in the which goods are stored, and in which on any one day of the preceeding twelve months ten or more persons have been so employed or
 - b) any market in which on any day of the preceeding twelve months or more person have been so employed; or
 - xxvii) employed in any occupation involving the handling and manipulation of radium or x-rays apparatus, or contact with radioactive substance; or
 - xxviii) employed in or in connection with the construction, erection, dismantling operation or maintenance of an aircraft as defined in section 2 of the Indian Aircraft Act, 1934 (22 of 1934); or
 - xxix) employed in horticultural operations, forestry, bee-keeping or farming) by tractors or other contrivances driven by steam or other mechanical power or by electricity; or
 - xxx) employed, otherwise than in a clerical capacity in the construction, working, repair or maintenance of a tube well; or
 - xxxi) employed in the maintenance, repair or renewal of electric fittings in a building; or
 - xxxii) employed in a circus.
 - xxxiii) employed as watchman in any factory or establishment
 - xxxiv) employed in any operation in the sea for catching fish;
 - xxxv) employed in any employment which requires handling of snakes for the purpose of extra action of venom or for the purpose of looking after snakes or handling any other poisonous animal or insects;
 - xxxvi) employed in handling animals like horses, mules and bulls.

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- xxxvii) employed for the purpose of loading or unloading any mechanically propelled vehicle or in the handling or transport of goods which have been loaded in such vehicles;
 - xxxviii) employed in cleaning of sewer lines or septic tanks within the limits of a local authority;
 - xxxix) employed on surveys and investigation, exploration or gauge or discharge observation of rivers including drilling operation, hydrological observations and flood forecasting activities, ground water surveys and exploration.
 - xi) employed in cleaning of jungles or reclaiming land or ponds in which on any one day of the preceeding twelve months more than twenty-five persons have been employed.
 - xli) employed in cultivation of land or rearing and maintenance of live-stock or forest operations or fishing on which on any one day of the preceeding twelve months more than twenty, five person have been employed.
 - xl ii) employed in installation, maintenance of repair of pumping equipment used for lifting of water from wells, tube-wells, ponds, lakes, streams and the like;
 - xl iii) employed in the construction, boring or deeping of an open well or dug well, bore well, bore-cum-dug well, filter point and the like;
 - xl iv) employed in spraying and dusting or insecticides or pesticides in agricultural operations or plantations;
 - xiv) employed in mechanised harvesting and threshing operation;
 - xlvi) employed in working or repair or maintenance of bulldozers, tractors, power tillers and the like;
 - xl vii) employed as artists for drawing pictures on advertisement boards at a height of 3.66 meters or more from the ground level;
 - xl viii) employed in any newspaper establishment as defined in the Working Journalists and other Newspaper Employees (Conditions of Service) and Miscellaneous Provisions Act, 1955 and engaged in outdoor work).

Explanation In this Schedule "the preceeding twelve months" relates in any particulars case to the twelve months ending with the day on which the accident in such case occurred.

**SCHEDULE III
(See Section 3)**

LITOF OCCUPATIONAL DISEASE

S.No.	Occupational Disease	Employment
PART A		
1.	infectious and parasitic disease contracted on an occupation where there is a particular risk of contamination.	a) All works involving exposure to health or laboratory work; b) All work involving exposure to veterinary work; c) Work relating to handling animals, animal carcasses, part of such carcasses or merchandise which may have been contaminated by animals or animal carcasses; d) Other work carrying a particular risk of contamination.
2.	Diseases caused by work in compressed air.	All work involving exposure to the risk concerned.
3.	Diseases caused by lead or its toxic compounds.	All work involving exposure to the risk concerned.
4.	Poisoning by nitrous fumes	All work involving exposure to the risk concerned.
5.	Diseases by organo phosphorus compounds.	All work involving exposure to the risk concerned.
PART B		
1.	Diseases caused by phosphorus or its toxic compounds.	All work involving exposure to the risk concerned.
2.	Diseases caused by mercury or its toxic compounds.	All work involving exposure to the risk concerned.
3.	Diseases caused by benzene or its toxic homologues.	All work involving exposure to the risk concerned.

S.No.	Occupational Disease	Employment
4.	Diseases caused by nitro and amino toxic dervative of benzene or its homologues	All work involving exposure to the risk concerned.
5.	Diseases caused by chromium or its toxic compounds.	All work involving exposure to the risk concerned.
6.	Diseases caused by arsenic, or its toxic compounds	All work involving exposure to the risk concerned.
7.	Diseases caused by radioactive substances and ionising radiations.	All work involving exposure to the action of radioactive substances or ionising radiations.
8.	Primary cancer of the skin caused by tar, pitch, bitumen, mineral oil, anthracene, or the compounds, products or residues of these substances.	All work involving exposure to the risk concerned.
9.	Diseases caused by the toxic halogen dervative of hydrocarbons (of the aliphatic and aromatic series)	All work involving exposure to the risk concerned.
10.	Diseases caused carbon disulphide	All work involving exposure to the risk concerned.
11.	Occupational cataract due to infrared radiations.	All work involving exposure to the risk concerned.
12.	Diseases caused by manganese or its toxic compounds	All work involving exposure to the risk concerned.
13.	Skin diseases caused by physical, chemical or biological agents not included in other items.	All work involving exposure to the risk concerned.
14.	Hearing impairment caused by noise.	All work involving exposure to the risk concerned.
15.	Poisoning by dinitrophenol or a homologue or by substituted dinitrophenol or by the salts of such substances.	All work involving exposure to the risk concerned.
16.	Diseases caused by beryllium or its toxic compounds	All work involving exposure to the risk concerned.
17.	Diseases caused by cadmium or its toxic compounds	All work involving exposure to the risk concerned.

18.	Occupational asthma caused by recognised sensitizing agents inherent to the work process.	All work involving exposure to the risk concerned.
19.	Diseases caused by fluorine or its toxic compounds	All work involving exposure to the risk concerned.
20.	Diseases caused by nitroglycerin, or other nitroacid esters.	All work involving exposure to the risk concerned.
21.	Diseases caused by alcohols and ketones.	All work involving exposure to the risk concerned.
22.	Diseases caused by asphyxiants carbon and its toxic hydrogen sulphide.	All work involving exposure to the risk concerned.
23.	Lung cancer and mesotheliomas caused by asbestos	All work involving exposure to the risk concerned.
24.	Primary neoplasm of the epithelial lining of the urinary bladder or the kidney or the ureter.	All work involving exposure to the risk concerned.
25.	Snow blindness in snow bound areas.	All work involving exposure to the risk concerned.
26.	Diseases due to effect of not in extreme hot climate	All work involving exposure to the risk concerned.
27.	Diseases due to effect of cold in extreme cold climate	All work involving exposure to the risk concerned.

PART- C

1.	Pneumoconioses caused by sclerogenic mineral dust (silicosis, anthraoosilicosis, asbestosis) and silicotuberculosis provided that silicosis is an essential factor in causing the resultant incapacity or death.	All work involving exposure to the risk concerned.
2.	Bagassosis	All work involving exposure to the risk concerned.
3.	Bronchopulmonary diseases caused by cotton, flax hemp and sisal dust (Byssionosis).	All work involving exposure to the risk concerned.
4.	Extrinsic allergic alveolitis caused by the inhalation of organic dusts.	All work involving exposure to the risk concerned.
5.	Bronchopulmonary diseases caused by hard metals.	All work involving exposure to the risk concerned.

SCHEDULE IV
(See Section 4)

Factors for working out lumpsum equivalent of compensation amount incase of permanent disablement and death.

Completed years of age on the last birthday
of the workman immediately preceeding the
date on which the compensation full due

Factor

1.

2.

Notmore than

16
17
18
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25
26
27
28
29
30
31
32
33
34
35
36
37
38
39
40
41
42
43
44
45
46

228.54
227.49
226.38
225.22
224.00
222.71
221.37
219.95
218.47
216.91
215.28
213.57
211.79
209.92
208.98
205.95
203.85
210.66
199.40
197.06
194.64
192.14
189.56
186.90
184.17
181.37
178.49
175.54
172.52
169.44
166.29

1.	2.
47	163.07
48	159.80
49	156.47
50	153.09
51	149.67
52	146.20
53	142.68
54	139.13
55	135.56
56	131.95
57	128.33
58	124.70
59	121.05
60	117.41
61	113.77
62	110.14
63	106.52
64	102.93
65 or more	99.37

FIRE ORDER FOR

FIRE PROTECTION AND FIRE FIGHTING

IN NTPC OFFICE AT SCOPE COMPLEX

1.0 INTRODUCTION :

- 1.1 In view of various fire incidents in high rise buildings world wide, fire protection and fire fighting in NTPC Office at SCOPE requires greater significance. Though, fire protection facilities have been provided, but we have to be well prepared and always be ready to tackle effectively any fire occurrence. Hazardous situation in office building cannot be ruled out as materials like wood, plastic, foam, paper etc. are used in the office.
- 1.2 This fire order provides compiled information on details of fire protection facilities and fire prevention guidelines. It is expected that every one will study and adopt the procedures and precautions and be well conversant with all responsibility during any emergency situation.

2.0 FIRE DETECTION SYSTEM :

- 2.1 The system provided in offices based in SCOPE Complex has got following provisions :
- i) The SCOPE Complex is monitored continuously with the help of smoke detectors and heat detectors.
 - ii) All offices are having heat type and ionization type smoke detectors. The smoke or combustion products from even a small fire can actuate the detector to send a signal to the Fire Control Room. The indicator lamp of ionising detectors lights up every 20 secs. to indicate that the detector is fit and operational.
 - iii) Heat detectors are provided in electrical switch rooms, corridors and halls for additional protection. These employ bimetallic thermostat switches which actuate above a predetermined ambient temperature (57 C) and send a signal to the Fire Control Room.

3.0 FIRE COMMUNICATION SYSTEM :

- i) The "Fire Control Room" of SCOPE Complex is situated in upper basement of Core-1 of SCOPE Complex and is manned 24 hrs. in three shifts by Fire Department Staff of SCOPE. It is having telephone Nos. 24362244 after office hours and 24360101 Extn. 2049 (SCOPE blue coloured telephone) during office hours.

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- ii) The actuation of smoke and heat detectors produces audio-visual alarms in (a) the fire control panel of concerned floor, (b) at the ground floor panel of that core with hooter and (c) at the Fire Control Room panel simultaneously. The Fire Operator in the Fire Control Room will immediately come to know the location of the fire, floor, Core No. and Zone having fire.
 - iii) Two nos. Manual Call Point Boxes (MCB) with glass windows are provided near the staircase on each floor. Audio-visual alarms are generated in the Fire Control Panels whenever the glass window of any MCB is broken.
 - iv) Intercom telephone is provided near Fire Control Panel at Ground Floor of Core-7 which is connected directly to scope Fire Control Room.
 - v) The Fire Control Room has a Public Announcement (PA) System through which announcement about fire or evacuation in any floor or simultaneously in the entire SCOPE building.
 - vi) NTPC is having an independent PA System in the Security Office at GF of Core-7 through which announcements can be made to all the floors.

4.0 **FIRE EXTINGUISHERS :**

4.1 Portable fire extinguishers are provided at conspicuous and accessible locations on each floor so that these can be utilised to control the fire when it is in an incipient stage and easiest to control.

4.2 The fire extinguishers provided are of Water Type gas fire extinguishers, Carbon dioxide fire extinguishers, Halon fire extinguishers.

- i) Water type gas extinguishers contain liquid carbon dioxide cartridge surrounded by water. When top knob of extinguisher is hit, the gas cartridge breaks and CO₂ gas forces water to come out through the outlet nozzle in the form of a jet which extinguishes fire primarily by its cooling action. These water type gas extinguishers are good for fighting fires due to plastic, foam, wood, paper etc. These extinguishers should not be used on electrical equipment since water conducts electricity and makes the user vulnerable to electrical shocks.

Directions and precautions for use :

- a) Take the extinguisher from the box and bring it near to the fire.
- b) Hold up right and remove the safety clip from the knob.

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- c) Strike the knob with the palm of the hand.
 - d) Direct the jet to the base of the flame by means of hose pipe.
- ii) CO2 type extinguishers contain liquid carbon-dioxide in the cylinder body which comes out on opening the valve in the form of gas. CO2 gas extinguishers fire by reducing the oxygen content of surrounding air to a point where combustion can not sustain itself. It is mainly used for fighting fires on electrical or electronic equipment. CO2 type extinguishers are at Electrical and Computer Rooms in Core-7, 7th Floor, SCOPE Complex.

Directions and precautions for use :

- a) Carry the extinguisher to the place of fire
 - b) Remove the safety pin and unscrew the valve of the extinguisher
 - c) Direct the jet at the base of the fire starting at one edge and sweeping across the burning material.
 - d) When used in open air, Operator should stand upwind direction and apply the gas in a downward direction.
 - e) Direct the gas as close as possible to the fire
 - f) The gas at the time of discharge makes considerable noise. The user should, therefore, be well conversant with its operation and prevent the jet from being misdirected during first few vital seconds.
- iii) Halon Fire Extinguishers are provided in 7th Floor of Core-7, SCOPE where communication equipments are provided. Halon fire extinguishers can be used on any electrical/electronic equipments.

Direction and precaution for use :

- a) Pull out safety pin from valve
- b) Aim discharge nozzle at the base of Fire
- c) Pressure control lever of the Extinguisher
- d) Open the doors and windows after extinguishing the Fire as the fumes are likely to be harmful in a closed space.

5.0 FIRE WATER SYSTEM

5.1 Fire water system in SCOPE Complex consists of a fire water tank, fire water pumps, wet riser system, yard hydrant system and sprinkler system.

- i) The 21 M³ fire water tank in lower basement is fed by tube wells as well as from MCD feeding line. Three main pumps and a jockey pump are provided to maintain a pressure of 6-7 kg/cm² in the entire fire water system. If the pressure drops down to 5.5 kg/cm² then the other pump called Hydrant pump starts automatically. In case of failure of hydrant pump either of the other two pumps (i.e. standby pump and sprinkler pump) is started manually and line pressure is maintained.
- ii) In case of power failure none of the above four pumps will operate, then diesel driver pump automatically after a gap of one minute of normal power supply failure and will supply water to fire water system.
- iii) The 6" dia wet riser is provided in each core on the side of staircase. Its hydrant opening in lift lobby has two 63 mm dia connections and one 32mm dia connection. 15/36.6 M long hoses are provided for each of the three connections. The wet risers in Core Nos. 2, 4, 6 & 8 have additional hydrant connections at the terrace of the building which can be used for fighting fires in various cores from the top as well.
- iv) An 8" dia yard hydrant ring is provided all around the SCOPE Complex. Each core is having one yard hydrant point and 2 numbers of 63 mm dia hoses are kept at each point. Yard hydrant system is meant for fighting fire from ground level.
- v) An automatic sprinkler system has been provided in the upper and lower basements of SCOPE Complex. The water sprinkler heads are provided on 32mm dia piping at an interval of 3 metres and these are designed to operate above 68°C. Each head is capable of spraying water on an area of 9 square metres.

6.0 FIRE EXITS/ESCAPE ROUTES

6.1 Fire exits are provided on each floor. In the event of a fire, occupants should vacate the building by using either the main staircase or the spiral staircase in fire exits.

6.2 The key of the fire exits are kept in the glass boxes provided at the entrance of the fire exit. To open the fire exit, one has to break the glass and take out the key of the fire exit.

6.3 All employees should in their own interest, know the fire exits of various floors.

6.4 Ensure that fire exits do not have any obstruction.

7.0 FIRE PREVENTION MEASURES :

- 7.1 An enhanced awareness of fire protection equipment and facilities is the first step towards fire prevention.
- 7.2 Do not smoke in the office as smoking is banned in NTPC Offices. If any one does in our interest we must object and also report.
- 7.3 Do not keep electrical appliances "ON" unnecessarily. Switch off fans, tube lights, A/C etc. while leaving the office.
- 7.4 Smoke coming out of electrical appliances or smell of burning electrical wiring must be reported to Administrative/Safety Deptt. immediately and supply should be switched off

Telephone Nos. (Administration Deptt.)

- i) Shri AK Bhatnagar, DGM (ES) 24314923 (direct), or 4260
 - ii) General Maintenance at 4224
- 7.5 Also inform CISF/Security Incharge on noticing any suspicious object.

Telephone No. Security Incharge

- i) Sr. Manager (Admn.) - 24367089 (or) 4190
- ii) CISF Security Incharge - 4201

8.0 CLASSIFICATION OF FIRES

- 8.1 Fires are classified in four groups based on the type of material under fire.
- i) Class "A" fires involve solid materials of organic nature like wood, paper, textiles, etc. A cooling media like water is essential for extinguishing such fires.
 - ii) Class "B" fires involve flammable liquids like petroleum products, solvents, paints etc. Blanketing effect with foam or heavy gas like CO₂ is essential for extinguishing these fires.
 - iii) Class "C" fires involve gases or liquified gases under pressure. It is necessary to isolate the burning gas at a fast rate with an inert gas, powder or vaporizing liquid for extinguishment. CO₂ or DCP should be used for extinguish such fires.

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- iv) Class "D" fires occur in combustible metals like magnesium, sodium etc. and specialized techniques and extinguishing agents are needed to control such fires. Special dry powder should be used in such cases.

WHAT TO DO IN CASE OF A FIRE :

Attempt to extinguish fire using appropriate fire extinguisher.

Break the glass of Manual Call Box (MCB) of your floor.

Switch-off power supply in case the fire involved electrical equipment.

Inform Security on Tel No. 4201 and Fire Control Room (SCOPE) Tel. No. 2049.

Inform Administration on Tel. No. 4224

Use CO₂ or Halon type extinguisher only on electrical fires.

In case fire is spreading beyond control then employees should rush to the nearest Fire Exit and leave the floor. Fire brigade staff will take care of fire fighting thereafter.

While evacuating the floor, employees should have a quick look for any suspicious or unusual object lying on the floor/passage.

Help handicapped colleagues if any on your floor or any others who may need help.

WHAT NOT TO DO IN CASE OF A FIRE :

Do not panic.

Do not stop to collect personal belongings.

10.3 Do not use lifts and make use of staircases only.

10.4 Never leave the fire exit door open unnecessarily in the event of fire as smoke may enter the fire exit staircase thereby making the evacuation of other employees difficult.

10.5 Water based fire extinguishers should NEVER be used on electrical fires since water conducts electricity thereby making human beings vulnerable to electrical shocks.

11.0 ROLE OF SECURITY STAFF DURING A FIRE :

11.1 After receiving information the Security personnel should rush to the spot and attempt to extinguish the fire with the suitable fire extinguishers.

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- 11.2 Inform the SCOPE Fire Control Room about fire incident giving all details like Core No. , Floor Deptt. etc.
 - 1.3 Assist in fire-fighting operation and evacuation/rescue of employees.
 - .4 Ensure that drive way is clear of vehicles for movement of fire brigade vehicles.
 - 11.5 Stop entry of outsiders/visitors.
 - 11.6 A record of Fire calls/incidents will be maintained by CISF security incharge.
 - 11.7 Every fire incident is to be investigated and preventive measures are to be informed to the concerned.
 - 12.0 **IMPLEMENTATION :**
 - 12.1 From each floor 2-4 fire safety stewards shall be nominated who shall ensure that no panic is created in case of occurrence of any fire. They will also guide the employees about their escape and help the fire brigade in fire fighting operation. The Safety Stewards will be provided necessary training/refresher training by Safety Group.
 - 12.2 Corporate Safety Group shall organise meetings at least once a quarter and conduct periodical fire inspections.
 - 12.3 Training will be provided by Corporate Safety Group to employees including those employed on security duties.

IMPORTANT TELEPHONE NUMBERS

		Tele (Office)	Extn.
1.	NTPC Security at Core-7 After Office hours	24360100 24360007	
2.	SCOPE Fire Control Room After Office hours	24360101 24362233	2049
3.	Administration (Maintenance)	242360100	4224
4.	Sr. Manager (Administration)	24367089	
5.	Reception Core 7	24360100	4200
7.	Jor Bagh Fire Station	2461 1111	
8.	Delhi Fire Brigade	101	
9.	Ambulance	102	
10.	Police	100	

SAFETY RULES FOR CONSTRUCTION & ERECTION

A comprehensive Safety Rules for Construction & Erection has been prepared for use by NTPC personnel and contractors engaged on and associated with construction and erection activities. It is a mandatory for the contractors to ensure that safe working conditions are provided as prescribed in the Safety Rules and General Conditions of the Contract. If the Contractor fails in providing safe working environment as per NTPC Safety Rules and continues the work even after being instructed to stop work by Engineer Incharge as provided in the GCC and pay compensation accordingly.

Further if the Contractor does not prevent hazardous conditions which cause injury to his own employees or any other persons who are at site for adjacent thereto. The contractor shall be responsible for payment of compensation to NTPC as per the schedule given in General Conditions of Contract.

The Safety Rules for Construction & Erection consisting of Responsibilities of the Contractor, Safety in Workplaces and Equipment, Safety in case of ladders and stairs, safety in excavation, safety in handling and use of explosives, safety in scaffolds, safety in steel structural work, safety in welding and cutting operations, safety in use of lifting machines and tackles, safety in use of electricity, safety in use of construction machines, safety in use of hand tools and power operated tools, safety in concrete work, safety in material handling and disposal, safety in demolition operations, and fire protection and fire fighting.

For further details may please refer "Safety Rules for Construction and Erection"

ELECTRICAL AND MECHANICAL SAFETY RULES

In accordance with NTPC Policy on Health and Safety, these Electrical and Mechanical Safety Rules have been produced to protect persons when working or testing or NTPC Plant and Apparatus. The explanation of the intent of these rules is given in the Philosophy and Principals, Section B of the rules, the Plant and Apparatus is defined in the Definitions, Section-C of the Rules.

The basic Safety Rules state the principals to achieve Safety From the System. The principals are amplified by the supporting Codes of Practice which form Section-H of the Safety rules.

The Rules consists of sections covering Introduction, Philosophy and Principals, Definitions, General Provisions, Basic Safety Rules, Safety Documents and Keys, Responsibilities of Persons and Codes of Practices.

The Safety Rules have been issued to concerned individuals to enable them to fulfill their responsibilities.

In addition to their statutory duties, it is the duty of all persons involved with these Safety Rules to make themselves fully familiar with them, as appropriate to their responsibilities.

For detailed Rules and Code of Practices may please refer "**Safety Rules Handbook**" (Electrical & Mechanical).

RESPONSIBILITIES OF THE CONTRACTOR

1. It shall be the responsibility of the Contractor to ensure that the safe working conditions as prescribed in "General Conditions of Contract" and "Safety Rules for Construction and Erection", are provided. He shall be responsible to provide suitable supervision to ensure that the system as required under "General Conditions of Contract" and "Safety Rules for Construction and Erection" Works suitably. For this purpose sufficient number of Supervisors shall be appointed by the Contractor to provide and ensure safe working conditions. The supervision shall be ensured at all time and all places of work.
2. It shall be the responsibility of the Contractor to supply suitable personal protective equipments (including helmets, safety belts, safety shoes etc.) to all the workmen (employed directly by him or through contractor or by his sub-contractor), who face the hazards and which can be protected with the use of these equipments. A register shall be maintained for issue of these personal protective equipments, and on this register all the entries regarding issue of personal protective equipments shall be made. The signature/thumb impression of the worker to whom the personal protective equipments are issued, shall be obtained as a proof of issuance of the personal protective equipments. The register shall be shown to the Engineer Incharge/Safety Officer Incharge on demand.
- 3.0 It shall be responsibility of the Contractor to ensure that the worker, to whom the personal protective equipments are issued, uses the personal protective equipments. In case the worker fail to use the issued personal protective equipments, it will be the responsibility of the contractor to immediately remove the worker from the place of work.
- 4.0 The Contractor shall ensure that the personal protective equipments are of best quality atleast to the Indian standard (wherever available) and will provide protection in case of danger. The Engineer Incharge shall have the right to prescribe the standard of personal protective equipment if he feels that the personal protective equipment issued by the Contractor to the owrkers are not of suitably quality.
- 5.0 The personal protective equipments (like Safety belt helmet etc.) shall be treated as a last line of protection. In no case it shall be treated as a substitute of safe working conditions like providing scaffolding, ladders etc. while working at height, arrangement for preventing the fall of material from height etc.
- 6.0 It shall be the responsibility of the Contractor to protect workmen employed by him directly or through the contractor and of his sub-contractor working at site and he shall be responsible for their protection from all hazards arising out of his work or the work carried out by other contractors there.

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- 7.0 The contractor shall be responsible for obtaining necessary licences as required under various statutory provisions and he shall fulfill all the conditions as prescribed for these purposes.
- 8.0 Wherever the work is carried out within the premises of the Power Station, it shall be responsibility of the contractor to fulfill all the provisions of Factories Act, 1948, as amended from time to time and any other act as relevant thereto and applicable from time to tome,

(CORPORATE SAFETY DEPARTMENT)

List of Act / Rules applicable to Thermal Power Plants

Sl. No.	Year of Act/ Rules	Subject Act / Rules
1.	1884	The Explosive Act
2.	1890	Indian Railway Act
3.	1908	The Explosive substance Act
4.	1923	Indian Boiler Act
5.	1934	The Petroleum Act (As amended till 1997)
6.	1948	The Factories Act (As amended till 1987)
7.	-	States Factories Rules under Factories Act
8.	2003	The Electricity Act
9.	1956	Indian Electricity Rules
10.	1974	The Water (Prevention and Control of Pollution) Act
11.	1975	The Water (Prevention and Control of Pollution) Rules
12.	1976	The Petroleum Rules (As amended till 1995)
13.	1977	The Water (Prevention and Control of Pollution) Cess Act
14.	1978	The Water (Prevention and Control of Pollution) Cess Rules
15.	1981	The Air (Prevention and Control of Pollution) Act
16.	1981	The Static and Mobile Pressure Vessels (Unfired) Rules as Amended till 1997
17.	1982/1983	The Air (Prevention and Control of Pollution) Rules
18.	1986	The Environment (Protection) Act
19.	1986	The Environment (Protection) Rules
20.	1983/1989	The Explosive Rules, including Amendment Rules, 1989
21.	1989	The Central Motor Vehicle Rules (under Motor Vehicle Act, 1988)
22.	1989/2000	The Hazardous Wastes (Management and Handling) Rules including Amendment 2000
23.	1989/2000	Manufacture, Storage and Import of Hazardous Chemicals Rule 1989 including Amendment of 2000
24.	1991	The Public Liability Insurance Act

25.	1992/1993	Environment (Protection) Rules - "Environmental Statement"
26.	1993	Environment (Protection) Rules - "Environmental Standards"
27.	1984/1993	Gas Cylinder Rules, including Amendment Rules, 1993
28.	1994	Environment (Protection) Rules - "Environmental Clearance"
29.	1995	The National Environment Tribunal Act
30.	1996	The Environment (Protection) Second Amendment Rules - "Environmental Standards"
31.	1996	Chemical Accident (Emergency, planning, preparedness and response) Rules
32.	1997	Amendments in the Environment (Protection) Rules, 1994 "Public Hearing"
33.	1998	National Environmental Appellate Authority Act
34.	1998	Environment (Protection) Second Amendment Rules- "Environmental Standards"
35.	1999	Direction for use of fly ash and fly ash based products under Environment (Protection) Rules, 1986
36.	2000	The Bio Medical Waste (Management and Handling) Rules
37.	2000	The Ozone Depleting Substances (Regulation) Rules
38.	2001	Battery Management and Handling Rules, 2001
39.	2000	The Noise Pollution (Regulation & Control) Rules, 2000
40.	2001	The Energy Conservation Act
41.	1996	The Building and other Construction Workers Act
42.	1923	The Workman's Compensation Act
43.	2003	Indian Electricity Act

Applicable International Standards (not Mandatory)

ISO - 14001	Deals with Environmental Management System
OHSAS - 18001	Occupational Health and Safety Assessment Series
ISO 9001	International Standards for Quality Management System
ISO 9002	Total Quality Management System



Safety Rules for Construction & Erection 2004

CORPORATE SAFETY DEPARTMENT

NATIONAL THERMAL POWER CORPORATION LTD.
NEW DELHI

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Introduction

1. There are two Acts and Rules (hereinafter referred to as Rules) prescribed under these Acts that specifically provide for Safety & Health Measures (besides Welfare, which is not covered by this Manual) for the building and construction workers, namely:
 - 1.1 Building and other construction workers (regulation of employment and conditions of service) Act, 1996 (briefly referred to as Building & Construction Act),
 - 1.2 Building and other construction workers (regulation of employment and conditions of service) Central Rules, 1998 (briefly referred to as Building & Construction Rules) as adopted by the various State Governments,
 - 1.3 Factories Act, 1948, and
 - 1.4 Factories Rules, 1950 (briefly referred to as Factories Rules) as adopted by the various State Governments.
2. While these legislations set out the minimum standards of compliance, the Management of the National Thermal Power Corporation Limited (hereinafter referred to as **NTPC**) may formulate additional and, if need be, more stringent norms for the contractors to whom it may award contracts for building, construction and, or erection work within their existing Plants or at sites in a green field where new construction and building activities have been planned.
3. Any expansion, modification, alteration and, or construction activity within an existing Plant operating as per approved site plan under the Factories Act, may attract the provisions of this Act/Rules. The application of Building and other Construction workers (regulation of employment and conditions of service) Act/Rules is mandated for a green field construction, building and, or erection activity.
4. This Manual primarily highlights a set of safety norms that are derived from both the Building & Construction Act/Rules and Factories Act/Rules and Indian Standards, as applicable, but are not necessarily quoted as such. Therefore, these norms may be deemed to be NTPC-specific general conditions of contract .
5. It shall be incumbent on the contractor as the employer of the building and construction workers to ensure that the requirements of safety, statutory or otherwise specified, are fully met. Thus the onus of implementation of the norms so prescribed shall squarely rest with the contractor concerned or, on his behalf, his sub-contractor or any other agency deployed by him, indemnifying NTPC from all the liabilities that may arise out of any failure to comply with the above mentioned Acts/Rules or any contravention thereof by the contractor or any other agency on his behalf.
6. It is also mandated that the authorized representative of **NTPC**, namely, the Engineer-in-charge, may, at his convenience, exercise such superintendence, supervision and, or

control as may be deemed necessary, but this shall not absolve the contractor of his basic responsibility for strict compliance with the norms, standards and, or legal provisions as applicable under the Factories Act/Rules and the Building and other construction (regulation of employment and conditions of service) Act/Rules.

7. The Safety Rules for Construction & Erection as outlined hereunder, while setting out a broad parameter of safety norms, are not exhaustive. The contractor and his agencies are advised to refer to the various statutory provisions, especially The Building and other Construction (regulation of employment and conditions of service) Act/Rules, The Factories Act/Rules, Indian Standards (Bureau of Indian Standards) etc., as the case may be, for details and strict compliance therewith.
8. The contractor is also required to ensure compliance with all the Acts/Rules that generally provide for safety measures such as:
 - i. Electricity Act/Rules
 - ii. Boiler Act/Rules/Regulations
 - iii. Explosives Act/Rules
 - iv. Petroleum Act/Rules
 - v. Motor Vehicles Act/Rules
 - vi. Dangerous Machines (Regulation) Act
 - vii. Environment (Protection) Act/Rules
 - viii. Mines Act/Rules, etc.

Definitions

- 1. Building or other construction work:** means the construction, alteration, repairs, maintenance or demolition, of or, in relation to, buildings, streets, roads, railways, tramways, airfields, generation, transmission and distribution of power, water works, oil and gas installations, electric lines, tunnels, bridges, viaducts, pipelines, towers, cooling towers and such other work as may be specified.
- 2. Building worker:** means a person who is employed by a contractor to do any skilled, semi-skilled or manual, supervisory, technical or clerical work for hire or reward, whether the terms of employment be expressed or implied, in connection with any building or other construction work;
- 3. Establishment:** means an establishment who or which employs building workers in any building or other construction work, and includes an establishment belonging to a contractor;
- 4. Contractor:** means a person who undertakes to produce a given result for any establishment, other than a mere supply of goods or articles of manufacture by the employment of building workers or who supplies building workers for any work of the establishment, and includes a sub-contractor or any other agency engaged on his behalf;
- 5. Employer:** in relation to an establishment, means the owner thereof that is the contractor himself.
- 6. Competent Person:** means a person so approved by the Central Government who belongs to a testing establishment in India possessing adequate qualification, experience and skill for the purpose of testing, examination or annealing and certification of lifting appliances, lifting gears, wire ropes or pressure plant or equipment;
- 7. Responsible Person:** means a person appointed by the employer to be responsible for the performance of specific duty or duties and who has sufficient knowledge and experience and the requisite authority for the proper performance of such duties;
- 8. Danger:** means danger of accident or of injury or danger to health;
- 9. Hazard:** means danger or potential danger;
- 10. Hazardous substance:** means any substance, which due to its explosiveness, inflammability, radioactivity, toxic or corrosive properties and similar hazardous characteristics may Cause injury; or Affect adversely the human system; or Cause loss of life or damage to property or environment;
- 11. Hazardous Process:** comprises roof work, steel erection, and work under and over water, demolition and work in confined space;

12. National Standard: means standards as approved by the Bureau of Indian Standards (BIS) and in the absence of such standards, the standards approved by the Central Government for a specific purpose;

13. Lifting Appliance: means a crane, hoist, derrick, winch, jack, pulley block or other equipment used for lifting materials, objects or building workers;

14. Lifting gear: means ropes, chains, hooks, slings and other accessories of a lifting appliance;

15. Safe Operating Practice: Means the practice followed in building and construction activities for the safety of workers and for safe operation of machinery and equipment used in such activities. Such practices shall conform to all or any of the following:

Relevant Standards approved by BIS;

National Building Codes;

Manufacturer's instruction on safe use of equipment and machinery;

Code of practice on safety in construction industry published by International Labour Organization (ILO).

16. Safe working load: in relation to an article of lifting gear or lifting appliance, means the load which is the maximum load that may be imposed on such article or appliance with safety in the normal conditions as assessed and certified by a competent person;

17. Workplace: means all places where building workers are required to be present or to go for work and which are under the control of an employer;

18. Personal Protective Equipment (PPE): are the protective devices made available for individual or collective use of the workers likely to be affected by the hazards of the workplace or process;

19. Construction & Erection Manual (E&C) Rules: all references to E&C Manual shall mean the Construction & Erection Rules that are detailed hereunder;

20. Engineer in-charge: All references to the Engineer in-charge shall mean the person in-charge of a building and construction of the NTPC.

21. Interpretation of words not defined: words and expressions not defined or used in this Manual shall have the same meaning as generally assigned in common engineering practices.

1.0 Responsibilities and duties of the contractor

1. Before commencing the work, the contractor shall prepare and obtain the approval of the Engineer-in-charge, NTPC in respect of the following:
2. The Contractor shall have a Safety Plan detailing the safety norms that he shall evolve through a Job Safety Analysis (JSA) or Hazard Assessment & Risk Management Process (HARMP) and constitute a Safety Organization. A sample format detailing the **Safety Plan** is annexed;
3. The contractor must also have a well-defined **Safety & Health Policy** as prescribed under the Building and Other Construction Workers (Regulation of Employment and Conditions of Service) Act 1996 and its Central Rules, 1998.
4. The contractor shall be responsible for providing constant and adequate supervision of any building or construction work under his control to ensure compliance with the legal provisions and/or standards specified by NTP. He shall take all the necessary measures to prevent accidents. It is the responsibility of the contractor not to allow any worker to work in an unsafe condition nor with unsafe equipment;
5. The contractor shall provide adequate and suitable, wherever they are required, to all concerned personnel. The quality of these equipment shall conform to National (BIS) or International Standards, where the National standards are not available;
6. Further, it shall be the responsibility of the contractor to ensure that the safe conditions and suitable supervision as prescribed in the **General Conditions of Contract & Safety Rules for Construction and Erection**; and for this purpose sufficient number of Supervisors shall be appointed for adequate and constant supervision at all times and in all workplaces;
7. All workers are protected from all hazards arising out of their work or due to the work carried out by others in the vicinity;
8. Suitable PPE of the approved quality (viz. safety helmet, safety shoes/boots, safety belt, safety nets, fall arrester, respiratory equipment, Face shield, goggles, ear plugs/muffs etc.) shall be provided for ensuring protection. A register bearing signature or thumb impression of the worker issued with such PPE will be maintained as the proof of the issue and the same will be made available for verification of the Engineer-in-charge on demand;
9. PPE shall be treated as the last line of protection and in no case they will be taken as the substitute of safe work conditions like safe scaffolds, safe platforms, safe access and egress, planned walkways/aisles, well laid-out approach roads, properly designed/engineered work methods etc.;
10. The worker shall use the PPE so issued and in case the worker fails to use the same, he will be promptly removed by the contractor from the workplace;
11. Necessary license/consents are obtained as required under various statutory provisions and all conditions as laid down in the said license/consent are fulfilled;
12. Wherever work is carried out within the premises of an operating power plant or that which is being commissioned after registration of the plant under Factories Act, 1948,

as amended from time to time and all other statutes relevant thereto, all legal provisions shall be fully complied with;

13. The contractor shall provide and maintain adequate and safe means of access and egress in all workplaces.

2.0 Responsibilities and Duties of the workers

- 1.1 It shall be the responsibility of the worker to comply with the requirements of safety as laid down for him and the group of workers to which he belongs and fully cooperate in the discharge of the responsibility that has been assigned to the contractor;
- 1.2 If he discovers any defects in the lifting appliance, lifting gear, lifting device or those concerning any transport equipment or other construction equipment or tools as well as the physical work conditions, he will report such defects promptly to his employer or NTPC Engineer or other person in authority;
- 1.3 No building worker shall, unless duly authorized or in case of absolute necessity, remove or interfere with any fencing, guards, gangways, gear, ladder, hatch covering, life saving appliances, lighting or other things whatsoever required and provided for safety and health. If any of the aforesaid things is removed, the persons engaged in the work shall restore such thing at the end of the period during which its removal was necessary;
- 1.4 Every worker shall use only means of access provided in accordance with the approved norms and no person shall authorize or order another to use such means of access or method other than those approved;
- 1.5 Workers shall use such means of access and egress for going to and exiting from the workplace as provided.

3.0 Safety Policy

- 1.1 It is required that every establishment employing fifty or more workers prepare a written statement of Policy in respect of safety of building and construction workers and submit the same for the approval of the Director General appointed under the Building and other construction (regulation of employment and conditions of service) Act/Rules as well as send a copy of the same, duly signed by an authorized signatory, to the Engineer-in-charge.
- 1.2 Copies of this policy shall also be displayed at conspicuous places in Hindi and in a local language understood by the majority of building workers at the construction site.
- 1.3 The said policy shall contain the following:
 - (a) The intentions and commitment taking into account plant, machinery, equipment, materials and placement of building workers of the establishment regarding health, safety and environmental protection;
 - (b) Organizational arrangements made to carry out the policy specifying the responsibility at different levels of hierarchy;
 - (c) Responsibilities of the contractor as the employer or, on his behalf, sub-contractor, transporter or other agencies involved in the building/construction work;
 - (d) Techniques and methods for assessment of risk to safety, health and environment and remedial measures therefore;
 - (e) Arrangements for training of building workers, trainees, supervisors or other persons engaged in the construction work;
 - (f) Other arrangements for making the Policy effective.
- 1.4 The contractor shall revise the Policy under the following circumstances:

- (a) Whenever any expansion or modification having implication on safety and health of building workers is;
- (b) Whenever any new building or construction work, substances, articles or techniques are introduced having implication on safety and health of construction workers.

4.0 Safety Organization

1.0 Safety Committees:

1.1 The contractor ordinarily employing two hundred and fifty or more building workers shall constitute a Safety Committee, which shall be represented by an equal number of Representatives of employer and building workers. In no case the number of representatives of the contractor shall exceed the number of representatives of the building workers. The Safety Committee shall meet at regular interval, at least once in a month, and the senior person having overall control over the affairs of the construction site shall chair it. The agenda and minutes of the meeting shall be circulated to all concerned and it shall be in the language understood by the majority of the building workers and shall be produced to NTPC on demand for examination. The contractor within reasonable time limits shall comply with the recommendations of the Safety Committee. The Committee shall consist of the representatives of the recognized Unions wherever such Unions exist;

1.2 The main functions of the Safety Committee shall be

- i) To identify probable causes of accidents and unsafe practices and to suggest remedial measures;
- ii) To stimulate interest of employer and building workers in safety by organizing safety campaigns periodically for a specified period viz. a week/month, safety competition, talk and film shows on safety, preparing posters or taking similar other measures as and when required or as necessary;
- iii) To go round the construction site with a view to check unsafe practices and detect unsafe conditions and to recommend remedial measures for the rectification including first-aid medical and welfare facilities;
- iv) To look into the health hazards associated with handling of different types of explosives, chemicals and other construction materials and to suggest remedial measures including use of proper Personal Protective Equipment;
- v) To suggest measures for improving welfare amenities in the construction site and other miscellaneous aspects of safety, health and welfare;
- vi) To bring to the notice of the employer the hazards associated with use, handling and maintenance of the construction equipment.

2.0 Safety Officer:

2.1 In every establishment wherein two hundred and fifty or more workers are ordinarily employed, the employer shall appoint Safety Officers as laid down hereunder:

Up to 1000 workers	One Safety officer
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Up to 2000 workers	Two Safety Officers
Up to 5000 workers	Three Safety Officers
Up to 10000 workers	Four Safety Officers
For every additional 5000 workers or part thereof	One Safety Officer

2.2 Wherever the number of workers employed by a single employer is less than two hundred and fifty, such employers may form a group and appoint a common Safety Officer who may be assisted by suitable and adequate staff, with prior approval of the Engineer-in-charge;

2.3 Duties, qualification and the conditions of service of Safety officers

2.3.1 The duties shall mainly comprise

- i) To advise and assist the employer in fulfilling his obligations, statutory or otherwise, concerning prevention of injuries and maintaining a safe working environment by:
- ii) Planning and organizing measures necessary for effective control of personal injuries;
- iii) Checking and evaluating effectiveness of action taken or proposed to be taken;
- iv) Advising purchasing and ensuring quality of Personal Protective Equipment conforming to the approved Standards;
- v) Advising on safety aspects and carrying out detailed safety studies of selected activities;
- vi) Carrying out safety inspection and rendering advice on measures to be adopted for removing unsafe physical conditions and preventing unsafe actions;
- vii) Investigating all fatal accidents and other selected accidents;
- viii) Investigating reportable dangerous occurrences and cases of occupational diseases contracted;
- ix) Advising on the maintenance of records as are necessary with regard to accidents, dangerous occurrences and occupational diseases;
- x) Promoting the working of Safety Committees and to act as an advisor to such committees;
- xi) Organizing with concerned Departments campaigns, competitions, contests and other promotional activities to help develop and maintain the interest of the workers and maintaining safe conditions of work and procedures;
- xii) Designing and conducting, either independently or in collaboration with other agencies, suitable training and educational programmes for prevention of accidents;
- xiii) Framing safety rules and safe work practices in consultation with senior officials of the establishment;
- xiv) Supervising and guiding safety precautions to be taken.

- 2.3.2 **Qualification & service conditions of the Safety Officer shall be as specified in the Schedule appended.**
- 2.3.3 **Facilities to be provided to Safety Officers:** the contractor shall provide such facilities, equipment and information that are necessary to enable him to discharge his duties effectively.
- 2.3.4 **Prohibition of discharge of other duties:** no Safety Officer shall be required to do any work which is unconnected to, inconsistent with or detrimental to the performance of the duties as prescribed.

2.4 Safety Promotional activities

- i) The contractors are required to celebrate the National Safety Day falling due on 4th march each year and follow the circulars that may be issued by the Engineer in-charge from time to time in this regard. It is also provided that he will allocate funds for organizing Safety week/month to elicit participation of workers in the promotion of safety as a shared concern and activity;
- ii) Safety posters, slogan competition, special meetings and talks shall be organized during such celebrations, besides safety badges etc. by the workers in appreciation of their involvement in the promotional activities.

2.5 Safety training and other educational programmes:

- i) Safety training is an essential and integral part of safety management in the workplace. The contractor required to work out a calendar of training programmes detailing the skill development modules and reinforcement of safety measures relating to the on-going jobs. The calendar of training programmes shall be made available to the Engineer in-charge for his information and follow up;
- ii) Should the Engineer in-charge so decide, his observations with regard to the efficacy or otherwise of the modules so worked out by the contractor shall be binding on the contractor, which he shall implement within an agreed time frame.

2.6 Safety control measures:

- i) Besides the requirement of inspection, which is incorporated under various clauses of the Construction & Erection Manual, the contractor shall schedule regular inspection of various job sites and activities by developing a check list appropriate to the task and the hazards involved therein and implement the findings of the inspection forthwith;
- ii) Job Safety Analysis, Safety Audits, Safety Surveys, Tool box talks and Pep talks, etc are some of the tools which shall be employed for improving the safety performance in the workplace. The contractor shall follow the audit protocol in vogue in the NTPC and submit a copy of the report to the Engineer in-charge within a week of such exercises having been completed.

5.0 Reporting and investigation of accidents & dangerous occurrences

1.0 Reporting of accidents:

- 1.1 Notice of any accident (the prescribed format is annexed to the manual) to a worker at the building or construction site that
- (a) Causes loss of life; or
 - (b) Disables a worker from working for a period of **48 hours** or more immediately following the accident;
 - (c) Shall forthwith be sent by Telegram, Telephone, Fax, or similar other means including special Messenger within **four hours** in case of **fatal accidents** and **72 hours** in case of **other accidents**, besides the Engineer-in-charge, to:
 - ii. The Regional Labour Commissioner (Central);
 - iii. The Board with which the worker involved was registered as a beneficiary;
 - iv. Director General of Building and other construction (regulation of employment and conditions of service) Act/Rules; and
 - v. The next of kin or other relative of the worker involved in the accident;
- 2.7 Further, notice of accident shall be sent in respect of an accident which
- (a) Causes loss of life; or
 - (b) Disables the injured worker from work for more than 10 days to
 - (1) The Officer-in-charge of the nearest Police Station;
 - (2) The District Magistrate or, if the District Magistrate by order so desires, to
 - (3) The Sub-Divisional Magistrate;
- 2.8 Where any accident causing **disablement that subsequently results in death**, notice thereof in writing of such death, shall be sent the Authorities mentioned above within **72 hours** of such death.
- 2.9 In case of an accident causing minor injury, first-aid shall be administered and that resulting in disability of **48 hours or more**, the injured worker shall be given first-aid and immediately transferred to a Hospital or other place for medical treatment.
- 2.10 All near-miss accidents shall be reported to NTPC Engineer In-charge and Safety Officer as per prescribed format.

2.0 Reporting of dangerous occurrences:

- 2.1 The following classes of dangerous occurrences shall be reported to the Inspector having jurisdiction, whether or not any disablement or death caused to the worker, namely:
- (a) Collapse or failure of lifting appliances, or hoist, or conveyors, or similar equipment for handling of building or construction material or breakage or failure of rope, chain or loose gears; or overturning of cranes used in construction work;
 - (b) Falling of objects from height;
 - (c) Collapse or subsidence of soil, any wall, floor, gallery, roof or any other part of any structure, platform, staging, scaffolding or means of access including formwork;
 - (d) Contract work, excavation, collapse of transmission;
 - (e) Explosion of receiver or vessel used for storage at a pressure greater than atmospheric pressure, of any gas(es) or any liquid or solid used as building material;
 - (f) Fire and explosion causing damage to any place on construction site where building workers are employed;

- (g) Spillage or leakage of any hazardous substance and damage to their container;
 - (h) Collapse, capsizing, toppling or collision of transport equipment;
 - (i) Leakage or release of harmful toxic gases at the construction site;
 - (j) In case of failure of a lifting appliance, loose gear, hoist or building and other construction work, machinery and transport equipment at a construction site, such appliances, gear, hoist, machinery or equipment and the site of such occurrence shall, as far as practicable, be kept undisturbed until inspected by the Authorities;
- 2.2 Every notice given for fatal accidents shall be followed by a written report to the concerned Statutory Authorities and the Engineer In-charge in the specified Form annexed as Schedule, under acknowledgement.

3.0 Investigation of accidents and dangerous occurrences

- 3.1 Besides reporting, it shall be the responsibility of the contractor to assign a responsible person to thoroughly investigate all incidents involving near-miss accidents, lost-time and reportable accidents and dangerous occurrences with a view to finding out the causative factor, taking remedial measures and fixing responsibility, and make a copy of the investigation report along with action-plan, specifying a definite time-frame for implementation of the findings, available to the Engineer in-charge forthwith;
- 3.2 In the establishments in which a Safety officer has been appointed in compliance with the requirements of the clause 2.0 provided under the head: **Safety Organization**, the responsibility for investigation shall be assigned to him.

6.0 Emergency Action Plan

- 1.1 The contractor shall ensure that an **Emergency Action Plan** is prepared to deal with emergencies arising out of:
- 1.2 Fire and explosion;
 - 1.3 Collapse of lifting appliances and transport equipment;
 - 1.4 Collapse of building, sheds or structure etc.;
 - 1.5 Gas leakage or spillage of dangerous goods or chemicals;
 - 1.6 Drowning of workers, sinking vessels, and
 - 1.7 Landslides getting workers buried; floods, storms and other natural calamities.
- 1.8 While arrangements shall be made for emergency medical treatment and evacuation of the victim in the event of an accident or dangerous incident occurring, the chain of command and the responsible persons of the contractor with their telephone numbers and addresses for quick communication shall be adequately publicized and conspicuously displayed in the workplace.
- 1.9 It is also required that there is a tie-up with the hospitals and fire stations located in the neighbourhood for attending to the casualties promptly and emergency vehicle kept on standby duty during the working hours for the purpose.
- 1.10 It shall be the responsibility of the contractor to keep the Local Law & Order Authorities informed and seek urgent help, as the case may be, so as to mitigate the consequences of an emergency. Prompt communication to NTPC, telephonically initially and followed by a written report, shall be made by the contractor.

7.0 Safety in the workplace and equipment

1.0 General provisions:

1.1.0 Housekeeping:

- 1.1.1 The contractor shall be primarily responsible for maintaining Good housekeeping and safety standards in the workplace;
- 1.1.2 Loose materials that are not required for use shall not be placed or left behind so dangerously as to obstruct workplaces or passageways;
- 1.1.3 All projecting nails shall be removed or bent to prevent injury;
- 1.1.4 Equipment, tools and small objects shall not be left lying unattended or unsecured from where they could fall or cause a person to trip;
- 1.1.5 Scrap, waste or rubbish shall not be allowed to accumulate in the site as these combustibles can create serious fire hazards and affect safe working;
- 1.1.6 Workplaces and passageways that become slippery owing to spillage of oil or other causes shall be cleaned up or strewn with sand, ash or the like;
- 1.1.7 Portable equipment shall be returned after use to their designated storage place.

1.2.0 Means of access and egress shall consist of

- 1.2.1 Adequate and safe means of access and egress shall be provided in all workplaces;
- 1.2.2 The means of access and egress shall be maintained in a safe condition;

1.3.0 Lighting and ventilation

- 1.3.1 All practical measures shall be taken to prevent smoke, fumes etc. from obscuring any workplace or equipment at which any worker is engaged;
- 1.3.2 Adequate and suitable artificial lighting shall be provided where natural lighting is not sufficient as per IS 3646 (Part II). The artificial lighting so provided shall not cause any incidental any danger, including that of producing glare or disturbing shadows;
- 1.3.3 To prevent danger to health from air contamination by dust generated during grinding, cleaning, spraying or manipulation of materials as also to provide protection against dangerous gases, fumes, vapours, mist, etc. effective arrangements shall be made for ventilation;
- 1.3.4 Workers shall be provided with suitable respiratory protective equipment, if it is not technically possible to have uncontaminated air. To this end, a study by a competent person shall be made to decide on the due protection. Sufficient illumination at all times for maintaining safe working conditions shall be provided where building workers are required to work or pass, and for passageways, stairways and landings such illuminations shall not be less a than 0.5 foot candles at the floor level;
- 1.3.5 Where natural lighting is not adequate to prevent danger, adequate and suitable lighting shall be provided as per IS: 3646 – Part II;
- 1.3.6 Artificial lighting shall not cause any danger due to a brightness greater than 10 foot candles per square inch, except where the angle of inclination from the eye to the source or the part pf the fitting as the case may be exceeds 20⁰, including that of producing glare or disturbing shadows;
- 1.3.7 Where necessary to prevent danger to health fom air contamination by dust from the grinding, cleaning, spraying, or manipulating of materials or objects, arrangements shall be made to limit the concentration of the pollutants by thorough ventilation, and dust generated due to movement of earthmoving machinery and other construction equipment, by spray of water in the area from time to time;

- 1.3.8 Adequate ventilation by the circulation of fresh air shall be maintained in such places where the concentration of pollutants is likely to affect the health of the workers;
- 1.3.9 Special care shall be taken to ventilate the workplace where gas cutting, welding or other operations involving generation of dangerous fumes, vapours, mists, gases etc is likely;
- 1.3.10 Where it is technically not possible to eliminate dust or noxious or harmful fumes or gases sufficiently to prevent injury to the health of the workers, the contractor shall provide suitable respiratory equipment like dust mask or gas/fume mask or breathing apparatus or other suitable respiratory equipment.

1.4.0 Dangerous and harmful environment:

- 1.4.1 When an internal combustion engine exhausts into confined space or excavation or tunnel or any other workplace where neither natural ventilation nor artificial ventilation system is adequate to keep the carbon monoxide content of the atmosphere below fifty parts per million, adequate and suitable measures shall be taken at such workplace in order to avoid exposure of building workers to health hazards;
- 1.4.2 No building worker shall be allowed to enter any confined space or tank or trench or excavation wherein there is given off any dust fumes or other impurities of such nature and to such extent as is likely to be injurious or offensive to the building worker or in which explosives, poisonous, noxious or gaseous material or other harmful articles have been carried or stored or in which dry ice has been used as a refrigerant, or which has been fumigated or in which there is a possibility of oxygen deficiency, unless all practical steps have been taken to remove such dust, fumes or other impurities and dangers which may be present and to prevent any further ingress thereof, from such workplace or tank or trench or excavation;
- 1.4.3 No worker shall be allowed to enter any such space unless a responsible person has certified it to be safe and fit for the entry of such building workers.

1.5.0 Fumes/gases due to Welding and gas-cutting operations: When welding or cutting operations are carried out in a confined space:

- 1.5.1 Adequate ventilation, by means of exhaust fans or forced draught, as the condition may require, shall be constantly provided; otherwise enough quantity of air shall be circulated by means of air compressors to dilute the contaminant within permissible limits;
- 1.5.2 Workers shall take necessary precautions to prevent unburned combustible gas or oxygen from escaping inside a tank or vessel or other confined space;
- 1.5.3 Welding or cutting operations on any container that has held explosives or where inflammable gases may have been generated, shall be undertaken after the container has been thoroughly cleaned by steam or other effective means; and
- 1.5.4 Gas-test shall be carried out ensure that the confined space is completely free from combustible gases and vapours.

1.6.0 Dust, gases, fumes

- 1.6.1 Concentration of dust, gases or fumes shall be prevented by providing suitable means to control their concentration within the permissible limit so that they may not cause injury or create health hazard to a building worker;
- 1.6.2 For protection against such hazardous substances, besides efficient and effective means of control, personal protective equipment like dust masks, breathing apparatus, other respiratory appliances, goggles, as the case may be, shall be provided.

1.7.0 Excessive noise:

- 1.7.1 Adequate measures shall be taken against the harmful effects of an excessive noise;
- 1.7.2 Use of earplugs/muffs and anti-vibration gloves shall be ensured to protect the workers from the impact of exposure to such dangers;
- 1.7.3 The noise level in no case shall exceed as prescribed in the concerned Rules and exposure in excess of 115 dBA over the period of a quarter of an hour cannot be permitted:

1.8.0 Corrosive substances:

- 1.8.1 All corrosive substances, including alkalis and acids, shall be stored and used by a person dealing with such substances at a building or other construction work in such a manner that it does not endanger the building worker and suitable protective equipment shall be provided by the employer to a building worker during handling or use of such substances at a building or other construction work and in case of spillage of such substances on the building worker, immediate remedial measures shall be taken;
- 1.8.2 While protection of the body could be ensured by use of corrosion resistant apparel/overalls, suitable goggles, gloves, apron, gum boots etc. shall be made available to all concerned personnel;
- 1.8.3 To deal with an accidental spillage of a corrosive substance on the body of a worker, the facility of eyewash fountain or water shower, as the case may be, shall be installed, within the easy reach of the workplace.

1.9.0 Eye protection:

- 1.2.1 Suitable personal protective equipment for the protection of eyes shall be provided and used by the building worker engaged in operations like welding, cutting, chipping, grinding or similar operations which may cause hazard to his eyes;
- 1.2.2 Goggles or face shield or welding screen with suitable shade of glass/filters etc shall be provided for the protection of the eyes.

1.10.0 Overhead protection:

- 1.10.1 It shall be ensured that at the building or other construction site, overhead protection is erected along the periphery of every building under construction that shall be of fifteen meters or more in height when completed;
- 1.10.2 Overhead protection shall not be less than two meters wide and shall be erected at a height not more than five meters above the base of the building and the outer edge of such overhead protection shall be one hundred fifty millimeters higher than the inner

edge thereof or shall be erected at an angle of not more than twenty degrees to its horizontal sloping into the building;

- 1.10.3 It shall be also ensured that at the building and other construction work that any area exposed to risk of falling material, articles or objects is roped or cordoned off or otherwise suitably guarded from inadvertent entry of persons other than building workers at work in such area.

1.11.0 Lifting and carrying of excessive weight:

- 1.11.1 No building worker lifts by hand or carries overhead or over his back or shoulders any materials, articles, tools or appliances exceeding in weight the maximum limits as set out in the following table unless aided by any other building worker or a mechanical device;
- 1.11.2 No worker aided by other workers, lift by hand or carry overhead or over their back or shoulders any materials, articles, tools or other appliances exceeding in weight the sum total of the maximum limits as prescribed in the concerned Rules, unless aided by a mechanical devices:

1.12.0 Protections against fall of persons –

- 1.4.1 All scaffolds/working platforms at height of two metres or more shall be fenced;
- 1.4.2 All guard-rails for the fencing of floor openings, gangways, elevated workplaces shall be made of sound material, good construction and possess adequate strength and be between 1 m and 1.5 m above platform level, consist of two rails (two ropes or chains may be used if they are sufficiently taut) and supporting stanchions;
- 1.4.3 Intermediate rails, ropes or chains shall be midway between the top and lower of edges of the top rail;
- 1.4.4 Sufficient number of stanchions or standard poles or uprights shall be maintained to ensure the required stability and resistance;
- 1.4.5 Guard-rails shall be free from sharp edges and be maintained in good repair;
- 1.4.6 Floor openings through which persons could fall, shall be guarded by covering or fencing;
- 1.4.7 If the means of protection is removed to allow the passage of persons or goods or other purpose, the same shall be replaced as soon as possible, while making temporary arrangements for reasonable degree of safety in the meanwhile;
- 1.4.8 Covers for floor opening shall be safe to walk on and if vehicles operate thereon it shall be safe for the same. This will require the contractor to have prior assessment of expected loads;
- 1.4.9 Cover for floor opening shall be secured by hinges, grooves, stops or other effective means against sliding, falling down or lifting out or any other inadvertent displacement;
- 1.4.10 Covers for any openings shall not constitute any hindrance to traffic and, as far as practicable, be flush with the floor;
- 1.4.11 If covers constitute as grids, the bars shall be spread not more than 5 cm apart;
- 1.4.12 Elevated workplaces at more than 2 m above the floor or ground shall be protected on all open sides by guardrails. It is commonly observed that fragile barricade tapes are used as a substitute of a strong and dependable fencing. This practice is prohibited. The barricade tapes can be used as markers/route guide only;
- 1.4.13 Elevated workplaces shall be provided with safe means of access and egress such as stairs, ramps or ladders according to suitability;

1.4.14 Persons employed at elevated workplaces or other situations at more than 2m from which they may fall, shall be protected by means of adequate safety nets, or platforms, or be secured by safety belts with the lanyard properly anchored above the head level of the user. All possible effort shall be made to have strong and dependable mechanical arrangement.

1.13.0 Protection against fall of objects and materials:

1.13.1 Materials and objects such as scaffolding materials, waste materials or tools shall not be thrown up or down from heights, as they are liable to cause injury;

1.13.2 If materials and other objects cannot be safely lowered from heights, adequate precautions such as the provision of fencing, lookout men or barriers shall be provided to protect any person from injury.

1.14.0 Protection against entry of unauthorized persons:

1.14.1 Construction zones in the site and built up areas alongside main traffic routes shall be barricaded;

1.14.2 Unauthorized persons shall not be allowed access to construction sites and visitors shall be provided with the required protective equipment and it be ensured that they use them effectively.

1.15.0 Head protection and other protection apparel:

1.15.0 Every building worker who is required to –

1.15.1 Pass through or working within the areas where there is hazard of his being struck by falling objects or materials, shall be provided with safety helmets of the type approved and tested in accordance with the national standards;

1.15.2 Work in water or in wet concrete or in other similar work, shall be provided with suitable waterproof;

1.15.3 Work in rain or in similar wet condition, shall be provided with waterproof coat with hat;

1.15.4 Workers using or handling of alkalis, acid or other similar corrosive substances shall be provided with appropriate protective equipment in accordance with the approved standards;

1.15.5 Every building worker engaged in handling sharp objects or materials at a building or other construction work, which may cause hand injury, shall be provided with suitable hand gloves in accordance with the approved standards.

1.16.0 Stability of structures: No wall, chimney or other structure or part of a structure shall be left unsupported in such condition that it may fall, collapse or weaken due to wind pressure, vibration or due to any other reason. Entry of persons into such locations where tall structures are being built shall be regulated without a let up.

1.17.0 Safety of Structures and equipment and other safety concerns

1.17.1 Safety of structures like scaffoldings, platforms, gangways/walkways, towers, stairs, ladders, ramps, safety in excavation, formwork, falsework, demolition work, storage, handling and use of explosives, inflammable substances and hazardous materials, gas

cutting and welding, use of electricity etc.; and equipment viz. construction machinery, crushers and batching plant, boiler and other pressure vessels, transport and material handling equipment, lifting appliances, vehicles etc., shall be operated and maintained as per approved norms and –

- i. They shall be made of sound material and of good construction, free from patent defects, provided with adequate safe guards, properly maintained, periodically inspected and strong enough to withstand safely the loads and stresses to which they may be subjected;
- ii. They shall carry enough factor of safety bearing in mind that the possibility of their abuse, which otherwise shall be prevented by constant and adequate supervision, cannot be ruled out altogether;
- iii. It is incumbent on the contractor to ensure that only competent and authorized persons operate the equipment or attend to electrical and mechanical systems and repair of faults or breakdowns etc.

1.17.2 Working in the confined space may involve certain serious hazards. Strict adherence to the conditions of Permit-to-work issued for the purpose is required;

1.17.3 Control of energy sources shall be ensured through Log-out/Tag-out practices.

1.18.0 Slipping, tripping, cutting, drowning and falling hazards:

1.18.1 The contractor shall keep all passageways, platforms and other places free from accumulations of dust, debris or similar material and from other obstructions that may cause tripping;

1.18.2 Any sharp projections or protruding nails or similar projections which may cause any cutting hazard to a building workers shall be removed or otherwise made safe by taking suitable measures;

1.18.3 No contractor shall allow any building worker at construction work to use the passageway, or a scaffold, platform or any other elevated working surface which is in slippery and dangerous condition and shall ensure that water, grease, oil or other similar substances which may cause the surface slippery, be removed or sanded/saw-dusted or covered with suitable material to make it safe from slipping hazard;

1.18.4 Wherever building workers are exposed to the hazarded of falling into water, they shall be provided with rescuing arrangement from such hazard and if it is considered necessary, well equipped boat or launch manned with trained personnel shall be provided by the contractor at the site of such work;

1.18.5 Every open side or opening into or through which a building worker, vehicle or lifting appliance or other equipments may fall at a building or other construction work shall be covered or guarded suitably to prevent such fall except where free access is necessary by reasons of their nature of the work;

1.18.6 Wherever building workers are exposed to the hazards of falling from height while employed on such work they shall be provided by the employer with adequate equipment or means for saving them from such hazards, Such equipments or means shall be in accordance with the standards as laid down;

1.18.7 Whenever there is a possibility of falling of any martial, equipment or building worker at a construction site relating to a building or other construction work, adequate and suitable safety net shall be provided in accordance with the above stipulation;

8.0 Safety in material handling and waste disposal

1.0 General provisions:

- 1.1 All building materials stored in tiers shall be stacked, racked, blocked, interlocked or otherwise secured safely to prevent sliding, falling or collapse and in an orderly manner to avoid obstruction of any passageway at the place of work. Piles of materials shall be stored or stacked in such a manner as to ensure their stability;
- 1.2 Maximum safe load limits of floors within buildings and structures in kg/cm² shall be conspicuously posted in all storage areas, except for floor or slab on gradient. Maximum safe load shall not be exceeded. Material or equipment shall not be stored upon any floor or platform in such quantity as to exceed its safe carrying capacity;
- 1.3 Ailes and passageways shall be kept clear to provide for the free and safe movement of material handling equipment or persons. Such areas shall be kept in good repair;
- 1.4 When a difference in road or working levels exist, means such as ramps, blocking or grading shall be used to ensure the safe movement of vehicles between two levels;
- 1.5 Material stored inside buildings under construction shall not be placed within 2 m of any hoist way or inside floor openings nor within 3.2 m of exterior wall which does not extend above the top of material stored;
- 1.6 Persons employed required to work on stored material in silos, hoppers and similar storage areas shall be equipped with lifelines and safety belts;
- 1.7 Non-compatible materials shall be segregated in storage;
- 1.8 Bagged materials shall be stacked by stepping back the layers and cross-keeping the bags at least every 10 bags high;
- 1.9 Materials shall not be stored on scaffolds or runways in excess of supplies needed for immediate operations;
- 1.10 Bricks stacks shall not be more than 2.2 m in height. When a loose brick stack reaches a height of 1.3 m it shall be tapered back 5 cm in every foot of height above the 1.25 m level;
- 1.11 When masonry blocks are stacked higher than 2 m, the stack shall be tapered back on half block per tier above the 2 m level;
- 1.12 Material or equipment shall not be stored or placed so close to any edge of a floor or platform as to endanger the safety of persons below or working in the vicinity. Where stacking, unshackling, stowing or unstrapping of construction material or article, or handling in connection therewith cannot be safely carried out unaided, reasonable measures to guard against accident or dangerous occurrences shall be taken by shoring or otherwise to prevent any danger likely to be caused by such handling;
- 1.13 Stacking of material or article shall be made on firm foundation not liable to settle and such material or article and shall not overload the floor on which such stacking is made;
- 1.14 The material or articles shall not be stacked against partition or walls of a warehouse or stores unless it is known that such partition or the wall is of sufficient strength to withstand the pressure of such materials or articles;

- 1.15 The materials or articles shall not be stacked to such a height and in such a manner as would render the pile of such stack unstable and cause hazards to the building workers or the public in general;
- 1.16 Where the building workers are on stack exceeding one point five meters in height, safe means of access to the stack shall be provided;
- 1.17 All stacking or unshackling operations shall be performed under the supervision of a responsible person for such stacking or unstacking;
- 1.18 The stacking of construction materials or articles shall not be made near the site of excavation, shaft, pit or any other such opening;
- 1.19 Stacks that may lean heavily or become unstable or collapse are barricaded shall be avoided;
- 1.20 Structural steel, poles, pipe, bar stock and other cylindrical materials, unless racked, shall be stacked and blocked so as to prevent sliding, spreading or tilting.

2.0 Lumber:

- 2.1 Used lumber shall have all nails withdrawn before stacking;
- 2.2 Lumber shall be stacked on level and solidly supported sills;
- 2.3 Lumber piles shall not exceed 6 m in height provided that lumber is handled manually, shall not be stacked more than 5 m height;
- 2.4 Lumber shall be so stacked as to be stable and self-supporting.

3.0 Stacking of cement and bags containing other materials:

- 3.1 The cement or other material in bags shall be stacked in a header and stature-wise in rows alternately in not more than 10 numbers and there will be circulation of space of at least 600 mm in between two such rows;
- 3.2 While removing bags from the stack pile the stability of such stack pile shall be ensured;
- 3.3 Bags containing cement or lime shall be stored on a firm ground;
- 3.4 The materials like bricks, tiles or blocks shall also be stored on a firm ground;
- 3.5 Reinforcing steel shall be stored according to its shape, size and length and stack of reinforcing steel kept as low as possible;
- 3.6 No pipe shall be stored on rack or in stack where such pipe is likely to fall by rolling;
- 3.7 The angle of repose shall be maintained where loose materials are stacked;
- 3.8 When dust laden material is to be stored or handled, measures shall be taken to suppress the dust produced by such storing or handling and suitable personal protective equipment supplied to and used by the building workers working for such storing or handling.

4.0 Disposal of debris and waste material:

- 4.1 It shall be ensured that debris is

- i) Handled and disposed of by a method, which does not cause danger to the safety of a person and not allowed to accumulate so as to constitute a hazard;
- ii) Kept sufficiently moist to bring down the dust under control;
- iii) Not thrown inside or outside from any height of such building or other construction work;

4.2 Brought down by suitable means/chutes provided for the purpose and on completion of work, leftover building material, article or other substance or debris shall be disposed off as soon as possible to avoid any hazard to any traffic or person;

4.3 Whenever materials are dropped more than 6 m to any point lying outside the exterior walls of the building an enclosed chute of wood, or equivalent material shall be used;

4.4 When debris is dropped through holes in the floor without the use of chutes, the area where the material is dropped shall be completely enclosed with barricades not less than 1.1 m high and not less than 1.9 m back from the edge of the opening above. Signs warning of the hazard of falling material shall be posted at each level;

4.5 All scrap lumber, waste material and rubbish shall be removed from the immediate work area as the work progresses;

4.6 Disposal of waste material or debris by burning shall be done under guidance of the Engineer in-charge;

4.7 All solvent wastes, oil rags and flammable liquids shall be kept in fire resistant covered containers until removed from the work site.

5.0 Handling gas cylinders: Gas cylinders shall not be lifted on bare slings. For lifting the cylinders, cage of suitable size shall be used and all cylinders shall be horizontally positioned in it. Such cage shall have fencing in such a way that there is no possibility of fall of cylinders from this cage.

6.0 Rigging equipment for material handling:

6.1 Rigging equipment for material handling shall be inspected prior to use in each shift as necessary during its use to ensure that it is safe. Defective rigging equipment shall be removed from service;

6.2 Rigging equipment shall not be loaded in excess of its recommended safe working load, as prescribed in the Indian standards;

6.3 Rigging equipment, when not in use, shall be removed from the immediate work area so as not to present a hazard to persons engaged in the area;

6.4 Special custom designed grabs, hooks, clamps, or other lifting accessories, for such units as modular panels, prefabricated structures and similar materials, shall be marked to indicate the safe working loads shall be proof tested prior to use 125% of their rated load;

6.5 Welded alloy steel chain slings shall have permanently affixed-durable identification standing size, grade, rated capacity and manufacturer.

7.0 Fencing of motors etc

- 7.1 All motors, cogwheels, chains and friction gearings, flywheels, shafting and the other dangerous and moving parts of machinery (whether or not driven by mechanical power) and steam pipes shall be securely fenced and the fencing of dangerous parts of machinery not removed while such machinery is in motion or in use;
- 7.2 No part of any machinery which is in motion and which is not securely fenced, shall be examined, lubricated, adjusted or repaired except by a person skilled and trained for such examination, lubrication, adjustment or repairs and machine parts cleaned only when such machine is stopped;
- 7.3 When a machine is stopped for servicing or repairs, adequate measures shall be taken to ensure that such machine does not restart inadvertently and not only tag-out sign is required; it is also essential that an active system of isolating the power be applied.

8.0 Protection against lightning

- 8.1 Where necessary, installations shall be protected against lightning, provided further that;
- 8.2 No bare conductors or bare current-carrying parts of equipment be permitted to be installed unless adequate precautions are taken to prevent direct or indirect contact;
- 8.3 Only flame-proof equipment and conductors shall be installed at places where explosives or inflammable substances are stored, handled or used or where explosive atmosphere exists;
- 8.4 Persons competent and authorized only shall attend to electrical breakdowns and other operational faults and give or restore power to an equipment and such persons shall be easily identifiable by their dress or special helmet worn;
- 8.5 It will constitute a standard practice to switch off portable tools while shifting from one place to another or while leaving them behind unattended;
- 8.6 The contractor shall ensure that a system is in place to always keep tools well maintained.

9.0 Vehicular Traffic

- 9.1 Whenever any building or other construction work is being carried on, or is located in close proximity to a road or any other place where any vehicular traffic may cause danger to building workers, it shall be ensured that such building or other construction work is barricaded and suitable warning signs and lights displayed or erected to prevent such danger and if necessary, a request in writing made to the concerned authorities to control such traffic;
- 9.2 All vehicles used at construction site shall comply with the requirements of the Motor Vehicles Act, 1988 (59 of 1988) and the Rules made hereunder;
- (a) The driver of a vehicle of any class or description operating at a construction site shall hold a valid driving license under the Motor Vehicles Act, 1988 (59 of 1988).

- 10.0 Use of safety belt or other fall arrest systems:** Wherever any work at a height of 2 m or more is carried out, use of a suitable fall arrest system is mandatory if the workplace has

already not been provided with an otherwise reliable means of protection for preventing the fall of persons from that height, provided further that:

- 10.1 Safety belt, lanyard, life lines and devices for the attachment of such life lines shall conform to the approved standards;
- 10.2 Every building worker shall be supplied with safety belt and safety life lines for his protection and such building worker shall use such belts and life lines during the performance of his work;
- 10.3 All building workers using safety belt and safety life lines shall have the knowledge of safe use and maintenance of such belts and life lines and shall be supplied with necessary instructions for its use;
- 10.4 The responsible person for supervising the use of safety belts and safety lifelines shall inspect and ensure that such safety belts and lifelines are fit for use before taking them into use.

11.0 Safety net and its use

- 11.1 Every safety net shall be of adequate strength, made of sound material and suitable for use and conform to the approved standards;
- 11.2 The responsible person for maintenance of safety nets and their use shall ensure safe fixing of such safety nets and provide such safety nets with suitable and sufficient anchorage so that the purposes for which such safety net is intended for use is served;

12.0 Storage of safety belts and nets, etc: Proper arrangement shall be made for the safe storage of safety belts, safety lifelines and safety nets when they are not in use and are protected against mechanical damage, damages from chemicals and damages from biological agents.

13.0 Safety Helmets and Safety footwear

- 13.1 The Engineer in-charge may declare whole or part of a site as the hardhat area and in such an eventuality it shall be the responsibility of the contractor to provide safety helmet of the approved quality to all personnel engaged in construction and erection work, including the visitors to the site;
- 13.2 Accordingly, wherever safety footwear is required for the safety of the personnel, the contractor shall provide the same of the approved type free of charge.

9.0 Welding and gas cutting operations

1.0 Gas welding:

1.1 General provisions:

- 1.2 All welders shall be provided with fire resistant protective clothing and equipment, such as fire resistant gauntlets and aprons, helmets and goggles with suitable filter lenses and its usage shall be ensured;

- 1.3 The welders shall not be allowed to wear clothing that is not free from grease, oil and other flammable material;
- 1.4 Adequate precautions shall be taken to protect persons working or passing near welding operations from dangerous sparks and radiation;
- 1.5 When welding or cutting is being done on materials containing toxic or harmful substances or liable to produce toxic or harmful fumes, adequate precautions shall be taken to protect workers from the fumes, either by
 - i) Exhaust ventilation, or
 - ii) Respiratory protective equipment;
 - iii) Arrangement shall be made so that welding sparks do not fall down on the persons working below or material, which are combustible in nature and may be damaged with such sparks.
- 1.6 The oxygen pressure for welding shall always be high enough to prevent acetylene flowing back into the oxygen cylinder;
- 1.7 Acetylene shall not be used for welding at a pressure exceeding 1 atmosphere gauge;
- 1.8 Adequate precautions shall be taken to prevent:
 - i) Fire being started by sparks,
 - ii) Slag or hot metal; and
 - iii) Damage to fibre ropes from heat, sparks, slag or hot metal;
- 1.9 Precautions shall be taken to prevent flammable vapours and substances from entering the working area;

2.0 Welding at places with fire risks:

- 2.1 Unless adequate precautions are taken, no welding or cutting operations shall be allowed near the place where combustible materials are stored, or near materials or plant where explosive or flammable dusts, gases or vapours are likely to be present or given off. If hot work permit system exists at the site, the same shall be followed;
- 2.2 Combustible materials and structures that cannot be removed from the vicinity of welding operations shall be shielded by asbestos or protected by other suitable means.

3.0 Welding in confined space:

- 3.1 When welding or cutting operations are being carried out in a confined space;
 - i) Adequate ventilation, by means of exhaust fans or forced draught as the condition may require, shall be constantly provided; otherwise enough quantity of air shall be blown in by means of compressors to dilute the pollutants;
 - ii) No blow pipe shall be left unattended inside a tank or vessel or other confined space during meal break or other interruption of the work;
 - iii) The worker shall take all necessary precautions to prevent unburned combustible gas or oxygen from escaping inside a tank or vessel or other confined space; and
 - iv) When necessary to prevent danger, an attendant shall watch the welders from outside.

4.0 Welding on containers for explosive or flammable substances:

- 4.1 Welding or cutting operations on containers in which they are explosives or flammable substances shall not be allowed;

- i) Welding or cutting operations on any container that has held explosive or where flammable gases may have been generated, shall only be undertaken,
- ii) After the container has been thoroughly cleansed by steam or other effective means; and
- iii) Found by air tests to be completely free from combustible gases and vapours; or
- iv) After the combustible gas in the container has been completely replaced by an inert gas or by water;
- v) If an inert gas is used as laid down in clause 4.2.3, after the vessel has been filled with gas, the gas shall continue to flow slowly into it thorough out the welding or cutting operations;
- vi) Before starting any welding operations on, or otherwise applying heat to, closed or jacketed containers or other hollow parts, such containers or parts shall be adequately vented in suitable manner.

5.0 Gas cylinders

- 5.1 Gas cylinders shall be inspected, stored, handled and transported in conformity with the requirements of Gas Cylinders Rules, 1981;
- 5.2 When in use, cylinders shall be held in upright positions by straps, collars or chains;
- 5.3 Devices referred to in clause 6.2 shall be such that the cylinders can be rapidly removed in an emergency;
- 5.4 Welders shall not temper with or attempt to repair safety devices and valves on gas cylinders;
- 5.5 When acetylene cylinders are coupled, flash back arrestor shall be inserted between the cylinder and the coupler block, or between the coupler bock and the regulator;
- 5.6 Only acetylene cylinders or approximately equal pressure shall be coupled;
- 5.7 No gas shall be taken from a cylinder unless a pressure reducing regulator has been attached to the valve;
- 5.8 Only the right pressure reducing regulator shall be used for the gas in the cylinder;
- 5.9 Cylinder valves shall be kept free from gases, grease, oil, dusts and dirt;
- 5.10 Leaky cylinders charged with acetylene or liquefied fuel gas shall be taken into the open air at a safe distance from any open flame or sparks.

6.0 Hose

- 6.1 Only hose especially designed for welding and cutting operations shall be used to connect an oxy-acetylene torch to gas outlet;
- 6.2 Hose lines for oxygen and for oxy-acetylene shall be of different colours and preferably of different size;
- 6.3 Hose connections shall be sufficiently light to withstand without leakage a pressure twice the maximum delivery pressure of the pressure regulators in the system;
- 6.4 Care shall be taken that hose does not become kinked or tangled, stepped on or run-over or otherwise damaged;
- 6.5 Any length of hose in which a flashback has burned, shall be discarded;
- 6.6 No hose with more than one gas passage shall be used;
- 6.7 Only soapy water shall be used for testing hose for leaks.

7.0 Troches

- 7.1 When torches are being changed, the gases shall be shut off at the pressure reducing regulators and not by crimping hose;
- 7.2 Torches shall be lit with friction lighters or other safe source but not with matches.

8.0 Electric welding equipment:

- 9.0 Welding machines shall be controlled by a switch mounted on or near the machine framework that, when opened, immediately cuts off the power from all conductors supplying the machine;
- 10.0 Welding circuit shall be so designed as to prevent the transmission of high potential from the source of supply to the welding electrodes;
- 11.0 The maximum open circuit voltage shall be in accordance with Indian Standards;
- 12.0 Electrode conductors or cables shall not be excessive in length and shall not be longer than necessary to perform the work;
- 13.0 Return conductors shall be taken directly to work and securely connected mechanically and electrically to it or to the work bench, floor etc. and to an adjacent metallic object;
- 14.0 Cable shall be supported so as not to create dangerous obstruction;
- 15.0 Motors, generators, rectifiers and transformers in arc welding or cutting machines, and all current carrying parts, shall be protected against accidental contact with uninsulated live parts;
- 16.0 Ventilating slots in transformer enclosures shall be so designed that no live part is accessible through any slot;
- 17.0 Frames of arc welding machines shall be effectively earthed;
- 18.0 In hand-operated arc welding machines, cables and cable connectors used in arc welding circuits shall be effectively insulated on the supply side;
- 19.0 The outer surface electrode holders of hand-operated arc welding machines, including the jaw so far as practicable, shall be effectively insulated;
- 20.0 Electrode holders of hand-operated arc-welding machines shall, if practicable, be provided with discs or shields to protect the operator's hands from the heat of the arcs;
- 21.0 Only heavy-duty cable with unbroken insulation shall be used;
- 22.0 Circuit connections shall be waterproof;
- 23.0 When lengths of cable have to be joined, only insulated connectors shall be used on the earth line and the electrode holder line;
- 24.0 Connections to welding terminals shall be made at distribution boxes, socket outlets, etc. by bolted joints;
- 25.0 Welding terminals shall be adequately protected against accidental contact by enclosures, covers or other effective means;
- 26.0 Electrode holder shall
 - vii) Have adequate current capacity;
 - viii) Be adequately insulated to prevent shock, short-circuiting or flashovers.

8.0 Operations

- 8.1 Arc welding and cutting operations that are carried on at places where persons other than the welders are working or passing shall be enclosed by means of suitable stationary or mobile screens;
- 8.2 Walls and screens of both permanent and temporary protective enclosures shall be provided to absorb harmful rays from the welding equipment and prevent reflection, and if necessary, be painted or otherwise treated for the purpose;
- 8.3 When arc welding is done in damp confined spaces;
 - i) Electrode holders shall be completely insulated; and
 - ii) The welding machines shall be outside the confined space;
- 8.4 Welders shall take adequate precautions
 - i) To prevent any part of their body from completing an electric circuit
 - ii) To prevent contact between any part of the body and the exposed part of the electrode, or electrode when in contact with metal; and

- iii) To prevent wet or damaged clothing, gloves and boots from touching any live part;
- 8.5 Welding circuits shall be switched off when not in use;
- 8.6 Electrodes shall only be inserted in the holder with insulating means such as insulating gloves;
- 8.7 Electrode and return leads shall be adequately protected against damage;
- 8.8 Live parts of electrode holders shall be inaccessible when they are not in use;
- 8.9 Electric arc-welding equipment shall not be left unattended with current switched on.

10.0 Safety in the use of Electricity

1.0 General provisions

- 1.1 Before commencement of any building or other construction work, adequate measures shall be taken to prevent any worker from coming into physical contact with any electrical equipment or apparatus, machines or live electrical circuit which may cause electrical hazard during the course of his employment and suitable warning signs shall be displayed and maintained at conspicuous places in Hindi and in local language understood by the majority of the building workers;
- 1.2 In workplaces where the exact location of underground electric power line is not known, the building workers using jack hammers, crow bars or other hand tools which may come in contact with a live electrical line shall be provided with approved insulated protective gloves and footwear;
- 1.3 As far as practicable, no wiring or cable, which may come in contact with water or which may be mechanically damaged or which may result in electric shock shall be left on ground or;
- 1.4 All electrical appliances and current carrying equipment used shall be made of sound material and adequately earthed;
- 1.5 All temporary electrical installations shall be provided with earth leakage circuit breakers;
- 1.6 It is required that all portable power-driven hand tools are provided with double insulation to secure a high degree of protection from electrical hazards;
- 1.7 Electrical installations shall comply with the requirements of any law for the time being in force, especially the Indian Electricity Act/Rules in particular with specific reference to the following:
 - i) All parts of installations shall be of standard construction not lower, from the safety point of view, than the national standards, as applicable. All parts of electrical installations shall be so constructed, installed and maintained so as to prevent electrical fires, explosion and shock;
 - ii) Earthing of metal work of electrical equipment, other than the parts which carry current, shall be provided and will conform to Electricity Act and IS: 3042 – 1966 (code of practice for earthing);
- 1.8 All parts of electrical installation shall be adequate size and characteristics for the work they may be called upon to do and in particular they shall:
 - i) Be of adequate mechanical strength to withstand working conditions in construction operations; and

- ii) Be not liable to damage by water, dust or electrical, thermal or chemical action to which they me subjected to in construction operations;

1.9 All parts of electrical installations shall be so constructed, installed and maintained as to prevent the danger of electric shock; fire and external explosion;

1.10 It shall be made impossible for circuit breakers to be opened or closed inadvertently, by gravity or by mechanical impact;

1.11 Before operation of OCBs, oil level must be checked and the event of short, extra quantity must be filled;

1.12 Use of rubber gloves and rubber gum boots of tested quality where electric shock is likely to occur shall be provided, but these shall not be considered as providing adequate protection against the risk of electric shock in lieu of inbuilt safety arrangement in the system;

1.13 First-aid boxes, instruction for restoration of persons affected by electric shock shall be made;

1.14 Arrangement shall be made for sufficient number of CO₂/chemical powder type fire extinguishers/sand buckets etc.;

1.15 No electrical circuits shall ever be overloaded to the dangerous extent or beyond the rated capacity;

1.16 In confined areas, only 24 volt supply shall be used for every equipment, including hand-held portable tools and hand lamps;

1.17 All electrical appliances and outlets shall be clearly marked to indicate their purpose and voltage.

2.0 Fuses

2.1 Fuses shall bear markings indicating their rated current, whether they are of the fast or slow-breaking type and, as far as practicable, and their rated breaking capacity. Fuses as per need and of correct rating shall be used in the circuit;

2.2 Effective measures shall be taken to ensure that persons removing or inserting fuses will not be endangered, in particular by any adjacent live parts;

2.3 In case of blow of fuses only after finding out and correcting of the fault, new fuses shall be provided in the circuit.

3.0 Switches

3.1 All switches shall be of enclosed type and so installed and earthed as to prevent danger in their operation;

3.2 Use of switches, which may connect or disconnect circuit through gravity, shall not be used.

4.0 Motors

4.2 All motors shall be equipped with a switch;

4.3 When a motor can be cut off from more than one place, where practicable, a stopping device shall be installed in the immediate vicinity of the motor;

- 4.4 Motors shall be so installed as to ensure that they can be adequately cooled;
- 4.5 Motors shall be effectively protected against over current;
- 4.6 Whenever the motors installed are in the open area where there is the possibility of fall of liquid corrosives or otherwise, it shall be suitably protected with covering;
- 4.8 Earthing shall be connected to all motors, generators etc. as prescribed in the Indian Electricity Rules, amended from time to time.

5.0 Connections

5.1 At points where conductors are joined, branched or led into apparatus, they shall be:

- i) Mechanically protected, and
- ii) Properly maintained;

5.2 Conductors shall be joined, branched or led into an apparatus through junction boxes, bushings, glands or equivalent connecting devices;

5.3 Junction boxes or plug-out-socket couplings shall be used for joining cables wherever practicable;

5.4 When parts of conductors are joined together, or conductors are joined to one another or to an apparatus, the attachment shall be made by screwing, clamping, soldering, riveting, brazing, crimping, or equivalent means. Loose connections shall not be provided in any case;

5.5 Cable joints, junction boxes and connectors shall be protected as far as practicable, against traffic, fall of ground, water and other sources of damage;

5.6 Whenever armoured cables are joined, the junction boxes shall be bridged by a suitably conductive bond between the armouring of the cables.

6.0 Transportable and portable electrical equipment:

6.1 The supply of electricity to portable apparatus shall not exceed 250v;

6.2 Hand-held and portable machines shall be equipped with a built-in switch to switch off power in case of emergency;

6.3 Hand-held electrically operated tools shall be provided with built-in switch to disconnect the circuit when the tool is not being used;

6.4 Portable electrical tools, unless flameproof, shall not be used in flammable or explosive atmosphere;

6.5 Only three-core cable shall be used for single-phase operated tools with the third core connected to earth.

7.0 Hand lamps

7.1 Hand lamps shall be equipped with strong cover of glass or other transparent material;

7.2 Portable lamp holders shall have:

- i) All current –carrying parts enclosed;
- ii) Insulated handle; and
- iii) They shall operate at 24 v;

8.0 Inspection, maintenance

8.1 All electrical equipment shall be inspected before it is taken into use to ensure that it is suitable for its purpose of use;

8.2 At the beginning of every shift every person using electrical equipment shall make a careful external examination of the equipment and conductors for which he is responsible, especially flexible cables;

8.3 Periodic inspections, testing, maintenance of all electrical equipment is to be made and record of test of transformer oil and pit earthing shall be maintained;

8.3 Electrical conductors and equipment shall be repaired by the electrician only as far as practicable, no work shall be done live conductors or equipment;

8.4 Before any work is begun on conductors or equipment that does not have to remain live;

- i) The current shall be switched off;
- ii) Adequate precautions shall be taken to prevent the current from being switched on again;
- iii) The conductors or the equipment shall be tested to ascertain that they are dead;
- iv) The conductor and equipment shall be earthed and short-circuited; and
- v) Neighbouring live parts shall be adequately protected against accidental contact;

8.5 After work on conductors and equipment, the current shall only be switched on again on the orders of a competent person;

8.7 Electricians shall be provided with adequate tools, and person protective equipment, such as rubber gloves, mats etc.;

8.8 All conductors and equipment shall be considered to live unless there is certain proof to the contrary.

9.0 Work in the vicinity of electrical installations

- 9.1 When work is to be done in the neighbourhood of electrical conductors or installations, the contractor shall ascertain the voltage carried and the works shall not be allowed to reach to unsafe distance from them;
- 9.2 When any excavation is to be made or any bore-holed sunk, the contractor shall ascertain whether there are any underground conductors, in or in dangerous proximity to, the zone of operations;
- 9.3 No work shall be done in dangerous proximity to a conductor or an installation until it has been made dead;
- 9.4 Before work begins, work permit shall be obtained from the Engineer in-charge if live electricity lines/circuit are passing in close vicinity;
- 9.5 Before the current is restored, the contractor shall ensure that no work remain on the work site;
- 9.6 If conductor or an installation in the neighbourhood of which work is to be done can not be made dead, special precautions shall be taken and special instructions given to the workers so as to prevent danger by adequately enclosing or fencing;
- 9.7 If mobile equipment has to be employed in the neighbourhood of conductors or installations that cannot be made dead, its movement shall be so controlled as to keep it as a safe distance from them.

11.0 Safety in the use of hand tools and power-operated tools

1.0 General provisions

- 1.1 All hands and power tools and similar equipment, shall be maintained in safe condition.
- 1.2 When power operated tools are designed to accommodate guards, they shall be equipped with such guards, when in use;
- 1.3 Belts, gears, shafts, pulleys, sprockets, spindles, drums, fly wheels, chains and other reciprocating, rotating or moving parts of the equipment shall be similarly guarded;
- 1.4 Personnel using hand and power tools and exposed to the hazard of falling, flying, abrasive, and splashing objects, or exposed to harmful dusts, fumes, mists, vapours, or gases shall be provided with the particular personal protective equipment necessary to protect them from the hazards;

- 1.5 All hand-held powered platen sanders, grinders, grinders with wheels of 5 cm or less, routers, planers, laminate trimmers, nibblers, shears, scroll saws and jigsaws with blade shanks of 0.5 cm wide or less shall be equipped with only a positive **on-off control**.
- 1.6 All hand-held powered drills, tappers, fastener drivers, horizontal, vertical or angle grinders with wheels greater than 5 cm in diameter, disc sanders, belt sanders, reciprocating saws, saber saws and other operating powered tools shall be equipped with a momentary contact on control provided that turnoff can be accomplished by a single motion of the same finger or fingers that turn it on.

2.0 Hand Tools

- 2.1 The contractor shall not issue or permit the use of unsafe hand tools;
- 2.2 Wrenches including adjustable pipe end and socket wrenches shall not be used when saws are sprung to the point that slippage occurs;
- 2.3 Impact tools such as drift pins, wedges and chisels shall be kept free of mushroomed heads;
- 2.4 The wooden handles of tools shall be kept free of splinters or cracks and shall be kept tight on the tools.

3.0 Power operated tools

- 3.1 Electric power operated tools shall be either of the approved double-insulated type or shall be grounded;
- 3.2 The use of electric cords for hoisting or lowering loads shall not be permitted;
- 3.3 Pneumatic power tools shall be secured to the hose or whip by some positive means to prevent the tool from becoming accidentally disconnected;
- 3.4 Safety clips or retainers shall be securely installed or maintained on pneumatic impact (percussion) tools to prevent attachments from being accidentally expelled;
- 3.5 All pneumatically riveting machine staplers and other similar equipment provided with automatic fastener feed, which operate at more than 7 kg/cm² pressure at the tool a safety device on the muzzle to prevent the tool from ejecting the fasteners unless the muzzle is in contact with the work surface;
- 3.6 Compressed air shall not be used for cleaning purposes except when the pressure is reduced to less than 2 kg/cm² and that too with effective chip guarding. The 2 kg/cm² pressure requirement does not apply to concrete form, mill scale and similar cleaning purposes;
- 3.7 The manufacturer's safe operating for hoses, pipes, valves, filters and other fittings shall not be exceeded;
- 3.8 Only personnel who has been trained in the operation of the particular tool shall be allowed to operate power-actuated tools;
- 3.9 The tool shall be tested each day before loading to see that the safety devices are in proper working condition. The method of testing shall be accordance with the manufacturer's recommended procedure;
- 3.10 Any tool found not in proper working order, or that which develops a defect during use, shall be immediately removed from service and not used until properly repaired;

- 3.11 Tools shall not be loaded until just prior to the intended firing time. Neither loaded nor empty tools are to be pointed at any other person. Hands shall be kept clear of the open barrel end;
- 3.12 Loaded tools shall not be left unattended;
- 3.13 Fasteners shall not be driven into very hard or brittle materials including, but not limited to, cast iron, glazed tiles, surface hardened steel, glass block, live rock, face brick or hollow tiles;
- 3.14 Driving into materials that can be easily penetrated shall be avoided unless backed by a substance that will prevent the pin or fastener from passing completely through and creating a flying missile hazard on the other side;
- 3.15 No fastener shall be driven into a palled area caused by an unsatisfactory fastening;
- 3.16 Only non-sparking tools shall be used in an explosive or flammable atmosphere;
- 3.17 All tools shall be used with the correct shield, guard or attachment as recommended by the manufacturer.

4.0 Abrasive wheels and tools

- 4.1 All grinding machines shall be supplied with sufficient power to maintain the spindle speed at safe levels under all conditions of normal operation;
- 4.2 Grinding machines shall be equipped with suitable safety guards;
- 4.3 The maximum angular exposure of the grinding wheel periphery and sides shall not be more than 90° , except that when the work requires contact with the wheel below the horizontal plane of the spindle, the angular exposure shall not exceed 120° . In either case, the exposure shall begin not more than 65° above the horizontal plane of the spindle. Safety guards shall be strong enough to withstand the bursting of the wheel;
- 4.4 Floor and bench-mounted grinders shall be work-rests, which shall be rigidly supported and readily adjustable. Such work-rests shall be kept at a distance not to exceed 5 mm from the surface of the wheel;
- 4.5 Cup type wheels used for external grinding shall be protected by either revolving cup guard or a band type guard;
- 4.6 When safety guards are required, they shall be mounted as to maintain proper alignment with the wheel and the guard and the guard and its fastening shall be adequate strength to retain the fragments of the wheel in case of accidental breakage. The maximum angular exposure of the grinding wheel periphery and sides shall not exceed 180° ;
- 4.7 Portable abrasive wheel used for internal grinding shall be provided with suitable safety flanges;
- 4.8 When safety flanges are required, they shall be used only with wheels designed to fit the flanges. Only safety flanges, of a type and design and properly assembled so as to ensure that the pieces of the wheel will be retained in case of accidental breakage, shall be used;
- 4.9 All abrasive wheels shall be closely inspected and ring tested before mounting to ensure that they are free from cracks or defects;
- 4.10 Grinding wheels shall fit freely on the spindle and shall not be forced on. The spindle nut shall be tightened only enough to hold the wheel in place;

4.11 All employees using abrasive wheels shall be protected by suitable eye protection equipment.

5.0 Woodworking tools

5.1 All fixed power driven woodworking tools shall be provided with a disconnect switch that can either be locked or tagged in the **off-position**;

5.2 The operating speed shall be attached or otherwise permanently marked on all circular saws over 0.5 m in diameter or operating at over 3000 peripheral rpm. Any saw so marked shall not be operated at a speed other than that marked on the blade. When a marked saw is retensioned for a different speed, the marking shall be corrected to show the new speed;

5.3 Automatic feeding devices shall be installed on machines wherever the nature of the work will permit. Feeder attachments shall have the feed rolls or other moving parts covered or guarded so as to protect the operator from hazardous points;

5.4 All portable power driven circular saws shall be equipped with guards above and below the base plate or shoe. The upper guard shall cover the saw to the depth of the teeth, except for the minimum arc required to permit the base to be tilted for bevel cuts. The lower guard shall cover the saw to the depth of the teeth, except for the minimum arc required to allow proper retraction and contact with the work. When the tool is withdrawn from the work, the lower guard shall automatically and instantly return to the covering position.

12.0 Safety in the use of ladders and stairs

1.0 General aspects of safety related to use of ladders

1.1 Every ladder or step-ladder used in building or other construction work shall be of good construction, made of sound material and of adequate strength for the purpose for which such ladder or step-ladder is used;

1.2 When a ladder is used as a means of communication, such ladder shall be lashed to a fixed structure so that while working on such ladder it does not slip;

1.3 A ladder or step ladder shall not stand on loose bricks or other loose packing and have a level and firm footing;

1.4 No ladder shall be used which has a missing or defective rungs or rungs, which depend for support solely on nails, spikes or other similar fixing.

2.0 Materials for ladders

2.1 Shall be constructed with upright of adequate strength and are made of straight-grained wood, free from defects and having the grain of such wood running length wise;

2.2 Shall have rungs made of straight-grained wood free for defects and mortised or securely notched into the upright, reinforcing metal ties, if wedges shall not secure the tenors of such ladders;

2.3 Where it is required, in case of use of fixed ladders, sufficient foot-hold and hand-hold shall be provided for use by the building worker;

2.4 Every ladder shall be -

- (I) Secured so as to prevent undue swaying;
- (II) Equally and properly supported on each of its upright;

- (III) So used as not to cause undue sagging; and
- (IV) Placed as nearly as possible at an inclination of four in one;

- 2.5 The use of all ladders and stepladders shall conform to the approved standards;
- 2.6 Wooden ladders shall be constructed with uprights of adequate strength as well as rungs made of wood free from visible defects and having the grains of the wood in the ladders running lengthwise and rungs mortised or rebuted into the uprights;
- 2.7 Uprights and rungs of metal ladders shall have a cross-section adequate to prevent dangerous deflection, shall be equal and not less than 25 cm or more than 35 cm;
- 2.8 Rungs of metal ladders shall be kept clean so as to prevent them from becoming slippery;
- 2.9 Portable ladders shall not exceed 9 m in length;
- 2.10 Every ladder or run of ladders rising to a height exceeding 9 m shall be provided with an intermediate landing, providing further that the intervals between landings shall not exceed 9 m. The landings shall be of suitable size and protected by railings;
- 2.11 Defective ladders that cannot be satisfactorily repaired shall be tagged Not Fit For Use and destroyed;
- 2.12 Wooden ladders shall not be painted, but oiled or covered with clean varnish or other transparent preservatives;
- 2.13 Metal ladders shall be protected against corrosion by being coated with rust-proof paint or by other means unless they are made of non-corrosive metals;
- 2.14 Every ladder shall rise at least 1 m above the highest point to be reached and have one of the uprights continued to that height to serve as a hand-rail at the top;
- 2.15 Ladders shall not stand on loose bricks or other loose packing but have a level and firm footing so that they are equally supported on each upright;
- 2.16 Every ladder shall be securely fixed so that it cannot move from its top and bottom points of rest and if it cannot be secured at the top, it shall be securely fastened at the base and if fastening at the top is also impracticable, it shall have a man stationed at the foot holding the end to prevent it from slipping;
- 2.17 Where a run of two or more ladders connects different floors, the ladders shall be staggered and a protective landing with the smallest practicable opening shall be provided at each floor;
- 2.18 A ladder having only one upright or a missing or dangerously defective rung shall not be used;
- 2.19 When a ladder is placed in position, the distance between the foot of a ladder and the base of the structure against which it rests shall be about one-quarter of its length;
- 2.20 Workers using ladders shall leave at least one hand free for climbing up and down, face the ladder, avoid wearing slippery footwear and avoid carrying heavy or bulky loads;
- 2.21 A ladder shall not be placed in front of a door that opens towards it unless the door is fastened or locked or guarded;
- 2.22 A ladder shall not be placed against a window frame unless the ladder is fitted with a board at the top so that the applied load is safely distributed over the frame;
- 2.23 Metal ladders shall not be used in the vicinity of live electrical equipment;
- 2.24 Adequate means shall be provided to prevent displacement of the ladder set up in public thoroughfare or where persons, vehicles etc. may accidentally collide with it.

3.0 Portable stepladders

- 3.1 The length of portable stepladders shall not exceed 6 m and their back legs shall be adequately braced;
- 3.2 Stepladders exceeding 1.5 m in length shall have two or more cross-ties;

- 3.3 The spread between the front and back legs shall be restricted by means of hinged metal flat bars or high-grade fibre or other effective means;
- 3.4 When in the open position, treads of stepladders shall be horizontal.

4.0 Portable trestle ladders

- 4.1 The height of the trestle ladders shall not exceed 5.5 m;
- 4.2 The spread between the front and back legs shall be restricted by means of hinged metal flat bars or high-grade fibre or other effective means;
- 4.3 The front and back legs shall be joined at the top by bolted steel hinges of adequate dimensions or other effective means;
- 4.4 Both legs of trestle ladders shall be equipped with sufficient number of steel cross-ties.

5.0 Extension ladders

- 5.1 The length of extension ladders shall not exceed 15 m;
- 5.2 Extension ladders shall be equipped with an effective lock and guide brackets by which the ladder can be extended, retracted or locked in any position;
- 5.3 The rungs of overlapping sections shall coincide so as to form double treads and shall be equipped with one or more extension ropes;
- 5.4 Extension ropes shall be securely anchored and run over suitable pulleys.

6.0 Mechanical ladders

- 6.1 Mechanical ladder is that ladder, which is a mechanically extendable ladder, mounted on a wheeled frame;
- 6.2 Mechanical ladder shall be equipped with guard-rails and toe-boards and a cage of heavy-gauge steel mesh;
- 6.3 If mechanical ladder has no railed platform or cage, workers using it shall be secured by suitable safety belt;
- 6.4 Mechanical ladders shall not be moved, while a person is on them, unless they have specially designed to ensure that perfect stability is maintained during movement.

7.0 Fixed ladders

- 7.1 Uprights of fixed ladders shall be at least 40 cm and shall be set an angle of 15° to the vertical;
- 7.2 Clearance at the back of the rungs shall be at least 15 cm and no obstruction within 75 cm of the face of the ladder;
- 7.3 There shall be at least 7.5 cm clearance between the ladder and the nearest fixed object;
- 7.4 When it is necessary for a ladder to pass closely through a hole in a platform or a floor, the edges of the hole shall be padded so as to prevent injury to the users;
- 7.5 The length of the runs of fixed ladder shall not exceed 9 m;
- 7.6 Landing platform shall be provided for each 9 m or fraction thereof;
- 7.7 As far as practicable, runs shall be staggered;
- 7.8 Runs from which a person could fall from more than 6 m shall be enclosed in a cage of heavy-gauge mesh or hoops;
- 7.9 Fixed ladders shall be firmly bolted or welded in position.

8.0 Stairs

- 8.1 Stairs shall be of adequate strength to withstand safely the loads that they will have to carry;
- 8.2 Stairs used for the purpose of construction work shall have a clear width of at least 60 cm;
- 8.3 Stairs made of perforated material shall not have openings exceeding 1.2 cm in width;
- 8.4 No step of a stairway shall depend for its support solely on nails, spikes, screws or other similar fixing;
- 8.5 No stairway with missing or dangerously defective steps shall be used;
- 8.6 Every stairway that is at an angle of less than 30⁰ from the vertical shall be provided with a secure handhold at the top landing place, either by extending one upright for at least 1 m or by other effective means;
- 8.7 Movable and removable stairs shall be adequately secured in the position of use;
- 8.8 In all building structures permanent stairs shall be constructed as soon as practicable;
- 8.9 When work on a building has progressed to a height of more than 18 m above the ground and it has not been practical to construct the permanent stairs, sufficient number of stairs shall be provided to ensure safe access to the working levels.

13.0 Safety in the use of lifting appliances & gears

1.0 Construction and maintenance of lifting appliances: All lifting appliances, including their parts and working gear, whether fixed or movable, and any plant or gear used in anchoring or fixing of such appliances -

- 1.1 Shall be of sound construction, sound material, and of adequate strength to serve the purpose for which these are to be used and all such appliances shall be free from patent defects, and
- 1.2 Maintained in good repair and working condition;
- 1.3 Every drum or pulley around which the rope of any lifting appliance is carried, shall be of adequate diameter and sound construction in relation to such rope;
 - (I) Any rope that terminates at the winding drum of lifting appliance shall be securely attached to such drum and at least three dead turns of such rope remain on such drum in every operating position of such lifting appliance;
 - (II) The flange of a drum projects twice the rope diameter beyond the last layer of such rope and if such rope and if such projection is not available, other measures like anti-slackness guards shall be provided to prevent such rope from coming off such drum;
- 1.4 Every lifting appliance shall be provided with adequate and efficient brakes which shall be:
 - i) Capable of preventing fall of suspended load (including any test load),
 - ii) Effectively controlling such load while it is being lowered, acting without shock and shall be attached with shoes that can be easily removed for running and which shall be simple and have easily accessible means of adjustment;
- 1.5 Provided that nothing contained above shall apply to **steam-winch** that can be operated as safely as with brakes.

2.0 Controls of every lifting appliance shall be so

- 2.1 Situated that the driver of such appliance at his stand or seat has ample room for operating and has an unrestricted view of building or other construction work, as far as practicable, and that he remains clear of the load and the ropes, and that no load passes over him;

- 2.2 Positioned with due regard to ergonomic considerations for proper operation of such appliance;
- 2.3 Located that the driver of such appliance remains above the appliance and shall have upon them or adjacent to them clear markings to indicate their purpose and mode of operations;
- 2.4 Provided, where necessary, with a suitable locking device to prevent accidental movement or displacement and shall move, as far as practicable, in the direction of the resultant load movement;
- 2.5 Wherever automatic brakes are provided, they shall automatically come to the neutral position in case of power failure.

3.0 Test and periodical examination

3.1 Test: all lifting appliances including all parts and gears thereof, whether fixed or movable, shall be tested and examined by a competent person before being taken into use for the first time or after it has undergone any alteration or repairs liable to affect its strength or stability or after erection on a site and also once at least in every five years, in the manner as specified;

3.2 Examination: all lifting appliances shall be thoroughly examined by a competent person at least in every twelve months and where the competent person making such examination forms the opinion that the lifting appliance cannot continue to function safely, he shall forthwith give notice in writing of his opinion to the contractor.

4.0 Automatic load indicator

- 4.1 Cut-out shall be provided which automatically arrests the movement of the lifting parts of every crane if the load exceeds the safe working load, wherever possible;
- 4.2 Wherever the above provisions cannot be applied and if it is not possible to install an automatic safe load indicator, in that case, provision of a table showing the safe working loads at the corresponding inclinations or radii of the jib on the crane shall be considered sufficient.

5.0 Installation: Fixed lifting appliances shall be installed by a competent person in a manner that

- 5.1 Such appliances cannot be displaced by the load, vibration or other influences;
- 5.2 The operator of such appliance is not exposed to danger from loads, ropes or drums;
- 5.3 The operator can either see over the zone of operation or communicate with all loading and unloading points by signal, or other communication system;
- 5.4 Adequate clearance is provided between parts or loads of lifting appliances and between the fixed objects such as walls and posts, or electrical conductors;
- 5.5 The lifting appliances; when exposed to wind loading, are given sufficient additional strength, stability and rigidity to withstand such loading safely;
- 5.6 No structural alterations or repairs are made on any part of the lifting appliances that affect the safety of such appliances without obtaining the opinion of the competent person to this effect.

6.0 Winches

- 6.1 Winches shall not be used if their control levers operate with excessive friction or play;
- 6.2 Double gear winches shall not be used unless a positive means of locking the gearshift is provided;
- 6.3 There shall be no load other than the fall and the hook assembly on the winch while changing gears on a two-gear winch;
- 6.4 Adequate protection shall be provided to the winch operator against abnormal weather;
- 6.5 Temporary seats or shelters for winch operators that may pose hazard to the winch operator or any other building workers shall not be allowed to be used;
- 6.6 Control levers shall be secured in the neutral position and, whenever possible, the power shall shut off if the winch is left unattended.

7.0 In use of every steam-winch

- 7.1 Measures shall be taken to prevent escaping steam from obscuring any part of the construction site or other workplace or from otherwise hindering or injuring any building worker;
- 7.2 Extension control levers which tend to fall off their own weight shall be counter-balanced;
- 7.3 Winch operators shall not be permitted to use the winch control extension levers except for short handles on wheel type controls and that such levers shall be of adequate strength, secure and fastened with metal connections at the fulcrum and at the permanent control lever;
- 7.4 In use of every electric winch, no building worker shall be permitted to transfer, alter or adjust electric control circuits in case of any defect in such winch;

8.0 Electric winches shall not be used for building work where

- 8.1 The electromagnetic brake is unable to hold the load; or
- 8.2 One or more control points either hoisting or lowering are not operating properly.

9.0 Buckets: It shall be ensured that tip-up buckets are equipped with a device that effectively prevents accidental tipping.

10.0 Identification and marking of safe working load:

- 10.1 Every lifting appliance and loose gear shall be clearly marked for its safe working load and identification by stamping or other suitable means;
- 10.2 Every derrick (**other than derrick crane**) shall be clearly marked for its safe working load when such derrick is used either in single purchase with lower block or in union purchases in all possible block positions;
- 10.3 The lowest angle to the horizontal, to which the derrick may be used, shall be legibly marked;

10.4 Every lifting appliance having more than one working load shall be fitted with effective means to enable the operator to determine safe working load at each point under all conditions of use;

10.5 Means to ascertain the safe working load for lifting gears under such conditions in which such gears may be used shall be provided to enable a worker using such gears and such means safely, which shall comprise:

- i) Marking of the safe working load in plain figures or letters upon the sling or upon a tablet or ring of durable material attached securely thereto in case of chain slings; and
- ii) The means specified or notices so exhibited as can be easily read by any concerned building worker stating the safe working load for the various sizes of the wire rope slings used.

11.0 Loading of lifting appliances and lifting gears

11.1 No lifting appliance, lifting gear or wire rope shall be used in an unsafe way and in such a manner as to involve risk to life of building workers and they are not loaded beyond their safe working load except for testing purposes under the direction of a **competent person** in the manner as specified in schedule;

11.2 No lifting appliance and lifting gear, or any other material-handling appliance shall be used if the Inspector having jurisdiction under the Building and Other construction (regulation of employment and conditions of service) Act/Rules is not satisfied with reference to a certificate of test or examination or to an authenticated record maintained as provided under the Rules or if in his view the lifting appliance, lifting gear or any other material handling appliance is not safe for use in building or other construction work;

11.3 No pulley block shall be used unless the safe working load and its identification are clearly marked on such block.

12.0 Operator's cab or cabin shall

12.1 Be made of fire resistant material;

12.2 Have a suitable seat, a foot rest and protection from vibration;

12.3 Afford the operator an adequate view of the area of operation;

12.4 Afford the necessary access to working parts in the cab;

12.5 Afford the operator adequate protection against the weather;

12.6 Be adequately ventilated; and

12.7 Be provided with a suitable fire extinguisher.

13.0 Operation of lifting appliances: Operator of every crane or lifting appliance shall possess adequate skill and training in the operation of the particular lifting appliances, provided further that

13.1 No person under eighteen years of age shall be in control of any lifting machine, scaffold winch, or give signals to the operator;

- 13.2 Precaution shall be taken by the trained operator to prevent lifting appliance from being set in motion inadvertently;
- 13.3 The operation of lifting appliances shall be governed by signals in conformity with the approved standards;
- 13.4 The operator's attention shall not be distracted while he is working;
- 13.5 No crane, hoist, winch or other lifting appliance or any part of such crane, hoist, winch or other lifting appliance shall, except for testing purposes, be loaded beyond the safe working load;
- 13.6 During the hoisting operation, effective precaution shall be taken to prevent any person from standing or passing under the load in such operation;
- 13.7 Operator shall not leave lifting appliance unattended while power is on or the load is suspended to such appliance;
- 13.8 No person shall ride on a suspended load of any lifting appliance;
- 13.9 Every part of a load in course of being hoisted or lowered shall be adequately suspended and supported to prevent danger;
- 13.10 Every receptacle used for hoisting bricks, tiles, slates or other material shall be suitably enclosed as to prevent the fall of any such material;
- 13.11 The hoisting platform shall be enclosed when loose material or loaded wheel barrows are placed directly on such platform or lowering such materials or wheel barrows;
- 13.12 No material shall be raised, lowered or slewed with any lifting appliance in such a way as to cause sudden jerks to such appliance;
- 13.13 In hoisting a barrow, any wheel of such barrow shall not be used as a means of support unless adequate steps have been taken to prevent the axle of such wheel from slipping out of its bearing;
- 13.14 Long objects like planks or girders shall be provided with tag line to prevent any possibility of danger while raising or lowering such objects;
- 13.15 During the process of landing or material, a building worker shall not be permitted to lean out into empty space for finding out the loading and unloading of such material;
- 13.16 When hoisting of load is done in an enclosed space, neither the lifting material nor the boom shall project outside the enclosed space;
- 13.17 Adequate steps shall be taken to prevent a load, in the course of being hoisted or lowered from coming into contact with any object to avoid any displacement of such load and appropriate appliances provided and used for guiding heavy loads when raising or lowering heavy loads to avoid crushing of hands of building workers during such raising or lowering of loads.

14.0 Hoists

- 14.1 Hoist towers shall be designed according to the relevant national standards;
- 14.2 Hoist shafts shall be provided with rigid panels or other adequate fencing at the ground level on all sides of such shafts and at all other levels on all sides of the access to such shafts while the walls of hoist shafts, except at approaches, extend at least two meters above the floor or platform of access to such shafts;

- 14.3 Approaches to hoist shall be adequately lit and provided with gates that shall be guarded to maintain visibility at least of two meters height; and equipped with a device, which requires such gate to be closed before the platform of such hoist can leave the landing, and prevents the gate from being opened unless such platform is at the landing;
- 14.4 The guides of hoist platforms shall offer sufficient resistance to bending and to bucking in the case of jamming, by providing a safety catch;
- 14.5 Overhead beams and their supports are capable of holding the total maximum live and dead loads that such beams and supports will be required to carry, with a safety factor of at least five;
- 14.6 A clear space shall be provided –
- iii) Above the highest stopping place of a cage or platform to allow sufficient unobstructed travel of such cage or platform in case of over-winding and
 - iv) Below the lowest stopping place of such cage or platform;
- 14.7 Adequate covering shall be provided above the top of hoist shafts to prevent materials from falling into such shafts;
- 14.8 Outdoor hoist towers shall be erected on adequately firm foundations and securely braced, guyed and anchored;
- 14.9 A ladder way shall extend from the bottom to the top of every outdoor hoist tower in case no other ladder way exists within easy reach and such ladder way shall comply with the relevant national standards;
- 14.10 The rated capacity of a hoisting engine shall at least be one and a half times the maximum load that such engine will be required to move;
- 14.11 All gearing on a hoisting engine shall be securely enclosed;
- 14.12 Steam piping of hoisting engine shall be adequately protected against accidental contact of such piping with a building worker;
- 14.13 Electrical equipment of a hoisting engine shall be effectively earthed;
- 14.14 A hoist shall be provided with suitable devices to stop a hoisting engine as soon as the platform of such hoist reaches its highest stopping place;
- 14.15 A hoisting engine shall be protected by suitable cover against weather and falling objects;
- 14.16 A hoisting engine set up in a public thoroughfare shall be completely enclosed;
- 14.17 All exhaust steam pipes shall discharge steam in such a manner that the steam so discharged does not scald any person or obstruct the operator's view;
- 14.18 The motion of a hoist shall not be reversed without first bringing it to rest to avoid any harm from such reverse motion;
- 14.19 A hoist not designed for the conveyance of persons shall not be set in motion from the platform of such hoist;
- 14.20 Pawls and ratchet wheels of a hoist, requiring disengagement of such pawls from such ratchet wheels, before the platform of such hoist is lowered, shall not be used;
- 14.21 A platform of a hoist shall be capable of supporting such maximum load that such platform may carry with a safety factor of at least three;

- 14.22 A platform of a hoist shall be equipped with suitable safety gear which can hold such platform with its maximum load in case its hoisting rope breaks;
- 14.23 On platform of a hoist, the wheel barrows or truck shall be efficiently blocked in safe positions;
- 14.24 A cage of a hoist or platform where the building workers are required to enter into such cage or to go on such platform at landing levels, shall be provided with a locking arrangement to prevent such cage or platform from moving during the time a worker enters or leaves such cage or platform;
- 14.25 The sides of platform of a hoist which are not used for loading or unloading, shall be provided with toe-board and enclosures of a wire mesh or any other suitable means to prevent the fall of any part of a load from such platform, further provided that
- iii) The platform of a hoist, which has any probability of falling of any part of a load from it, shall be provided with an adequate covering to prevent such fall;
 - iv) The counter weights of a hoist consisting of an assemblage of several parts shall be so constructed that such parts shall be rigidly connected together;
 - v) The counter weights of a hoist shall run between guides;
 - vi) At every level of work the building workers shall be provided with adequate platforms for performing such work;
 - vii) A legible notice in Hindi as well as in a local language shall be displayed in a conspicuous place of the platform of a hoist and that such notice shall state the maximum carrying capacity of such hoist in kilograms on the hoisting engine;
 - viii) On a hoist authorized and certified for the conveyance of the persons on the platform or in the cage and such notice shall state the maximum number of persons to be carried on such hoist at one time;
 - ix) On a hoist carrying goods and other materials such notice shall state that such hoist is not meant for carriage of persons.

15.0 Fencing and means of access to lifting appliances

- 15.1 Safe means of access shall be provided to every part of lifting appliances;
- 15.2 The operator's platform on every crane or tip driven by mechanical power shall be securely fenced and provided with safe means of access and where access to such platform is by a ladder, the sides of such ladder shall extend to a height reasonable beyond such platform or some other suitable handhold shall be provided in the platform;
- 15.3 The handling place on such platform shall be maintained free from obstruction and slipping; and
- 15.4 In case the height of such ladder exceeds six meters, the resting platforms shall be provided on such ladder at every six meters of its height and where the distance between last platform so provided and the top end of such ladder is more than two meters then on such top end.

16.0 Rigging of derricks: Every derrick shall have current and relevant rigging plans and any other information necessary for the safe rigging of such derrick and its gear.

17.0 Securing of derrick foot: Appropriate measures shall be taken to prevent the foot of a derrick from being lifted out of its socket or supports.

18.0 Construction and maintenance of lifting gear

18.1 Every lifting gear shall be –

- i) Of good design and construction, sound material and adequate strength to perform the work for which it is used;
- ii) Free from patent defects; and
- iii) Properly maintained in good repair and working order;

18.2 Components of the loose gear, at the time of its use, shall be renewed if one of its dimensions at any point has decreased by ten per cent or more;

18.3 A chain shall be withdrawn from use when it is stretched and increased in length which exceeds five per cent of its length or when a link of such chain is deformed or is otherwise damaged or defects in the welds have appeared on it;

18.4 Rings, hooks, swivels and end links attached to a chain shall be of the same materials as that of such chain;

18.5 The voltage of electric supply to any magnetic lifting device shall not fluctuate by more than **plus** or **minus** 10%.

19.0 Test and periodical examination of lifting gears

19.1 A lifting gear shall be initially tested for the manufacturer by a competent person in a manner specified as per schedule annexed before taking into use or after undergoing any substantive alterations which renders its any part liable to affect its safety and such gear after such test shall subsequently be retested for the use of its owner at least once in every five years;

19.2 A lifting gear in use shall thoroughly examined once at least in every twelve months by a competent person;

19.3 A chain in use shall be thoroughly examined at least once every month by a responsible person for its use;

19.4 Certificates of initial and periodical test and examinations of loose gears shall be obtained in the form annexed.

20.0 Ropes

20.1 No rope shall be used for building or other construction work unless -

- i) It is of good quality and free from patent defects; and
- ii) In the case of wire rope, it shall be tested and examined by a competent person in the manner annexed;

- iii) Every wire rope of lifting appliance or lifting gear used for building or other construction work shall be inspected by a responsible person for such use, once at least in every three month;
- 20.2 Provided that after if any such wire is broken in such rope, the responsible person shall thereafter inspect it once at least in every month and ensure that;
- 20.3 No wire rope shall be used for building or other constructing work if in any length of eight diameters of such wires, the total number of visible broken wires exceed ten per cent of the total number of wires in such rope, or such rope shows signs of excessive wear, corrosion or other defects which in the opinion of the person who inspects it, is unfit for use;
- 20.4 Eye splices and loops of ropes for the attachment of hooks, rings and other such parts to wire rope shall be made with suitable thimble;
- 20.5 A thimble or loop splice made in any wire rope sling shall conform to the following standards, namely:
- i) Wire rope sling shall have at least three tucks with full strand of rope and two tucks with one-half of the wires cut out of each of such strand in all cases, such strands shall be tucked against the lay of the rope;
 - ii) Protruding ends of such strands in any splice of wire rope slings shall be covered or treated so as to leave no sharp points;
 - iii) A fiber rope or a rope sling shall have at least four tucks, tail of such tuck being whipped in a suitable manner; and
 - iv) A synthetic fiber rope or rope sling shall have at least four tucks with full strands followed by further tuck with one-half filaments cut out of each of such strand and final tuck with one-half of the remaining filaments cut out from such strands. Any portion of the splices containing such tucks, with reduced number of filaments, shall be securely covered with suitable tape or other materials;
 - v) Provided further that nothing contained above shall apply where any other form of splice, which may be shown to be as efficient as the splice with above standards, shall be used.

21.0 Heat treatment of lifting gears

- 21.1 All chains other than bridle chains attached to derricks and all rings, hooks, shackles and swivels used in hoisting or lowering of such derricks shall be effectively annealed under supervision of a competent person and at the following intervals, namely:
- i) Such chains, rings, hoods, shackles and swivels which are not more than twelve and a half millimeter of length annealed at least once in every six months; and
 - ii) All other such chains rings hooks shackles and swivels shall be so annealed at least once in every twelve months;
- 21.2 Provided that the clause (a) above shall not apply to -
- iii) Pitched chins, working on sprocket or sprocket wheels;

- iv) Rings, hooks and swivels permanently attached to pitched chains, pulley blocks or weighing machines, and
 - v) Hooks and swivels having ball bearings or other case hardened parts;
- 21.3 A chain or a loose gear made of high tensile steel or alloy steel shall be plainly marked with a mark indicating that it is so made;
- 21.4 No chain or loose gear made of high tensile steel or alloy steel shall be subjected to any form of heat treatment except where such treatment is necessary for the purpose of repair of such chain or loose gear and that such repair shall be made under the direction of the competent person;
- 21.5 That the wrought iron gear, the past history of which is not traceable, shall be suspected of being heat treated at incorrect temperature shall be normalized before using it on any building or other construction work.

22.0 Certificate to be issued after actual testing and examination etc: A competent person shall issue a certificate after actual testing or examination of the apparatus specified and record of such test or examination shall be maintained for inspection.

23.0 Register of periodical test, examination and certification thereof

- 23.1 A register in the form annexed shall be maintained and particulars of such test and examination of lifting appliances, lifting gears and heat treatment as required shall be entered in such register;
- 23.2 Certificate in respect of each of the following shall be obtained from a competent person:
- i) In cases of initial and periodical test and examination of the lifting appliances such as Winches, Derricks and their accessory gears, Cranes or Hoists and their accessory gears;
 - (ii) In case of test, examination and re-examination of loose gears;
 - (iii) In case of test and examination of wire ropes;
 - (iv) In case of heat treatment and examination of loose gears;
 - (v) In case of annual thorough examination of the loose gears, except where required particulars of such exemption have been enclosed in the register referred to in Form annexed and such certificates are attached to the register referred to as above and certificates kept at such construction site in case such register and certificate relate to lifting appliances, loose gear and wire ropes and
- 23.3 Produced on demand and retained for at least five years after the date of the last entry made in such register;
- 23.4 No lifting appliance or lifting gear in respect of which an entry is required to be made in register referred to above and certificate of test and examination are required to be attached in such register in the manner as specified, shall be used for building or other construction work unless the required entries have been made in such register and certificates.

24.0 Vacuum and magnetic lifting gear

24.1 No vacuum lifting gear, magnetic lifting gear or any other lifting gear where the load on it is held by adhesive power, shall be used while workers are performing operations beneath such gear;

24.2A magnetic lifting gear used in connection with building or other construction work shall be provided with an alternative supply of power, such as batteries, which may come into operation immediately in the event of failure of the main power supply;

24.3 No building worker shall work within the swinging zone of the lifting gear or load or building or other construction material suspended to such lifting gear.

25.0 Knotting of chains and wire ropes: No chain or wire rope with a knot in it shall be used in building or other construction work.

26.0 Carrying of persons by means of lifting appliances etc.

26.1 No building worker shall be raised, lowered or carried by a power driven lifting appliance, except

- i. On the drive's platform in the cage of a crane; or
- ii. On as hoist; or
- iii. On an approved suspended scaffold;

26.2 Provided that a building worker may be raised, lowered or carried by a power driven lifting appliance:

- i. In circumstances where the use of a hoist or of a suspended scaffold shall not reasonably be practicable, or
- ii. On an aerial cableway or aerial ropeway, provided further that the following requirements are met:
 - iii. That the appliance referred to above can be operated from one position only and that
 - iv. Any winch used in connection with the appliance shall also comply with the requirements as laid down vide clause **10.1.6** above.

26.3 The appliance referred to above shall not carry any person except:

- (i) In a chair or cage,
- (ii) In a skip or other receptacle at least three feet deep which shall be suitable for safe carriage of a person and any such chair, cage, skip or other receptacle shall be made of good construction, sound material, and adequate strength and properly maintained with suitable means to prevent any occupant therein from

falling out of it and shall be free from any material or tools which may interfere with the handhold or foothold of such occupant or otherwise endanger him; and

- (iii) Those suitable measures shall be taken to prevent the chair, cage skip or other receptacle from spinning or tipping in a manner dangerous to any occupant therein.

27.0 Hoists carrying persons

27.1 No building worker shall be carried with the help of a hoist unless it is provided with a cage which:

- i) Is so constructed as to prevent, when its gates are shut, any building worker carried by such hoist from falling out of it or from being trapped between any part of such cage and any fixed structure or other moving part of such hoist or from being struck by articles or materials falling down the hoist way on which such hoist is moving; and
- ii) Is fitted on each of its side from which access is provided to a landing place with a gate which has efficient interlocking or other devices to secure so that such gate cannot be opened except when such cage is at a landing place and that such cage cannot be moved away from any such place until such gate is closed;

27.2 Every gate in the hoist way enclosure of such hoist used for carrying persons shall be fitted with efficient interlocking or other devices to secure so that such gate cannot be opened except when the cage of such gate is at the landing place and that such cage cannot be moved away from the landing place until such gate is closed;

27.3 In every hoist used for carrying building workers there are provided with suitable and efficient automatic devices to ensure that the cage of such hoist comes to rest at a point above the lowest point to which such cage may travel.

28.0 Attachment of loads

28.1 When a sling is used to hoist long materials, a lifting beam shall be used to space the sling legs for proper balance and when a load is suspended at two or more points with slings, the eyes of the lifting legs of such slings shall be shackled together and such shackled or eyes of the shackled slings shall be placed on the hook or the eyes of such lifting legs shall be shackled directly to the hoisting block, ball or balance beam, as the case may be;

28.2 Every container or receptacle used for raising or lowering stone, bricks tiles, slates or other similar objects shall be so enclosed with the hoist as to prevent the fall of such objects;

28.3 A loaded wheel barrows placed directly on a platform of a hoist for raising or lowering of such wheel barrows shall be so secured that such wheel barrows cannot move and such platform shall be enclosed to prevent the fall of the contents kept in such wheel barrows;

28.4 Landings of hoists shall be so designed and arranged that building workers on such hoist be not required to lean out into empty space for loading and unloading on any material from such hoist.

29.0 Tower Cranes

29.1 No person other than the operator trained and capable to work at heights shall be employed to operate tower cranes;

29.2 The ground on which a tower crane stands shall have adequate bearing capacity;

29.3 Bases for tower cranes and trucks for rail mounted tower cranes shall be firm and leveled and such cranes erected at a reasonably safe distance from excavations and operated within gradient limits as specified by the manufacturer of such cranes;

29.4 Tower cranes shall be sited where there is a clear space available for erection, operation and dismantling of such cranes;

29.5 Tower cranes shall be sited in such a way that the loads on such cranes shall not be handled over any occupied premises, public thoroughfares, railways or near power cables, other than construction works for which such cranes are used;

29.6 Where two or more tower cranes are sited and operated, every care shall be taken to ensure positive and proper communication between operators of such cranes to avoid any dagger or dangerous occurrences;

29.7 Tower cranes shall not be used for loading magnet, or demolition ball service, piling operation or other similar operations which could impose excessive load stresses on the crane structure of such cranes;

29.8 The instruction of the manufacturer of a tower crane and standard safe practices regarding such cranes shall be followed while operating or using such cranes.

30.0 Qualification of operator of lifting winches and of signaler etc.

30.1 No person shall be employed to drive or operate a lifting appliance whether driven by mechanical power or otherwise or to give signals to driver of operator of such lifting appliance or to work as an operator of a rigger or derricks unless he is

- i) Sufficiently competent and reliable;
- ii) Possesses the knowledge of the inherent risks involved in the operation of lifting appliance;
- iii) Medically examined periodically as specified and
- iv) Is above eighteen years of age.

14.0 Safety in the use of transport, earthmoving equipment & other construction machinery

1.0 Earthmoving equipment and vehicles

- 1.1 All vehicles and earthmoving equipment shall be made of good material, proper design and sound construction and be sufficiently strong for the purpose for which such equipment are properly used in accordance with standard safe operating practices;
- 1.2 Provided that the truck or trailer employed for transporting freight containers shall be of the size sufficient to carry the containers, without over hanging and provided with twist locks conforming to approved standards, at all the four corners of each of such use by an authority under the relevant law for the time being in force and is inspected by a responsible person, at least once in a month and record of such inspection shall be maintained:
- 1.3 All transport or earth moving equipment and vehicles shall be inspected at least once a week by a responsible person and in case any defect is noticed in such equipment or vehicle it shall be immediately taken out of use;
- 1.4 Power trucks and tractors shall be equipped with effective brakes, headlights and tail lamps and maintained in good repair and working order;
- 1.5 Side stanchions on power trucks and trailers for carrying heavy and long objects shall be
 - i) Of sound construction and free from defects;
 - ii) Provided with tie chains attached to the top across the loads for preventing such stanchions from spreading out; and
 - iii) Kept in position while loading and unloading;
 - iv) Safe gangways provided for to and fro movement of building workers engaged in loading and unloading of lorries, trucks, trailers and wagons;
 - v) Trucks and other equipment shall not be loaded beyond their safe capacity and carry workers engaged in loading and unloading of lorries, trucks trailers and wagons in an unsafe condition;
 - vi) Handles of trucks shall be so designed as to protect the hands of the building workers working on such trucks, or such handles provided with knuckle guards;
 - vii) No unauthorized person shall ride the transport equipment employed in such work;
 - viii) A driver of a transport equipment shall maneuver such equipment under the direction of a signaler;
 - ix) Adequate precaution such as isolating the electric supply or erecting overhead barriers of a safe height shall be taken when earth moving equipment or vehicles are required to operate in dangerous proximity to any live electric conductor;
 - x) Vehicles and earth moving equipment shall not be left on a slope with the engine of such vehicles or equipment running;

- xi) All earth moving equipment, vehicles or other transport equipment shall be operated only by such person who are adequately trained and possess such skills as required for safe operation of such equipment, vehicle or other transport equipment.

2.0 Power shovels and excavator

- 2.1 A shovel or an excavator whether operated by steam or electric or by internal combustion, shall be constructed, installed, operated, tested and examined as per approved standards;
- 2.2 Excavator equipped for use as a mobile crane shall be examined and tested in accordance with the requirements for such mobile cranes as laid down by the manufacturer; and
- 2.3 Fitted with an automatic safe working load indicator;
- 2.4 Buckets or grabs of power shovels shall be propped to restrict the movement of such buckets or grabs while being repaired or while the teeth of such buckets or grabs are being changed.

3.0 Bulldozer

- 3.1 Operator of every such bulldozer before leaving the dozer shall take the following steps:
 - i) Apply the brakes;
 - ii) Lower the blade and sipper and
 - iii) Put the shift lever into neutral;
 - iv) Dozer left on level ground at the close of the work for which such bulldozer is used;
 - v) The blade of a bulldozer kept low when such bulldozer is moving uphill;
 - vi) The bulldozer blades not used as brakes except in an emergency.

4.0 Scrapers

- 4.1 A tractor and scraper shall be joined by safety line at the time of its operation;
- 4.2 The scraper bowls shall be propped while blades of such scraper are being replaced;
- 4.3 A scraper moving downhill shall not be left in gear.

5.0 Mobile asphalt layers & finishers

- 5.1 A mixture elevator shall be located within a wooden or sheet metal enclosure with a window for observation, lubrication and maintenance;
- 5.2 Bitumen scoops shall have adequate covers;

- 5.3 When asphalt plants are working on public road, adequate traffic control shall be established on such road and the building workers working with such plant provided with reflective jackets;
- 5.4 A sufficient number of fire extinguishers shall be kept in readiness at such workplace where fire hazards may exist;
- 5.5 The materials shall be loaded on the elevator after the drying drum has warmed up of such elevator;
- 5.6 No open light shall be used for ascertaining the level of asphalt;
- 5.7 Inspection opening shall not be opened till there is a pressure in the boiler, which may cause injury to building workers.

6.0 Pavers: Pavers shall be equipped with guards suitable to prevent building workers from walking under the skip of such pavers.

7.0 Road rollers: Before a road roller is used on the ground, such ground shall be examined for its bearing capacity and general safety, especially at the edges of slopes such as embankment on such grounds and shall not be moved downhill with the engine out of gear.

7.0 General safety in respect of powered construction machinery

7.1 Every vehicle or earthmoving equipment shall be equipped with -

- i) Silencers;
- ii) Tail lights
- iii) Power and hand brakes;
- iv) Reversing alarm; and
- v) Search light for forward and backward movement, which are required for safe operation of such vehicle or earthmoving equipment;

7.2 The cab of vehicle or earthmoving equipment shall be kept at least one meter from the adjacent face of a ground being excavated;

7.3 When cranes or shovel are traveling, the boom of such crane or shovel shall be in the direction of such travel and the bucket or scoop attached to such crane or shovel raised and without load except when such traveling is downhill.

15.0 Safety in the provision of Runways and Ramps

1.0 Use of runways and ramps:

1.1 Runway or ramps shall not be less than 430 mm in width and constructed of not less than 25 mm thick planking or any other material of adequate strength to withstand the

required load, supported substantially in relation to the span and braced with such runway or ramp, and design and construction of such runway or ramp shall be in accordance with the approved standards;

1.2 Every runway or ramp located more than 3 m above the floor or ground shall be on open sides and provided with a guardrail of adequate strength and height of not less than 1 m.

1.3 Use of runways and ramps by vehicles:

i. All runways and ramps shall be of sound construction, strength and securely braced and supported;

1.4 Every runway or ramp for the use of transport equipment like trailers, trucks or heavier vehicles shall have a width of not less than 3.7 m and provide with timber curbs or any other material of adequate strength with not less than 200 mm by 200 mm in width placed parallel to, and secured to, the side of such runway or ramp and such runways or ramps shall be designed in accordance with the approved standards.

2.0 Slope of Ramps: Every ramp shall have a slope not exceeding one in four and the total rise of a continuous ramp used by building workers carrying material or using wheelbarrows shall not exceed 3.7 m, unless broken by horizontal landing of at least 1.2 m in length.

3.0 Use of runways or ramps by wheelbarrows, etc.

3.1 Every runway or ramp used for wheelbarrows and carts or hand trucks shall not be less than 1 m width and constructed of not less than 50 mm thick planking, and supported and braced suitably for such use;

3.2 Every runway or ramp located more than 3 m above the floor or ground shall be provided on the open sides with suitable guardrails of adequate strength.

16. Safety in handling and use of explosives

1.0 General Provisions:

1.1 The use of explosives shall be carried out in a safe manner to avoid injury to any person and under the direct supervision of a responsible person;

1.2 No person other than authorized and competent one shall be allowed to handle and use explosives;

1.3 Before using any explosive, necessary warning and danger signals shall be erected, at conspicuous places of such use to warn the building workers and the general public of the danger involved in such use.

No person other than authorized and competent one shall be allowed to handle and use explosives.

- 1.2 Smoke, open lamps, other type of hot or heat producing items and sparks shall be prohibited in or near explosives magazines or while explosives are being handled, transported or used.
- 1.3 No person shall be allowed to handle or use explosives while under the influence of intoxicating liquors or dangerous drugs.
- 1.4 The explosives shall be accounted for at all times. No explosives or blasting agents shall be abandoned.
- 1.5 No fire shall be fought where the fire is in the imminent danger of contact with explosives. All employees shall be removed to a safe area and the fire area shall be guarded against intruders.
- 1.7 Employees authorized to prepare explosive charges or conduct blasting operations shall use every reasonable precaution including but not limited to visual and audible warning signals, flags, or barricades to ensure employee safety.
- 10.1 Due precautions shall be taken to prevent accidental discharge of electric blasting caps from current induced by induced voltage, lightning, adjacent power lines, dust storms, or other sources of extraneous electricity or otherwise. These precautions shall include:
 - 1.8.1 Short-circuiting of detonators in holes, which have been primed and shunted until wired into the blasting circuit.
 - 1.8.2 The suspension of all blasting operations and removal of persons from the blasting area during the approach and progress of an electric storm.
- 10.1. ? The prominent display of adequate signs, warning against the use of radio transmitters, on all roads within 1000 ft of blasting operations. Whenever adherence to the 1000 ft distance would create an operational handicap, a competent and expert person shall be consulted to evaluate the particular situation, and an alternative provided, which are adequately designed to prevent any premature firing of electric blasting of caps. A description of any such blasting shall be reduced to writing and shall be certified as meeting the purposes of this subdivision by the competent person consulted. The description shall be maintained at the construction site during the duration of the work, and shall be available for inspection.
- 10.1 Empty boxes and paper and fiber packing materials, which have previously contained high explosives, shall not be used again for any purpose, but shall be destroyed by burning at an approved location.
- 10.1 Explosives, blasting agents and blasting supplies that are obviously deteriorated or damaged shall not be used.
- 10.1 Delivery and issue of explosives shall only be made authorized persons into authorized magazines or approved temporary storage or handling areas.