भारत हेवी इलेक्ट्रिकल्स लिमिटेड
(सार्वजनिक क्षेत्र का उपक्रम)
Bharat Heavy Electricals Limited
(A Public Sector Undertaking)
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BHEL PAN: AAACB4146P

**Ref:** BHE/PW/PUR/TLRPT-MM/2678 /Corg-01 Dt: 23/11/2022



**To,**

ALL BIDDERS

**Subject:** **Corrigendum-01**: Issuance of Revised HEALTH, SAFETY & ENVIRONMENT PLAN

**Tender Specification No: BHE/PW/PUR/TLRPT-MM/2678**

**Job Description:** THE WORK RECEIPT, UNLOADING, VERIFYING, SHIFTING, STACKING, PRESERVATION, HANDLING AND HANDING OVER OF COMPONENTS OF BOILER WITH AUXILIARIES INCLUDING MILLS & FEEDERS ETC.; ESP WITH AUXILIARIES, STEAM TURBINE & AUXILIARIES; TURBO-GENERATOR & AUXILIARIES; PUMPS WITH AUX., ROTATING MACHINES, TANKS & VESSELS, COMPLETE ELECTRICAL, CONTROLS AND INSTRUMENTATION EQUIPMENTS, PANELS, CABLES / CABLE TRAYS, AND OTHER RELATED ITEMS INCLUDING ITEMS OF BOILER, TG & BOP'S PACKAGES; HP&LP PIPING; REFRACTORY & INSULATION WITH CLADDING MATERIALS; BHEL T&P; COMPONENTS & EQUIPMENT OF VARIOUS OTHER SYSTEMS, PRE-FABRICATED STRUCTURES, STRUCTURAL & REINFORCEMENT STEEL, CEMENT AND PROVIDING SERVICES FOR MATERIALS MANAGEMENT AT **2X660 MW NTPC TALCHER ODISHA**

Bidders to kindly take note of the following:

**AA)** HEALTH, SAFETY & ENVIRONMENT PLAN has been revised and the same has been attached to this Corrigendum (REV02 Dtd:22/11/2022)

All other Terms and conditions of the Tender Specification shall remain unaltered unless expressly amended by BHEL in writing.

Bidders are requested to submit as a part of their offer, a copy of this corrigendum duly Digitally countersigned by the authorized signatory as a token of Bidder's unqualified acceptance of this corrigendum.

BIDDERS MAY PLEASE NOTE THAT SUBJECT TENDER IS E-TENDER AND THE OFFER IS TO BE SUBMITTED ONLY IN E-PROCUREMENT PORTAL→ **https://eprocurebhel.co.in**

BIDDERS WHO HAVE ALREADY SUBMITTED THEIR OFFERS PRIOR TO ISSUANCE OF THIS CORRIGENDUM IN E-TENDER PORTAL ARE REQUIRED TO RE-SUBMIT THEIR OFFER AFTER TAKING COGNIZANCE OF THIS CORRIGENDUM.

Thanking you,
Yours Sincerely,

GM (Purchase)

# BHARAT HEAVY ELECTRICALS LIMITED

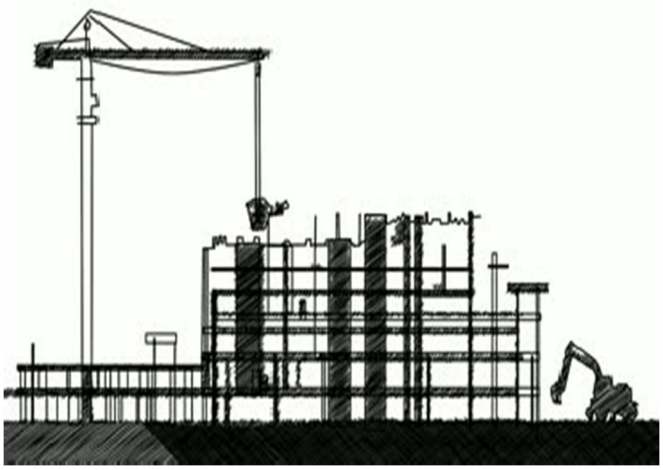
# HEALTH, SAFETY & ENVIRONMENT PLAN

*for*

## SITE OPERATIONS

*by*

## CONTRACTOR (HSEP14)



## 2X660 MW BHEL TALCHER PROJECT

# BHARAT HEAVY ELECTRICALS LIMITED
# POWER SECTOR WESTERN REGION

## HSE PLAN FOR SITE OPRATIONS BY BHEL CONTRACTORS AT A GLANCE

| BEFORE START |
|---|
| **SIGNING OF MOU** |
| Agree to comply to HSE requirement- Statutory and BHEL's |

| MANPOWER PLANNING | | | |
|---|---|---|---|
| **HSE ORGANISATION** | | | |
| **No. of Workers** | **No. of Safety Supervisors** | **No. of Safety Officers** | **HSE Roles and responsibilities** |
| Up to 100 | 1 | 1 | • Site In-charge- As per clause 7.3.2<br>• Safety officer- As per clause 7.3.4<br><br>**Qualification**<br>• As per Cl. 7.2 |
| 101 to 250 | 2 | 1 | |
| 251 to 500 | 4 | 1 | |
| 501 to 1000 | 6 | 2 | |
| 1000 to 2000 | 6+ One additional supervisor up toevery additional 250 workers | 3 | |
| 2000-3000 | 10+ One additional supervisor up to every additional 250 workers | 4 | |
| 3000-4000 | 14+ One additional supervisor up to every additional 250 workers | 5 | |
| Above 4000 | 18 + One additional supervisor up to every additional 250 workers | 5 + one safety officer up to addition 1000 workers | |

| HSE PLANNING |
|---|
| For Man, Machine / Equipment /Tools & Tackles |

| PROVIDE | |
|---|---|
| **HSE INFRASTUCTURE** | |
| • PPEs<br>• Drinking Water<br>• Washing Facilities<br>• Latrines and Urinals<br>• Provision of shelter for rest<br>• Medical facilities | • Canteen facilities<br>• Labor Colony<br>• Emergency Vehicle<br>• Pest Control<br>• Scrap yard<br>• Illumination |

| TRAINING | |
|---|---|
| **HSE TRAINING, AWARENESS & PROMOTION** | |
| **Training**<br>• Induction training<br>• Height work and other critical areas<br>• Tool Box talk & Pep Talk | **Awareness & Promotion**<br>• Signage<br>• Poster<br>• Banner<br>• Competition<br>• Awards |

| COMMUNICATION | |
|---|---|
| **HSE COMMUNICATION** | |
| **Incident Reporting**<br>• Accident- Fatal & Major<br>• Property damage<br>• Near Miss | **Event Reporting**<br>• HSE Celebrations<br>• HSE Training<br>• Medical camp<br>• Mock drill (Fire, Medical, emergency, height etc.) |

## EXECUTIVE SAFETY

**OPERATIONAL CONTROL PROCEDURES**

## PERMIT TO WORK

Height work (above 1.8 meters), Hot Work, Heavy Lifting, Confined Space, Radiography, excavation, Safety Facility Removal, Night / Holiday Work, Loading / Unloading, Lockout / Tag out, Alignment etc..

**SAFETY DURING WORK EXECUTION**

- Height work
- Welding
- Rigging
- Lifting
- Cylinder- storage & Movement
- Demolition work
- T&Ps
- Chemical Handling
- Electrical works
- Fire
- Scaffolding
- Working on Platform
- Excavation
- Ladder
- Hoisting appliance

**HOUSE KEEPING**

**WASTE MANGEMENT**

**TRAFFIC MANAGEMENT**

**ENVIRONMENTAL CONTROL**

**EMERGENCY PREPAREDNESS AND RESPONSE PLAN**

## HSE CHECKS

**HSE AUDITS & INSPECTION**

- Daily Checks
- Inspection of PPEs
- Inspection of T& Ps
- Inspection of Cranes & Winches
- Inspection of Height work
- Inspection of Welding and Gas cutting
- Inspection of elevators etc.

## HSE PERFORMANCE EVALUATION PARAMETER

## CONFEORMANCE

**PENALTY FOR NON CONFORMANCE**

**REFER FORMAT NO. HSEP:14-F14**

**INCREMENTAL PENALTY**

- For repeated violation by the same person, the penalty would be double of the previous penalty. The contractor will pay 2 times the penalty compared to previously paid in case there are repeated cases of fatal incidents under the same contractor for the same package in the same unit.
- Any additional penalty or any other penalty levied by the customer/ authorities on account of safety violations by the contractor shall be payable by the contractor.
- In case of non-fulfilment of mandatory / contractual HSE requirements, BHEL shall have the right to fulfil such requirements at the risk & cost of contractor with applicable overheads.

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# 1.0 PURPOSE

| | |
|---|---|
| **1.1** | The purpose of this HSE Plan is to provide for the systematics identification, evaluation, prevention and control of general workplace hazards, specific job hazards, potential hazards and environmental impacts that may arise from foreseeable conditions during installation and servicing of industrial projects and power plants. |
| **1.2** | This document shall be followed by Contractor for EPC scope at 2X660 MW Talcher Thermal Power Projects. In case customer specific documents are to be implemented, the same will be followed in conjunction with the document. |
| **1.3** | Although every effort has been made to make the procedure and guideline in line with statutory requirements, in case of any discrepancy relevant statutory guidelines or HSE contract requirements must be followed of which the most stringent shall apply. |
| **1.4** | We will promote and maintain a safe, healthy & environmentally complaint workplace for all employees, agency/ contractor, visitors and any others that may be affected by construction activities in line with BHEL HSE Policy may be displayed in its office and strive for a “GOAL TO ZERO RECORDABLE INCIDENTS” at project site. |
| **1.5** | In case the customer has any specific requirement, the same is to be fulfilled. Customer’s HSE Policy and local state/central HSE Rules will be part of HSE policy. |
| **1.6** | All safety rules & codes applied by the BHEL/ Customer as per the contract at site shall be ensured by the contractor and hence customers HSE policy and local state/ central HSE rules will be part of HSE policy. |
| **1.7** | Vendors have to comply requirements of HSE & Statutory requirement in line with BHEL HSE plan, NTPC Safety requirement, Odisha/BOCW/Central statutory requirement. |
| **1.8** | In case the customer has any specific requirement, the same is to be fulfilled. |

# 2.0 SCOPE

| | |
|---|---|
| **2.1** | **"HSE Plan for site operations by contractor"** is applicable to all the contractor/ agency / sub-contractor. In line with this **"BHEL general safety rule"** mention under **"HSE Plan for site operations by contractor"** for 2x660 mw NTPC Talcher EPC project. This **HSE plan** must be implemented in all work area including Dismantling, Material Management, Erection, Commissioning and Testing's, Civil work and Labor colony etc. for 2x660 mw NTPC Talcher Thermal Power Projects rating as per the relevant contractual obligations and provides the HSE requirements as per provision of contract to be followed at the Talcher project site. As an item of note, this HSE plan is considered a living document and will be revised as/if necessary to ensure contract and regulatory compliance requirements are met during the performance of work at 2x660 mw NTPC Talcher EPC project. |
| **2.2** | The document is applicable for BHEL's Agency/ contractors at all activities of BHEL Power Sector for 2X660 MW Talcher Thermal Power Projects as per the relevant contractual obligations. |

# 3.0 OBJECTIVES AND TARGETS

- **To achieve "Zero Incident at Site"**
- **100% PPEs compliance in high and medium risk activities.**
- **100% compliance to all legal/statutory requirements related to EHS.**
- **100% incident reporting, recording and reviewing for corrective actions.**
- **100% Health, Safety and Environmental Induction training attendance for all workers.**
- **Regular Safety Reviews to assess HSE program compliance and closure of any recognized gaps to improve safety management and incident prevention.**
- **100% High Risk activities to be carried out only after approved Method Statement, HIRA / Aspect-Impact / JSA / OCP and Permit to Work are implemented.**

| | |
|---|---|
| **3.1** | Prevent injury and ill health of all workers at site ('Workers' refers to all personnel including managerial, supervisory, professional, technical, clerical and other workers including contract laborers). |
| **3.2** | Prevent Pollution to environment as per ISO 14001:2015 (Environment Management System). |
| **3.3** | Ensure the Health and Safety of all persons at work site is not adversely affected by the work. |
| **3.4** | Ensure protection of environment of the work site. |
| **3.5** | Comply at all times with the relevant statutory and contractual HSE requirements. |
| **3.6** | Provide trained, experienced and competent personnel. Ensure medically fit personnel only are engaged at work. |
| **3.7** | Provide and maintain plant, places and systems of work that are safe and without risk to health and the environment. |
| **3.8** | Provide all personnel with adequate information, instruction, training and supervision on the safety aspect of their work. |
| **3.9** | Effectively control, co-ordinate and monitor the activities of all personnel on the Project sites including contractors in respects of HSE. |
| **3.10** | Establish effective communication on HSE matters with all relevant parties involved in the Project works. |
| **3.11** | Ensure that all work planning takes into account all persons that may be affected by the work. |
| **3.12** | Ensure fitness testing of all T&Ps. Lifting appliances like cranes, chain pulley blocks etc. are to be certified by competent authority. |
| **3.13** | Ensure timely provision of resources to facilitate effective implementation of HSE requirements. |
| **3.14** | Ensure continual improvements in HSE performance |
| **3.15** | Ensure conservation of resources and reduction of wastage |
| **3.16** | Capture the data of all incidents including near misses, process deviation etc. Investigate and analyze the same to find out the root cause. |
| **3.17** | Ensure timely implementation of correction, corrective action and preventive action. |

| | |
|---|---|
| **NOTE** | **A. The contractor shall also comply with HSE Targets/ Compliance stipulated by BHEL/ Customer from time to time.**<br>**B. BHEL install IP based CCTV system along with IP based announcement system which shall be used for monitoring safety during construction from Safety control room. It shall be possible to make announcements to alert the workers. Whenever required. These cameras shall be installed at all strategic locations in the plant area. This camera can be wired or wireless as per suitability at site. Initially these installations will be temporary & locations will keep on changing depending upon the work in progress. Drone based safety monitoring shall be done during day to day monitor of all construction activity at a close range.**<br>**C. Contractor shall take all necessary precautions to protect all the existing equipment, structures, facilities and buildings etc. from damage. In case any damage occurs due to the activities of the contractor on account of negligence, ignorance, accidental or any other reason whatsoever, the damage shall be immediately made good by the contractor at his own cost to the satisfaction of the Employer/ NTPC. The contractor shall also take all necessary safety measures with specific reference to excavation in rock, at his own cost, to avoid any harm or injury to his workers and staff from the equipment and facilities of the power plant.** |

# 4.0 REFERENCES

| | |
|---|---|
| **4.1** | Contract Documents |
| **4.2** | Relevant Legislations |
| **4.3** | BHEL Power Sector HSE Management System |
| **4.4** | BHEL to provide contractor hard / soft copies of all applicable HSE Procedures, Work Permits, Operational Control Procedures, Job Safety Analysis, Hazard Identification & Risk Assessment formats and any other instructions required to be followed by the contractors, as a minimum before commencing operations at site. These shall include, but not limited to:<br>i. HSE Procedures<br>ii. Method Statements<br>iii. JSA & HIRA Standard Format<br>iv. Operational Control Procedures<br>v. Work Permits<br>vi. Inspection & HSE Formats |
| **4.5** | Relevant Indian & international standards in case of any ambiguity in/ lack of procedure/ specifications. All these IS & BS standards must follow wherever applicable. |
| **NOTE** | **Contractor shall ensure availability and understanding of these requirements prior to commencing work at site. In case the statutory requirements i.e. State or Central Acts and / or applicable rules like the Building and Other Construction Workers' Regulation of Employment and Conditions of Service- Act,1996 or State Rules (wherever notified), the Factories Act, 1948 or Rules (wherever notified), etc. are more stringent than the requirements stipulated in this document, they shall be applicable.** |

## 5.0 BHEL HEALTH, SAFETY & ENVIRONMENT POLICY

In BHEL, Health, Safety and Environment (HSE) responsibilities are driven by our commitment to protect our employees and people we work with, community and environment. BHEL believes in zero tolerance for unsafe work/non-conformance to safety and in minimizing environmental footprint associated with all its business activities. We commit to continually improve our HSE performance by:

- Developing safety and sustainability culture through active leadership and by ensuring availability of required resources.
- Ensuring compliance with applicable legislation, regulations and BHEL systems.
- Taking up activities for conservation of resources and adopting sound waste management by following Reduce/Recycle/Reuse approach.
- Continually identifying, assessing and managing environmental impacts and Occupational Health & Safety risks of all activities, products and services adopting approach based on elimination/ substitution/reduction/control.
- Incorporating appropriate Occupational Health, Safety and Environment criteria into business decisions, design of products & systems and for selection of plants, technologies and services.
- Imparting appropriate structured training to all persons at workplace and promoting awareness amongst customers, contractors and suppliers on HSE issues.
- Reviewing periodically this policy and HSE Management Systems to ensure its relevance, appropriateness and effectiveness.
- Communicating this policy within BHEL and making it available to interested parties.

Chairman & Managing Director

**BHEL**

**5.1** **MEMORANDUM OF UNDERSTANDING:**

After award of work, contractors are required to enter into a memorandum of understanding as given below:

## Memorandum of Understanding

BHEL, Power Sector_____Region is committed to Health, Safety and Environment Policy (HSE Policy).

M/s (Contractor)_____do hereby also commit to comply with the same HSE Policy while executing the Contract Number _____

M/s_____have gone through and understood all the HSE requirements of the contract including HSE manpower, tools & equipment, systems & procedures, and agree to fulfill the same as a minimum. Any additional resources and support required for ensuring fulfillment of HSE Objectives shall be provided by contractor at no extra cost.

M/s_____agree that in case they fail to comply to the HSE requirements as stipulated in the contract, BHEL shall have the right to implement the same at the risk and cost of the contractor with applicable overheads.

M/s_____agree that delays on account of non-implementation of HSE requirements by contractor, incidents etc. shall not be attributed to BHEL.

M/s_____shall ensure that safe work practices as per the HSE plan. Spirit and content therein shall be imbibed in all workers and supervisors for compliance.

In addition to this, M/S_____shall comply to all applicable statutory and regulatory requirements which are in force in the place of project and any special requirement specified in the contract document of the principal customer.

M/s_____shall co-operate in HSE audits/inspections conducted by BHEL /customer/ third party and ensure to close any non-conformity observed/reported within prescribed time limit.

Signed by authorized representative of M/s ----------

Name:

Place & Date:

**5.2 TERMS & PROCEDURE FOR THE PAYMENT LINKED TO RA BILL FOR SAFETY**:

**There is an amount linked to each RA bill**. Contractor must fulfill all the details mention below to process the amount linked to RA bill for Safety aspect/ safety Rule/ Compliance etc.

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| I. | The amount linked to Safety Aspects/ compliance to Safety shall be paid in two parts, viz, |
| A | 10% amount (calculated as 0.1 Y of the service portion amount of RA bill) shall be linked to Fatal/Major Accidents, and |
| B | 90% amount (calculated as 0.9 Y of the service portion amount of RA bill) shall be linked to various Safety Aspects specified in HSE Plan for Site operation by Contractor. |
| **NOTE** | ( Amount linked to Safety Aspects/ Compliance to Safety specified in Price Schedule)<br>Y = ---------- X 100<br>(Total amount for construction/ Service Portion of the Contract, i.e. (Civil , Installation/ Erection, Structural Works etc.) |
| II. | While raising each RA Bill, Contractor shall claim Amount linked to Safety Aspects/ Compliance to Safety in such a manner that amount claimed is equal to Y% of the service portion (i.e. Civil/ Installation/ Erection/Structural Works etc.) of RA Bill. |
| III. | The amount as elaborated at para-A shall be withheld from first and second monthly RA bill of the respective quarter/three-month period and shall be released in part or full based on safety compliance duly certified by Project Manager and Safety-in-charge on quarterly basis. The amount for the entire quarter (i.e. RA bills raised during a 3-month period) shall be paid to the Contractors at the end of that three months' period along with 3rd/last RA Bill for the quarter/three months' period upon complying the following conditions: |

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| A. | Amount of RA bill linked to FATAL/ Major Accidents (0.1Y as mention at clause 5.2.I.A).<br>i) **No fatal injury** or accident-causing death in that three months' period.<br>And<br>ii) **No Major injury** or accident causing 25% or more permanent disablement to workmen or employees in that three-month period. Permanent disablement shall have the same meaning as indicated in The Workmen's Compensation Act' 1923 or IS 3786.<br>In case of any fatal injury or accident as elaborated above occurs during that three-month period, the stipulated amount (0.1Y) subject to minimum of **Rs 10 Lakh per fatality** shall be forfeited and shall not be payable to the contractor under the contract. In case, the amount to be deducted/forfeited exceeds the amount linked to Fatal/ Major Accidents, the same shall be recovered from remaining Amount (0.9Y) linked to Compliance of Safety Rules and/or any other payments immediately due to the contractor under the Contract. |

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| | | In case of any Major injury or accident causing **25%** or more permanent disablement to workmen/worker or employees occurs during that three-month period, **Rs 4 lakh per Major injury** shall be deducted from the amount (0.1Y) linked to Fatal/ Major Accidents and shall not be payable to the Contractor under the contract. In case, the amount to be deducted/forfeited exceeds the amount linked to Fatal/ Major Accidents, the same shall be recovered from remaining Amount (0.9Y) linked to Compliance of Safety Rules and/or any other payments immediately due to the Contractor under the Contract.<br><br>Further, in case, Contractor doesn't raise RA Bills in any three-month period/quarter and if any fatal injury and/or major accident takes place in that period, Construction Manager shall deduct the amount **[Rs 10 Lakh per fatality and Rs 4 lakh per Major injury]** pertaining to this particular quarter from his next RA bill/due payment. In case, the amount to be deducted/forfeited exceeds the amount linked to Safety, the same shall be recovered from any other payments immediately due to the contractor under the Contract.<br><br>The amount deducted/forfeited as 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. |
| | B | **Amount of RA Bill linked to Compliance of Safety Rules (0.9Y i.e. 90% of amount as elaborated as mention at clause 5.2.I).**<br><br>Aforesaid amount (on quarterly basis) shall be payable to Contractor in five equal parts under five heads as under:<br><br>**(i) Amount payable on deployment of required Safety Personnel**<br>One fifth of the amount specified at clause 5.2.III.B (calculated as 0.18Y of Service portion amount of RA Bill), on quarterly basis, shall be paid upon certification by Construction Manager in consultation with Safety dept. that required number of Safety personnel as per Clause 7.0 have been deployed. The aforesaid amount linked to deployment of requisite safety personnel shall be paid as under:<br><br>a) 50% of the amount referred at 5.2.III (i), for deployment of Safety Supervisors shall be paid on pro-rata basis depending upon the actual no. of Safety Supervisors deployed vis-à-vis actual requirement:<br><br>(Amount to be paid) = 0.09Y x Service portion of RA bill amount x (a/b)<br><br>Where 'a' is actual no. of Safety supervisors deployed.<br><br>And<br>'b' is required no. of Safety supervisors as per HSE Plan for site operation by contractor.<br><br>In case, actual no. of Safety supervisors deployed is more than requisite number (i.e. a/b is more than 1), the amount to be paid shall be restricted to 0.09Y. |

b) 50% of the amount referred at clause 5.2.III.B.(i), for deployment of Safety Officers shall be paid on pro-rata basis depending upon the actual no. of Safety Officers deployed vis-à-vis actual requirement:

(Amount to be paid) = 0.09Y x Service portion of RA bill amount x (a/b)

Where 'a' is actual no. of Safety Officers deployed
And
'b' is required no. of Safety Officers as per HSE plan for site operation by contractor. In case, actual no. of Safety Officers deployed is more than requisite number (i.e. a/b is more than 1), the amount to be paid shall be restricted to 0.09Y.

c) In case aforesaid requisite no. of Safety personnel are not deployed by contractor, amount not to be paid as calculated above for that particular quarter/three-month period shall be forfeited and shall not be payable to the contractor under the contract.

**(ii) Amount payable on providing requisite Personal Protective Equipment & Safety Equipment**

One fifth of the amount specified at Clause 5.2.III.B (calculated as 0.18Y of Service portion amount of RA Bill), on quarterly basis, shall be paid upon certification by Construction Manager in consultation with Safety dept. that contractor has adhered to the requirements of Clause 8.7 (Personal Protective Equipment).

In case of non-compliance by contractor, warning letter/Noncompliance shall be issued by Construction Manager /Safety Officer of BHEL. Further, if more than two such warning letters/Non Compliance Memos are issued in a quarter/three monthly period, above mentioned amount for that particular quarter/three-month period shall be forfeited and shall not be payable to the contractor under the contract.

**<u>Note:-</u> The agency should ensure sufficient inventory of personal protective equipment (PPEs) prior to initial mobilization. After identifying the need of the required PPEs for various activities performed at the site, an additional inventory of approx. 20% of required PPEs should be maintaining during the execution of the work. If sub agency fail to provide the PPEs to worker the same may be issued by BHEL and cost for the PPEs debited to the Sub agency from regular RA Bill with 30 % overhead charges.**

**(iii) Amount payable on providing requisite Safety Induction and Training**

One fifth of the amount specified at Clause 5.2.III.B (calculated as 0.18Y of Service portion amount of RA Bill), on quarterly basis, shall be paid upon certification by Construction Manager in consultation with Safety dept. that contractor has adhered to the requirements of imparting Safety training as per Clause 9.0 (HSE Training &

Awareness) to at least 90% of its employees/workmen (who have not been previously provided with requisite training) in a quarter/ three months' period. In case contractor fails in meeting the aforesaid requirement, above mentioned amount for that particular quarter/three-month period shall be forfeited and shall not be payable to the contractor under the contract.

**(iv) Amount payable on providing requisite Medical and First Aid Amenities**

One fifth of the amount specified at clause 5.2.III.B (calculated as 0.18Y of Service portion amount of RA Bill), on quarterly basis, shall be paid upon certification by Construction Manager in consultation with Safety dept. that contractor has adhered to the requirements of Clause 8.8.5 (i.e. Medical Facilities & First Aid Amenities). In case contractor fails to provide Medical Facilities and First aid amenities as per requirement of aforesaid Clause 8.8.5 even on one incidence in any quarter/three-month period, above mentioned amount for that particular quarter/three-month period shall be forfeited and shall not be payable to the contractor under the contract.

**(v) Amount payable on compliance to Work Permit System**

One fifth of the amount specified at Clause 5.2.III.B (calculated as 0.18Y of Service portion amount of RA Bill), on quarterly basis, shall be paid upon certification by Construction Manager in consultation with Safety dept. that contractor has adhered to the requirements of Clause 11.2 (i.e. Work Permit System). In case of non-compliance by contractor, warning letters/Non Compliance Memos shall be issued by Construction Manager/ Safety Officer of BHEL. In case of issuance of more than two such warning letters/Non Compliance Memos in a quarter/three monthly period, above mentioned amount for that particular quarter/three-month period shall be forfeited and shall not be payable to the contractor under the contract.

IV. **In case 'Amount linked to Safety Aspects / compliance to HSE Plan for site operation by contractor' is less than 1 % of the cumulative total of Service Portion of the Contract, i.e. Civil/ Installation/ Erection /Structural Works etc.,** the amount by which it is lower shall be retained proportionately from the other components of RA Bill while releasing payments of each RA bill. No interest shall be payable on the amounts linked to Safety Aspects / Compliance to HSE Plan for Site operation by contractor including aforesaid retained amount. The amounts linked to Safety Aspects / Compliance to HSE Plan for site operation by contractor including aforesaid retained amount shall be payable in part or full based on safety compliance duly certified by Construction Manager and Safety-in-charge on quarterly basis.

V Amount withheld from one package against Safety/ HSE in line with procedures & modalities mentioned in this plan will never be less than the amount withheld by customer/ NTPC against Safety/ HSE from BHEL in that package.

# 6.0 TERMS & DEFINITIONS

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| **6.1** | **SAFETY WALK: -**<br>It's conducted periodically by an official - it's a walk through a portion or whole of a site as a HSE officer who notes down HSE observations, speak to concerned workmen and supervisor on observation, get the same corrected with personal follow up- this sends out a strong message on Management's commitment to safety. |
| **6.2** | **BUILDING OR OTHER CONSTRUCTION WORK: -**<br>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. |
| **6.3** | **BUILDING WORKER: -**<br>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. |
| **6.4** | **ESTABLISHMENT: -**<br>Establishment means an establishment who or which employs building workers in any building or construction work, and includes an establishment belonging to a contractor. |
| **6.5** | **CONTRACTOR: -**<br>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 contractor or any other agency engaged on his behalf. |
| **6.6** | **EMPLOYER: -**<br>Employer in relation to an establishment, means the owner thereof that is the contractor himself. |
| **6.7** | **COMPETENT PERSON: -**<br>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. |
| **6.8** | **DANGER: -**<br>Danger means danger of accident or of injury or danger to health. |

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| **6.9** | **HAZARD: -**<br>Hazard means danger or potential danger. |
| **6.10** | **HAZARDOUS SUBSTANCE: -**<br>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; |
| **6.11** | **HAZARDOUS PROCESS: -**<br>Hazardous Process comprises roof work, steel erection, and work under and over water, demolition and work in confined space etc. |
| **6.12** | **NATIONAL STANDARD/ INDIAN STANDARD: -**<br>National Standard/ Indian 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. |
| **6.13** | **LIFTING APPLIANCE: -**<br>Lifting Appliance means a crane, hoist, derrick, winch, jack, pulley block etc. or other equipment used for lifting materials, objects or building workers etc. |
| **6.14** | **LIFTING GEAR: -**<br>Lifting gears means ropes, chains, hooks, slings and other accessories of a lifting appliance etc. |
| **6.15** | **SAFE OPERATING PRACTICE: -**<br>Safe operating practice/ method statement/ operating control procedure 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:<br>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. |
| **6.16** | **SAFE WORKING LOAD: -**<br>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. |
| **6.17** | **INCIDENT: -**<br>Work- related or natural event(s) in which an injury, or ill health (regardless of severity), damage to property or fatality occurred, or could have occurred. |

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| **6.18** | **NEAR MISS: -**<br><br>An incident where no ill health, injury, damage or other loss occurs, but it had a potential to cause is referred to as “Near-Miss”. |
| **6.19** | **MAN-HOURS WORKE: -**<br><br>The total number of man hours worked by all employees including contractors working in the premises. It includes managerial, supervisory, professional, technical, clerical and other workers including contract labors. Man-hours worked shall be calculated from the payroll or time clock recorded including overtime. When this is not feasible, the same shall be estimated by multiplying the total man-days worked for the period covered by the number of hours worked per day. The total number of workdays for a period is the sum of the number of men at work on each day of period. If the daily hours vary from department to department separate estimate shall be made for each department and the result added together. |
| **6.20** | **FIRST AID CASES: -**<br><br>First aids are not essentially all reportable cases, where the injured person is given medical treatment and discharged immediately for reporting on duty, without counting any lost time. |
| **6.21** | **LOST TIME INJURY: -**<br><br>Any work injury which renders the injured person unable to perform his regular job or an alternative restricted work assignment on the next scheduled work day after the day on which the injury occurred. |
| **6.22** | **MEDICAL CASES: -**<br><br>Medical cases come under non-reportable cases, where owing to illness or other reason the employee was absent from work and seeks Medical treatment. |
| **6.23** | **TYPE OF INCIDENTS & THEIR REPORTING: -**<br><br>**i) Non-Reportable Cases:**<br><br>An incident, where the injured person is given medical help and discharged for work without counting any lost time.<br><br>**ii) Reportable Cases:**<br><br>In this case the injured person is disable for 48 hours or more and is not able to perform his duty.<br><br>**iii) Injury Cases:**<br><br>These are covered under the heading of non-reportable cases. In these cases the incident caused injury to the person, but he still continues his duty. |
| **6.24** | **TOTAL REPORTABLE FREQUENCY RATE: -**<br><br>Frequency rate is the number of Reportable Lost Time Injury (LTI) per one Million Man hours worked. Mathematically, the formula read as: |

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| | (Number of Reportable LTI x 1,000,000) / Total Man Hours Worked |
| **6.25** | **SEVERITY RATE: -**<br>Severity rate is the Number of days lost due to Lost Time Injury (LTI) per one Million Man hours worked. Mathematically, the formula reads as:<br>(Days lost due to LTI x 1,000,000) / Total Man Hours Worked |
| **6.26** | **INCIDENCE RATE: -**<br>Incidence Rate is the Number of LTI per one thousand manpower deployed. Mathematically, the formula reads as:<br>(Number of LTIx1000) /Average number of manpower deployed |
| **6.27** | **PERSONAL PROTECTIVE EQUIPMENT (PPE): -**<br>PPEs 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. |

# 7.0 HSE ORGANIZATION

**7.1** **Deployment:** The contractor should deploy sufficient HSE Officers and HSE Supervisors/ Stewards, as per requirement given above, since initial stage and add more in proportion to the added strength in work force.

**The schedule of requirement of safety personnel is given below.**

| No. of Workers | No. of Safety Supervisors | No. of Safety Officers |
|---|---|---|
| Up to 100 | 1 | 1 |
| 101 to 250 | 2 | 1 |
| 251 to 500 | 4 | 1 |
| 501 to 1000 | 6 | 2 |
| 1000 to 2000 | 6+ One additional supervisor up toevery additional 250 workers | 3 |
| 2000-3000 | 10+ One additional supervisor up toevery additional 250 workers | 4 |
| 3000-4000 | 14+ One additional supervisor up toevery additional 250 workers | 5 |
| Above 4000 | 18 + One additional supervisor upto every additional 250 workers | 5 + one safety officer up to addition 1000 workers |

**7.2** **MINIMUM QUALIFICATION & EXPERIENCE REQUIREMENTS OF HSE PERSONNEL**

| 1. HSE Officer | 2. HSE Supervisor | 3. HSE Steward |
|---|---|---|
| **A.**<br>i. Recognized degree in any branch of Engg. or Tech. or Architecture with practical experience of working in a building or other construction work in supervisory capacity for a period of not less than two years,<br>or<br>Recognized diploma in any branch of Engg. or Tech with practical experience of working in a building or other construction work in supervisory capacity for a period of not less than five years. | (i) Possesses recognized degree in any branch of Engineering. **OR**<br>(ii) Diploma in any branch of Engineering with at least one-year construction experience.<br>a. Should possess requisite skills to deal with construction | **1. Class XII pass certificate and**<br>**2. Trained in fire-fighting as well as in safety / occupational health related subjects, with:** |

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| | | ii. Recognized degree or diploma in Industrial safety<br>iii. (Preferably) have adequate knowledge of the language spoken by majority of the workers at the construction site. | safety & fire related day-to-day issues. | **a. Minimum two year of practical experience in constructio n work environme nt and**<br>**b. Should have adequate knowledge of the local language spoken by majority of the workers at the construction site.** |
| | | **Alternatively**: **B.**<br>Graduation Degree in Science with Physics & Chemistry and degree or diploma in Industrial Safety (from any Indian institutes recognized by AICTE or State Council of Tech. Education of any Indian State) with practical experience of working in a building, plant or other construction works (as Safety Officer, in line with Indian Factories Act, 1958) for a period of not less than five years. | | |
| **7.2.1** | **Appointment of Safety Officer/ Safety Supervisor/ Safety Steward: -**<br>Each contracting Agency shall provide a sufficient number of qualified, suitable and experienced persons to manage all safety related matter on Site relating to the works. Irrespective of manpower employed by the agency whether temporary, casual, and probationer, regular or permanent or on contract, Agency shall deploy a qualified Safety Officer/executive, responsible for carrying out the safety management programme before start of the work. | | | |
| **7.2.2** | Safety Steward min. 05 Nos shall be deployed for each package. | | | |
| **7.2.3** | **AVAILABILITY AND PENALTY FOR NON-DEPLOYMENT:**<br>In case contractor fails to employ the required safety professionals, the department may at the cost and risk of the contractor deploy additional/required safety professionals. The cost incurred towards this shall be deducted from contractor's bill at following the rates or actual whichever is higher.<br>**1. Safety Engineer Rs. 1500/day.**<br>**2. Safety Supervisor Rs. 1000/day.** | | | |
| **7.3** | **RESPONSIBILITIES FOR IMPLEMENTATION OF SAFETY RULES:-**<br>**HSE - A LINE RESPONSIBILITY**<br>• HSE is a Line Responsibility.<br>• The term "Line" includes management, Executives, Supervisors, Foremen, and Workers who are part of the workforce. Line is to be fully involved in HSE Planning & Implementation with the aid and advice of HSE organization. | | | |

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| | • Line, having control of resources and manpower is responsible for action on the HSE non-conformities reported by the HSE personnel.<br>• HSE organization should play a supporting role to line management and should work closely with them on executing HSE Planes) all together. |
| **7.3.1** | **SAFETY RULES** |
| **1** | 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. |
| **2** | All equipment's 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 equipment's 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. |
| **3** | The Contractors shall provide suitable latest Personal Protective Equipment's of prescribed standard to all their employees and workmen according to the need. The Engineer I/c shall have the right to examine this safety equipment's to determine their suitability, reliability, acceptability and adaptability. The contractor should also ensure these before their use at worksite. |
| **4** | 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 guards 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. |
| **5** | The Contractor shall follow and comply with all the Safety Rules, standards, code of practices of BHEL 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 BHEL safety documents as stated above. |
| **6** | 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). |
| **7** | 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 OR Annexure 2-Details & Contents of First Aid Box as per Contract Labor (Regulation & Abolition Act), Central Rules, 1971 whichever is applicable to site 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. |

| 7.3.2 | **SITE IN-CHARGE OF CONTRACTOR** |
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| **1** | Shall sign Memorandum of Understanding (MoU) for compliance to BHEL's HSE Plan for Site Operations as per clause 5.1 |
| **2** | Shall engage (HSE Organization) qualified safety officer(s), supervisor(s) and steward (s) as per clause 7.0 and their sub clause. |
| **3** | Shall adhere to the rules and regulations mentioned in this code, practice very strictly in his area of work in consultation with his concerned engineer and the safety coordinator. |
| **4** | Shall screen all workmen for health and competence requirement before engaging for the job and periodically thereafter as required. |
| **5** | Shall not engage any employee below 18 years. |
| **6** | Shall ensure that all T&Ps engaged are tested for fitness and have valid certificates from competent person. |
| **7** | Shall ensure closure of all HSE non-conformities reported by BHEL or observed during internal inspection by providing appropriate resources in a timely manner. |
| **8** | Shall ensure that provisions stipulated in contract Labor Regulation Act 1970 for canteen, rest rooms/washing facilities to contracted employees at site. |
| **9** | Shall adhere to the instructions laid down in Operation Control Procedures (OCPs) available with the site management. |
| **10** | Shall ensure that person working above 1.8 meter should use Safety Harness tied to a life line/stable structure. |
| **11** | Shall ensure that materials are not thrown from height. Cautions to be exercised to prevent fall of material from height. |
| **12** | Shall report all incidents (Fatal/Major/Minor/Near Miss) to the Site engineer / HSE officer of BHEL. |
| **13** | Shall ensure that Horseplay is strictly forbidden. |
| **14** | Shall ensure that adequate illumination is arranged during night work. |
| **15** | Shall ensure that all personnel working under contractor are working safely and do not create any Hazard to self and to others. |
| **16** | Shall ensure display of adequate signage/posters on HSE. |
| **17** | Shall ensure that mobile phone is not used by workers while working. |
| **18** | Shall ensure conductance of HSE audit, mock drill, medical camps, induction training and training on HSE at site. |
| **19** | Shall ensure full co-operation during HQ/External /Customer HSE audits. |
| **20** | Shall ensure submission of look-ahead plan for procurement of HSE equipment's and PPEs as per work schedule. |
| **21** | Shall ensure good housekeeping. |
| **22** | Shall ensure adequate valid fire extinguishers are provided at the work site. |
| **23** | Shall ensure availability of sufficient number of toilets /restrooms and adequate drinking water at work site and labor colony. |
| **24** | Shall ensure adequate emergency preparedness. |

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| **25** | Shall be member of site HSE committee and attend all meetings of the committee |
| **26** | Power source for hand lamps shall be maximum of 24 v. |
| **27** | Temporary fencing should be done for open edges if Hand – railings and Toe-guards are not available |
| **28** | To record all incidents including near miss and report to BHEL and to ensure analysis & corrective actions for the same |
| **29** | Shall conduct weekly Safety Walks in the work area. |
| **7.3.3** | **SITE HSE COMMITTEE** |
| **1** | **Site HSE/ Safety committee** shall be formed within each contracting agency comprising of worker representatives with equal no. of management representatives as per the provisions of BOCW Act/rules. This committee in each agency shall meet at least once in every month. The safety officer of the concerned agency shall coordinate these meetings. BHEL/ NTPC Safety officer shall be special invitee for Safety Committee meetings. The safety committee functioning shall be in line with the provisions of BOCW Act/Rules. |
| **2** | Apart from the above, each agency shall organize safety meetings every day before start of day's work to educate & motivate the workers about the necessity of safety. Case study of accident/ incident can be shared in these meetings. |
| **3** | The contractor shall also regularly organize safety meetings for all job supervisors/foremen. |
| **4** | Weekly meeting with contractors Safety Officers to be organized by safety department of BHEL/ NTPC and minutes to be recorded, circulated and compliance status to be checked on regular basis. |
| **5** | Site HSE committee shall consist of BHEL Construction Manager (Chairman), Site BHEL HSE coordinator (Secretary/Convener), BHEL HOS (Member), Site In charge of contractor (Member) and Safety officer of contractor (Member). |
| **6** | Shall evaluate a suitable course of action for the effective implementation of safety system & procedures. Committee will also ensure that all the relevant codes & acts / rules are followed. |
| **7** | Shall meet monthly and as and when required, to discuss ways and means to eliminate unsafe acts/condition. |
| **8** | Shall monitor the performance of the HSE programs and suggest improvements as required. |
| **9** | Shall discuss exception points relating to HSE Audits, sub-contractor HSE practices, incident reports, near miss reports, etc. |
| **10** | Shall analyze the high risk activities to be undertaken in the near future to identify hazards and decide on the control measures to be taken. |
| **11** | Shall inspect the site on regular intervals to locate unsafe conditions with reference to the inspection checklist. |
| **12** | Shall investigate all incidents and strengthening the safety programme by additional precautions, if any based on the incident investigate. |
| **7.3.4** | **HSE OFFICER/ INCHARGE OF CONTRACTOR** |
| **1** | Carry out safety inspection of Work Area, Work Method, Men, Machine & Material, P&M and other tools and tackles. |
| **2** | Facilitate inclusion of safety elements into Work Method Statement. |

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| **3** | To prepare deployment plan of HSE personnel for all shifts, so as to ensure constant supervision of all areas. The plan to be submitted to BHEL. |
| **4** | Highlight the requirements of safety through Tool-box / other meetings. |
| **5** | Help concerned HOS to prepare Job Specific instructions for critical jobs. |
| **6** | Conduct investigation of all incident/dangerous occurrences & recommend appropriate safety measures. |
| **7** | Advice & co-ordinate for implementation of HSE Systems & Procedures. |
| **8** | To stop work in case of any critical safety violation until the violation is cleared |
| **9** | Convene HSE meeting & minute the proceeding for circulation & follow-up action. |
| **10** | Plan procurement of PPE & Safety devices and inspect their healthiness. |
| **11** | Report to BHEL on all matters pertaining to status of safety and promotional program at site level. |
| **12** | Facilitate administration of First Aid |
| **13** | Facilitate screening of workmen and safety induction. |
| **14** | Conduct fire Drill and facilitate emergency preparedness |
| **15** | Design campaigns, competitions & other special emphasis programs to promote safety in the workplace. |
| **16** | Apprise BHEL on safety related problems. |
| **17** | Notify site personnel non-conformance to safety norms observed during site visits / site inspections. |
| **18** | Recommend to Site In charge, immediate discontinuance of work until rectification, of such situations warranting immediate action in view of imminent danger to life or property or environment. |
| **19** | To decline acceptance of such PPE / safety equipment that do not conform to specified requirements. |
| **20** | Encourage raising Near Miss Report on safety along with, improvement initiatives on safety. |
| **21** | Shall work as interface between various agencies such customer, package-in-charges, contractors on HSE matters |
| **22** | The contractor shall submit the certificates of qualification & experience of HSE manpower at least 10 days before deployment for BHEL to assess suitability as per requirement detailed in this document. |
| **23** | The deployment of HSE personnel shall be part of payment terms |
| **24** | BHEL shall have the right to reject in case of any deviation. In case of rejection, contractor shall arrange suitable candidates as a replacement and submit resume to BHEL. Penalties will be applicable during the period of non-deployment in such cases as well. |

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| **25** | At any point of time (incase contractor is not deployed HSE officer), BHEL shall have the right to deploy the required HSE manpower at the risk and cost of contractor with applicable overheads at market determined rates with applicable overheads. |
| **26** | In such cases also, the provision of logistics, transportation, food and other logistical support to the HSE personnel shall be in the scope of contractor in addition to the salary. |
| **27** | Contractor shall ensure physical availability of safety personnel at the place of specific work locations. No work shall be started at any of the project sites until above safety personnel & concerned Site Engineer of contractor are physically deployed at site. |
| **28** | The Contractor shall prepare an organization chart identifying the areas of operations, responsibilities and reporting structure of all safety personnel for each shift and submit the same to BHEL. |
| **29** | Blood Alcohol test must be performed regularly/ daily basis by contractor Employee/ designated worker to ensure safe working environment at project site. In case of any employees or workers observed that they consume alcohol, same are not allowed at project site for the day. |
| **7.3.5** | **HSE RESPONSIBILITIES OF HSE SUPERVISOR OF CONTRACTOR** |
| **1** | All requirements as per 7.3.1 (Safety Rules) and their sub clause. |
| **2** | To assist Safety officer |
| **7.3.6** | **HSE RESPONSIBILITIES OF ALL EMPLOYEES (INCLUDING ABOVE)** |
| **1** | To be aware of, get involved in and ensure implementation of all HSE related Systems and Procedures including but not limited to:<br>a. BHEL HSE Management System including HSE Procedures and OCPs<br>b. Work Permit System<br>c. Emergency Preparedness Response Plans<br>d. Contractual HSE requirements<br>e. Legal Requirements<br>f. Penalty System<br>g. Training requirements |
| **2** | To ensure that the persons engaged in respective area follow the safety rules like using appropriate PPEs. |
| **3** | To record all incidents including near miss and report to BHEL. |
| **4** | To adopt safe working practices at all times and act as role model for Safety |
| **5** | To take immediate corrective action in case any non-conformity is observed on product / process / system with respect to Occupational Health, Safety and Environment. |
| **6** | In case any particular activity / work has extremely high consequential risk or high environmental impact, same shall be brought to the notice of BHEL Package In-charge before starting the work. |
| **7** | To interfere/ stop work as & when identified unsafe. |
| **8** | To maintain & promote improved level of house-keeping all the time at site. |
| **9** | To support/co-operate with audit team members as & when safety audits are carried out. |
| **10** | To involve in investigation, if any incident occurs in his work area. |

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| **11** | To participate in safety promotional programmes |
| **12** | To attend the safety committee meeting, if member/invitee |
| **13** | To ensure that only fit T&Ps and qualified persons are engaged for all activities. |
| **14** | Shall ensure that person working above **1.8 meter** should use Safety Harness tied to a life line/stable structure. |
| **15** | Shall ensure that materials are not thrown from height. Cautions to be exercised to prevent fall of material from height. |
| **16** | Shall ensure that all T&Ps engaged are tested for fitness and have valid certificates from competent authorities. |
| **7.3.7** | **HSE RESPONSIBILITIES OF SUB CONTRACTOR WORKERS:** |
| **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 for work that has been assigned to the contractor. |
| **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 agency or BHEL or BHEL or other person in authority; |
| **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, lifesaving 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; |
| **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; |
| **5** | Workers shall use such means of access and egress for going to and exiting from the workplace as provided. |
| **6** | All worker must ensure that they are not consume alcohol during Working hours or under work/ plant premises. |
| **7.3.8** | **PUNITIVE ACTIONS ON WORKERS AND EMPLOYEES FOR "CRITICAL SAFETY VIOLATIONS"** |
| | **"CRITICAL SAFETY VIOLATIONS"** |
| **1** | Not wearing required PPEs when provided and not following safe work procedure |
| **2** | Taking unnecessary risks especially in height work, hot work, radiation work, lifting activity |
| **3** | Coming to work under influence of sedatives like alcohol, drugs etc. |
| **4** | Coming to work without ID Card/ Gate Pass (if provided) |
| **5** | Smoking in work area. |
| **6** | Bringing arms or firearms to work. |
| **7** | Intimidating/ threatening at work |
| **8** | Using cell phones during height work, hot work, lifting activity, driving |

In case any worker/ employee carries out any of the critical safety violations as above, punitive action shall be ensured in following manner:

| First Offence | Second Offence | Third Offence | Fourth Offence |
|---|---|---|---|
| Warning letter to be issued with HSE orientation training of 1 hour. | Warning letter to be issued with HSE orientation training of 2 hours and 1st Punch on Gate Pass. | Warning letter to be issued with HSE orientation training of 2 hours and to be sent on 2 days' unpaid leave and 2nd Punch on Gate Pass. | 3rd Punch on Gate Pass and Worker/ Employee to be dismissed. Gate Pass to be confiscated. |

**Note:** For above violations, guilt of the worker/ employee has to be established.
If worker/ employee has not been given the required PPEs and safety equipment by the agency and/or not facilitated by the agency to follow safety rules, he/ she will not be considered liable but the agency will be penalized as per penalty provision in this document. In such cases, the contractor shall not pass the penalty over to the worker/ employee through wage deduction etc.
These critical safety violations and their consequences shall be shared with all workers and employees during induction and other training programmes / meetings etc.

**Note:**

a. Gate Pass shall have provision of Punching as indicated above.
b. Warning Letters shall contain documentary proof and signature of erring worker/ employee, contractor safety officer and BHEL Safety Officer, and shall be approved by and submitted to Contractor site in-charge by BHEL Package In-charge.
c. The appellate authority in this case shall be the BHEL Site In-charge whose decision shall be final on the matter and binding on all parties.

# 8.0 HSE PLANNING BY CONTRACTOR

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| **8.1** | **IDENTIFYING HAZARDS / RISKS & ASPECTS / IMPACTS AND PLANNING CONTROL MEASURES** |
| **1** | Contractor shall identify all OHS Hazards and Risks applicable to all activities in scope throughout the duration of the job as per HSEP01: HSE Procedure for Register of OHS Hazards and Risks, and plan & implement the required control measures. |
| **2** | Contractor shall identify all Environmental Aspects and Impacts applicable to all activities in scope throughout the duration of the job as per HSEP02: HSE Procedure for Register of Environmental Aspects and Impacts, and plan & implement the control measures. |
| **3** | The procedures referred above are for reference purposes only, shall be tailored to the requirements of the activities in the contract, and shall cover all activities throughout the duration of the task. |
| **4** | These registers shall be reviewed:<br>a. At fixed frequency of 3 months<br>b. Addition/ deletion/ modification of a process/ activity<br>c. After an accident/ incident |
| **NOTE** | **Contractor shall ensure availability and understanding of these requirements prior to commencing work at site. In case the statutory requirements i.e. State or Central Acts and / or applicable rules like the Building and Other Construction Workers' Regulation of Employment and Conditions of Service- Act,1996 or State Rules (wherever notified), the Factories Act, 1948 or Rules (wherever notified), etc. are more stringent than the requirements stipulated in this document, they shall be applicable.** |
| **8.2** | **REGISTER OF REGULATIONS** |
| | Contractor shall prepare a register of applicable rules and regulations in the scope as per HSEP03: HSE Procedure for Register of Regulations and plan to ensure compliance. These registers shall be submitted to BHEL at least 10 days prior to start of work at site and shall be reviewed:<br>a. At a fixed frequency of 3 months<br>b. After any change in applicable rules/ regulations/ laws |
| **8.3** | **MONTHLY HSE PLANNING & REVIEW:** |
| | Monthly planning and review of HSE activities shall be carried out by contractor as per format No. HSEP: 14-F30 jointly along with B (Register of regulation). |
| **8.4** | **MOBILISATION OF MACHINERY/EQUIPMENT/TOOLS BY CONTRACTOR** |
| 1 | As a measure to ensure that machinery, equipment and tools being mobilized to the construction site are fit for purpose and are maintained in safe operating condition and |

<table>
<tr><td></td><td>complies with legislative and owner requirement, periodic inspection shall be arranged by in-house competent authority for acceptance as applicable.<br><br>Inspection by Third Party competent person shall be arranged:<br><br>a. Before first time use at site<br><br>b. After carrying out any modification<br><br>c. After repairs subsequent to involvement in any accident/ incident.<br><br>The machinery and equipment to be covered shall include but not limited to the following:<br><br>
<table>
<tr>
<td>▪ Mobile cranes.<br>▪ Side Booms.<br>▪ Forklifts.<br>▪ Grinding machine.<br>▪ Drilling machine.<br>▪ Air compressors.<br>▪ Man lifter<br>▪ Seissor lift</td>
<td>▪ Welding machine.<br>▪ Batching Plants<br>▪ Generator sets.<br>▪ Dump Trucks.<br>▪ Excavators.</td>
<td>▪ Dozers<br>▪ Grit Blasting Equipment.<br>▪ Hand and power tools.<br>▪ Lifts</td>
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</td></tr>
<tr><td>2</td><td>Contractor shall notify the engineer, of his intention to bring on to site any equipment or any container, with liquid or gaseous fuel or other substance which may create a hazard. The Engineer shall have the right to prescribe the condition under which such equipment or container may be handled and used during the performance of the works and the contractor shall strictly adhere to such instructions. The Engineer shall have the right to inspect any construction tool and to forbid its use, if in his opinion it is unsafe. No claim due to such prohibition will be entertained.</td></tr>
<tr><td>8.5</td><td>MOBILISATION OF MANPOWER BY CONTRACTOR</td></tr>
<tr><td>1</td><td>The contractor shall arrange induction and regular health check of their employees as per schedule VII of BOCW rules by a registered medical practitioner.</td></tr>
<tr><td>2</td><td>The contractor shall take special care of the employees affected with occupational diseases under rule 230 and schedule II of BOCW Rules. The employees not meeting the fitness requirement should not be engaged for such job.</td></tr>
<tr><td>3</td><td>Ensure that the regulatory requirements of excessive weight limit (to carry/lift/ move weights beyond prescribed limits) for male and female workers are complied with.</td></tr>
<tr><td>4</td><td>Appropriate accommodation to be arranged for all workmen in hygienic condition.</td></tr>
<tr><td>8.6</td><td>START UP, COMMISSIONING & TESTING<br><br>There are various activities involved prior to commissioning- the major ones not limited to - Hydraulic Test, Steam Blowing, charging of transformers, Boiler Light Up, Rolling and Synchronization and Full loading of unit etc. These activities shall be personally supervised by the site executive along with the commissioning engineer. The readiness of upstream and downstream system shall be ensured before taking up. These shall be handled strictly by the authorized persons only and the team shall be suitably briefed about the activity including hazards & risks involved and control plan by the concerned executive-in-charge before start.</td></tr>
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| | Entry of persons to the area of activity shall be suitably restricted and the emergency functions like Ambulance, first aid centre and Fire station shall be intimated about the plan well in advance. Lock-out/ Tag-out shall be in place while charging transformer and whenever necessary. Electricians with valid wiremen license only shall be permitted to work on power lines. The area and the passage shall be adequately illuminated. |
| **8.7** | **PROVISION OF PPEs** |
| **1** | Safety Equipment and Devices shall be ensured a per Annexure 1 |
| **2** | Personnel Protective Equipment (PPEs), in adequate numbers, will be made available at site & their regular use by all concerned will be ensured |
| **3** | The following matrix recommends usage of minimum PPEs against the respective job. |

| **S. No** | **Type of work** | **PPEs** |
|---|---|---|
| 1 | Concrete and asphalt mixing | Nose mask, hand glove, apron and gum boot |
| 2 | Welders/Grinders/ Gas cutters | Welding/face screen, apron, hand gloves, nose mask and ear muffs if noise level exceeds 90dB. Helmet fitted with welding shield is preferred for welders |
| 3 | Stone/ concrete breakers | Ear muffs, safety goggles, hand gloves |
| 4 | Electrical Work | Rubber hand glove, Electrical Resistance shoes |
| 5 | Insulation Work | Respiratory mask, Hand gloves, safety goggles |
| 6 | Work at height | Double lanyard full body harness, Fall arrestor (specific cases) |
| 7 | Grit/Sand blasting | Blast suit, blast helmet, respirator, leather gloves |
| 8 | Painting | Plastic gloves, Respirators (particularly for spray painting) |
| 9 | Radiography | As per BARC guidelines |

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| **4** | The PPEs shall conform to the relevant standards (ISI mark) as per Annexure 6 - Indicative List of Indian Standard Codes for Safety |
| **5** | Where workers are employed in sewers and manholes, which are in use, the contractor shall ensure that the manhole covers are opened and ventilated at least for an hour before the workers are allowed to get into manhole, and the manholes so opened shall be cordoned off with suitable railing and provided with warning signals or boards to prevent incident to the public. |
| **6** | Besides the PPEs mentioned above, the persons shall use helmet and safety shoe. The visitors shall use Helmet and any other PPEs as deemed appropriate for the area of work. |
| **7** | Proposed Color scheme for Helmets:<br>a) Workmen: Yellow<br>b) Safety staff: Green or white with green band<br>c) Electrician: Red<br>d) Others including visitors: White |
| **8** | The contractor shall maintain register for issue and receipt of PPEs. |

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| **9** | All the PPEs shall be checked for quality before issue and the same shall be periodically re-checked. The users shall be advised to check the PPEs themselves for any defect before putting on. The defective ones shall be replaced. |
| **10** | The Helmets shall have logo or name (abbreviation of agency name permitted) affixed or printed on the front. |
| **11** | The agency should ensure sufficient inventory of personal protective equipment (PPEs) prior to initial mobilization. After identifying the need of the required PPEs for various activities performed at the site, an additional inventory of approx. 20% of required PPEs should be maintaining during the execution of the work. If sub agency fail to provide the PPEs to worker the same may be issued by BHEL and cost for the PPEs debited to the Sub agency from regular RA Bill with 30 % overhead charges. |
| **12** | Mandatory PPEs: Wearing of Safety Helmet, Safety Shoes and reflective jacket is mandatory for all work at site and it should be ensured that all employees and project visiting personnel shall invariably wear safety helmet, safety shoes & reflective jacket. |
| **13** | PPEs required while execution of work: Face Shield, Chemical splash goggles, Helmet mounted welder's shield, gum boot, Double lanyard full body harness, Safety goggles, Dust mask, supplied air mask/hood, Ear plug/Ear Muff, Cotton hand gloves, Leather hand gloves, Leather apron, Rubber gloves, PVC Gloves, PVC Apron, Self-contained breathing apparatus, Welding goggles, Electrical Rubber Gloves. Breathing apparatus etc... |
| **14** | The above-mentioned PPEs should be made available with contractor at site and issued to the concerned workers on the day of employment. All PPEs shall comply with ISI standards with valid test certificates. |
| **15** | At least two breathing apparatus sets (complying requirement as per IS: 10245) shall be provided at each site where excavation/tunneling works and Welding/ Cutting operations in confined areas are being carried out, to rescue the victims under exposure to harmful gases/vapors, if any. |
| **16** | The body harnesses shall be serial numbered. |
| **17** | **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. |
| **8.8** | **ARRANGEMENT OF INFRASTRUCTURE** |
| **8.8.1** | **DRINKING WATER** |
| **1** | Drinking water shall be provided and maintained at suitable places at different elevations. |
| **2** | Container should be labeled as “Drinking Water” in languages understood by the workers |
| **3** | Cleaning of the container shall be ensured at least once in a month or whenever required. |
| **4** | Suitability of water source for drinking to be tested as per IS10500 at least once in six months or whenever required. |
| **8.8.2** | **WASHING FACILITIES** |
| **1** | In every workplace, adequate and suitable facilities for washing shall be provided and maintained. |
| **2** | Separate and adequate cleaning facilities shall be provided for the use of male and female workers. Such facilities shall be conveniently accessible and shall be kept in clean and hygienic condition and dully illuminated for night use. |
| **3** | Water suitable for washing and not for drinking shall be clearly indicated as “Not for Drinking” in language understood by workers. |

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| **4** | Overalls shall be supplied by the contractor to the workmen and adequate facilities shall be provided to enable the painters and other workers to wash during the cessation of work. |
| **8.8.3** | **LATRINES AND URINALS** |
| **A** | **LATRINES** |
| **1** | Latrines shall be provided in every work place as per BOCW Act. |
| **2** | Every latrine shall be under cover and so partitioned off as to secure privacy, and shall have a proper door and fastenings. |
| **3** | Where workers of both sexes are employed there shall be displayed outside each block of latrine and urinal a notice in the language understood by the majority of the workers 'For Men Only', or For Women Only', as the case may be. |
| **4** | The notice shall also bear the figure of a man or of a woman, as the case may be. |
| **5** | They shall be adequately lighted and shall be maintained in a clean and sanitary condition at all times, by appointing designated person. |
| **B** | **URINALS** |
| **1** | There shall be at least one urinal for male workers up to fifty and one for female up to fifty employed at a time and further as per BOCW Act. |
| **2** | The urinals shall be designed and located so as to ensure privacy. |
| **3** | The latrines and urinals shall be conveniently situated and accessible to workers at all times at the establishment. |
| **4** | The latrines and urinals shall be adequately lighted and shall be maintained in a clean and sanitary condition at all times. |
| **5** | Latrines and urinals other than those connected with a flush sewage system shall comply with the requirements of the public health authorities. |
| **6** | Water shall be provided by the means of tap or otherwise so as to be conveniently accessible in or near the latrines and urinals. |
| **NOTE** | **Latrines and Urinals shall be adequately lighted and shall be maintained in a clean and sanitary condition at all times, by appointing designated person.** |
| **8.8.4** | **PROVISION OF SHELTER FOR WORKERS DURING REST PERIOD** |
| **1** | Proper Rest Shed (s) with shelter shall be provided for rest during break so as to accommodate all workers. |
| **2** | The sheds shall be cleaned, ventilated with fans, windows etc. as required and have provision of seating and drinking water facility etc |
| **8.8.5** | **MEDICAL FACILITIES AND FIRST AID AMENITIES / MEDICAL CENTRE & AMBULANCE (As per Schedule V, X and XI of BOCW central Rules, 1998)** |
| **1** | Medical facilities / Medical Centre, Medical officer, Ambulance & Nursing staff, will be centrally arranged by BHEL on cost recovery model basis (i.e. Out of pocket expense for this will be apportioned among all the working contractors proportionate to their contract values). |
| **2** | A first aid center shall be ensured/identified at site by contractor with basic facilities for handling medical emergencies. |
| **3** | Medical waste shall be disposed as per prevailing legislation (Bio-Medical Waste – Management and Handling Rules, 1998) |
| **4** | **Following Condition shall be prevailing before start of work.** |

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| **I** | Contractor has to arrange one trained and certified first aider for every twenty workers in each shift. To ensure compliance of first aider, list of first aider along with gate pass / identification no. shall be submitted every month to HSE Officer for his Clearance before RA bill processing. List of First aider must be displayed at first aid center. |
| **II** | Ambulance will be centrally arranged by BHEL on cost recovery model basis & shall be used by all contractors. Ambulance with proper equipment for prompt transportation of the injured persons to a physician or a hospital shall be available at work place. (i.e. Out of pocket expense for this will be apportioned among all the working contractors propionates to their contract value). |
| **III** | BHEL will deploy full time construction medical officer as per BOCW (qualification as per Schedule XI of BOCW Central Rules -1998). One additional construction medical officer if required as per BOCW, for providing adequate medical treatment by qualified medical officers and nursing staff, as and when required.<br>Note: Medical officer will be centrally arranged by BHEL on cost recovery model basis & shall be used by all contractors. (i.e. Out of pocket expense for this will be apportioned among all the working contractors propionates to their contract value). |
| **IV** | Notwithstanding anything stated above, Contractor/Agency shall strictly comply with the requirements of relevant BOCW Act/ BOCW Rules/ Factory Act/Factory Rules/ any other statutory Act/Rules/Law with regards to providing suitable medical facilities to the workers. |
| **V** | Additional staff including one nurse, one dresser-cum compounder, one sweeper-cum-ward boy with each construction medical officer for full working hours shall be arranged by BHEL on cost recovery model basis and distributed to all working contractor propionates to their contract value. |
| **VI** | The Telephone nos. of Medical officer, Hospital(s) or ambulance shall also be conspicuously displayed at each work site and first aid Centre. |
| **VII** | First-aid kits as approved by medical officer shall be provided at accessible points in the ratio of at least one kit for every 50 employees. |
| **VIII** | **Health Management:** The site manager shall implement health examinations for the working personnel on a regular basis. |

| TYPES OF HEALTH EXAMINATION | TARGET | FREQUENCY |
|---|---|---|
| General health examination | All workers | Annual |
| Occupational health examination (Audiometric, PFT, Vision etc.) | Worker engaging in noise, dust, vibration, harmful light generating work | Annual |
| Occupational health examination (Vision) | Personnel involved in operation of Cranes, heavy vehicles | Annual |
| Occupational health examination (Vertigo/Height pass) | Workers engaged at Height Works | At the time of induction training and every year |

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| **8.8.6** | **FIRST AIDER/ FIRST AID FACILITY** |

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| **1** | Ensure availability of Qualified First-aider throughout the working hours. |
| **2** | Every injury shall be treated, recorded and reported. |
| **3** | The First Aider shall be put through recertification course prior to expiry of the existing certificate. |
| **4** | The First Aider shall refer any victim to doctor or any other medical facilities for further treatment if necessary. |
| **5** | First aid center will be maintained by BHEL and cost will be proportionately recovered from vendors |
| **6** | Refresher course on first aid shall be conducted as necessary. |
| **7** | List of Qualified first aiders and their contact numbers should be displayed at conspicuous places |
| | **FIRST AID TREATMENT:**<br>**GENERAL:**<br>➢ Test area will be cordoned off and unauthorized person's entry shall be prohibited. suitable signboard shall be displayed.<br>➢ Hydro test need to be conducted for the whole system including temp connections. Test the integrity of temp piping's.<br>➢ Whenever any inspection is made during the cleaning process, the location should be adequately ventilated.<br>➢ The valve to the acid cleaning tank should be erected 2-3 meters away from the tank, so that during spillage/overflow from tank it will be safe to handle/operate.<br>➢ Adequate illumination should be available near the activity area including arrangement for emergency lighting.<br>➢ Any gland leakage in valve/pipeline leakage of permanent /temporary system prior to hot water rinsing and alkali flushing during system fill test, the same may be isolated and attended before putting acid into the system/boiler.<br>**SPLASHES OF THE EYE:**<br>➢ Immediately flood the eye with water. To be effective the eyelids must be opened. The eyelids should be pushed apart using the thumb and index finger of the left hand. The injured personnel will probably not be able to open the eye himself because of painful spasms.<br>➢ If an eye wash bottle is used the jet should not be directed at the front of the eye. It should be directed in from the side, so that flow is over the surface of the eye.<br>➢ Irrigation should be continued for 5 - 10 minutes after which the casualty should be taken to the first aid room.<br>➢ Irrigation should be continued in the first aid room. Remember vision is saved by thorough Irrigation; no other treatment can prevent damage if this is omitted.<br>➢ After thorough irrigation the eye should be covered with a pad; the patient should be referred for medical opinion. |
| **8.8.7** | **FIRST AID BOX (as per BOCW)** |
| **1** | The contractor shall provide necessary first aid facilities as per BOCW. |
| **2** | At every work place first aid facilities shall be provided and maintained. |
| **3** | The first aid box shall be kept by first aider who shall always be readily available during the working hours of the work place. His name and contact no to be displayed on the box |
| **4** | The first aid boxes should be placed at various elevations so as to make them available within the reach and at the quickest possible time. |
| **5** | The first aid box shall be distinctly marked with a Green Cross on white background. |
| **6** | Details of contents of first aid box is given in Annexure No. 2. |

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| **7** | A slip of contents shall be pasted/display on the First Aid Box. |
| **8** | The first aid box shall be distinctly marked with a Green Cross on white background. |
| **9** | Monthly inspection of First Aid Box shall be carried out by the owner as per format no. HSEP:14-F01 |
| **10** | The contractor should conduct periodical first–aid classes to keep his supervisor and Engineers properly trained for attending to any emergency. |
| **8.8.8** | **HEALTH CHECK UP (As per BOCW)**<br>The persons engaged at the site shall undergo health check-up as per the format no.<br>HSEP: 14-F02 before induction. The persons engaged in the following works shall undergo health check-up at least once in a year:<br>a. Height workers<br>b. Drivers/crane operators/riggers<br>c. Confined space workers<br>d. Shot/sand blaster<br>e. Welding and NDE personnel |
| **8.8.9** | **HEIGHT PHOBIA/ VERTIGO TEST** |
| **1** | The persons engaged in working at heights (above 1.8 meters) to be assessed for Vertigo and associated conditions. |
| **2** | Such workers are to be allowed only on successful completion of test, otherwise shall be allocated ground based jobs. |
| **8.8.10** | **PROVISION OF CANTEEN FACILITY** |
| **1** | Canteen facilities shall be provided for the workmen of the project inside the project site. |
| **2** | Proper cleaning and hygienic condition shall be maintained. |
| **3** | Proper care should be taken to prevent biological contamination. |
| **4** | Adequate drinking water should be available at canteen. |
| **5** | Fire extinguisher shall be provided inside canteen. |
| **6** | Regular health check-up and medication to the canteen workers shall be ensured as per applicable regulations. |
| **7** | Canteen waste to be disposed of in hygienic manner |
| **8.8.11** | **PROVISION OF ACCOMODATION/LABOR COLONY**<br>The Contractor shall have total responsibility for providing and maintaining facilities for safety, welfare, drinking water and sanitation, hygiene etc. for construction workers at their workplaces as well as at labour & staff colonies. The facilities for occupational safety, healthy environment, first aid, drinking water, resting place & toilets, canteen, crèche, etc. shall be provided at the workplace for construction workers by the contractor. |
| **1** | The area in which the quarters and/or barracks are located as well as the latrines and bathrooms provided therein shall be kept in a clean and sanitary condition at all times |
| **2** | Regular housekeeping of the labor colony shall be ensured. |
| **3** | Proper sanitation and hygienic conditions shall be maintained and inspected once in a month. |
| **4** | Adequate number of toilet facilities with water for workers as per norms to be provided. There must be separate toilet for women workers. Drinking water and electricity to be provided at the labour colony. |

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| **5** | Potable water shall be tested once in one year as per IS10500. |
| **6** | Availability of Bathing/ washing bay to be ensured |
| **7** | Room ventilation and safe electrification to be ensured |
| **8** | The labor colony shall be secure so that only authorized persons have access to it. |
| **9** | Availability of local market to be ensured by the Contractor |
| **10** | Labor colony shall be inspected each week by Safety Officer and report submitted to BHEL as per Format No. HSEP:14-F16. |
| **11** | MSDS of LPG shall be put up prominently. This shall be included in the induction training as well. |
| **12** | The labour colony shall be appropriately secure so that only authorized persons have access to it. |
| **13** | First aid facility shall be provided in the labour camp under the administration of trained first aiders. |
| **14** | Common kitchen facilities to be ensured and cooking inside the room to be avoided. The canteen should be maintained in hygienic condition. |
| **15** | Awareness training shall be organized for the workers regarding fire safety, safe use of LPG, Health & Hygiene, and electrical safety etc. on monthly basis. |
| **16** | No. of occupants in room to be as per the standards practice. |
| **17** | Adequate drainage and approach roads to be done. |
| **18** | Perimeter fencing, security and main gate entrance shall be established and maintained. |
| **19** | Monthly inspection to be done to ensure the compliance and for opportunity of improvement |
| **20** | For sprinkling on roads, it is to be kept in respective vendor's scope |
| **21** | A "Suggestion Register" shall be made available at the labor colony for workers. The feedback shall be reviewed on weekly basis and acted upon |
| **8.8.12** | **PROVISION OF EMERGENCY VEHICLE**<br>Dedicated emergency vehicle/ ambulance shall be coordinate with BHEL to handle emergency situation/ condition occur at site. However, Ambulance shall be used exclusively for taking victim/ injured person to hospital. |
| **8.8.13** | **PEST CONTROL**<br>Regular pest control should be carried out at all offices, mainly laboratories, canteen, labor colony and stores. |
| **8.8.14** | **SCRAPYARD** |
| **1** | In consultation with customer, scrapyard shall be developed to store metal scrap, wooden scrap, waste, hazardous waste. |
| **2** | Scrap/Waste shall be segregated as Bio-degradable and non-bio-degradable and stored separately. |
| **8.8.15** | **CONFINED SPACE ENTRY (CONTRACTOR TO HAVE OXIMETER AND TOXIC GAS METER)**<br>A hazard assessment must be completed prior to any entry into a confined space. The hazard assessment must identify the sequence of work to be performed in the confined space, the specific hazards known or anticipated, and the control measures to be implemented to eliminate or reduce each of the hazards to an acceptable level. No entry must be permitted until the hazard assessment has been reviewed and discussed by all persons engaged in the activity. Personnel who enter confined spaces must be trained per role e.g. entrant (worker), |

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| | confined space supervisor & attendant, and must be informed of known or potential hazards associated with the confined spaces to be entered. Number of persons entering shall be kept at minimum. All confined spaces must be inventoried at site and kept on file. Confined spaces must be posted at the entrance with similar type wording “DANAGER - Do Not Enter – Confined Space - Permit required”.<br> |
| **8.8.16** | **ILLUMINATION** |
| **1** | Each phase of construction will create its own illumination and lighting challenges; whether the work is related to confined spaces, hazardous atmospheres, stairways, pedestrian walkways or night work. Proper and adequate illumination is critical in order to perform the work in a safe and healthy manner. The following are the minimum requirements: Lamp (hand held) shall not be powered by mains supply but either by 24V or dry cells. |
| **2** | Temporary lighting used in damp and / or hazardous locations and confined areas must be of not more than 24 volts. |
| **3** | Lamps shall be protected by suitable guards where necessary to prevent danger, in case of breakage of lamp. Broken and burnt-out bulbs must be replaced immediately. |
| **4** | Emergency lighting provision for night work shall be made to minimize danger in case of main supply failure. |
| **5** | Adequate and suitable light shall be provided at all work places & their approaches including passage ways as per 29 CFR 1926.56. |
| **6** | The contractor shall arrange at his cost adequate lighting facilities e.g. flood lighting, hand lamps, area lighting etc. at various levels for safe and proper working operations at dark places and during night hours at the work spot as well as at the pre-assembly area. |
| **7** | Lamp (hand held) shall not be powered by mains supply but either by 24V or dry cells. |

| Foot-Candles | Area of Operation |
|---|---|
| 5 | General construction area lighting. |
| 3 | General construction areas, concrete placement, excavation and waste areas, access ways, active storage areas, loading platforms, refueling, and field maintenance areas. |
| 5 | Indoors: warehouses, corridors, hallways, and exit ways. |
| 5 | Tunnels, shafts, and general underground work areas: (Exception: minimum of 10 foot-candles is required at tunnel and shaft heading during drilling, mucking, and scaling. Bureau of Mines approved cap lights shall be acceptable for use in the tunnel heading) |
| 10 | General construction plant and shops (e.g., batch plants, screening plants, mechanical and electrical equipment rooms, carpenter shops, rigging lofts and active store rooms, mess halls, and indoor toilets and workrooms.) |
| 30 | First aid stations, infirmaries, and offices. |

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| **8** | Lamps shall be protected by suitable guards where necessary to prevent danger, in case of breakage of lamp. |
| **9** | Emergency lighting provision for night work shall be made to minimize danger in case of main supply failure. |
| **10** | Adequate and suitable light shall be provided at all work places & their approaches including passage ways as per IS: 3646 (Part-II). |
| **11** | Illuminations shall be inspected on weekly basis as per Format No. HSEP:14-F19. |
| **12** | Suitable illumination levels for various areas shall be decided based on broad guidelines indicated below: |

| S. No. | Location | Lux Level (lumens/sqm) |
|---|---|---|
| A | **Construction Site** | |
| 1 | Outdoor areas like store yards, entrance and exit roads | 20 |
| 2 | Platforms | 50 |
| 3 | Entrances, corridors and stairs | 100 |
| 4 | General illumination of work area | 150 |
| 5 | Rough work like fabrication, assembly of major items | 150 |
| 6 | Medium work like assembly of small machined parts | 300 |
| 7 | Fine work like precision assembly, precision measurements etc. | 700 |
| 8 | Sheet metal works | 200 |
| 9 | Electrical and instrument labs | 450 |
| B | Office | |
| 1 | Outdoor area like entrance and exit roads | 20 |
| 2 | Entrance halls | 150 |
| 3 | Corridors and lift cars | 70 |
| 4 | Lift landing | 150 |
| 5 | Stairs | 100 |
| 6 | Office rooms, conference rooms, library reading tables | 300 |
| 7 | Drawing table | 450 |
| 8 | Manual telephone exchange | 200 |

# 9.0 HSE TRAINING AND AWARENESS

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| **9.1** | **HSE INDUCTION TRAINING** |
| **1** | All persons entering into project site shall be given HSE induction training by the HSE officer of BHEL /contractor before being assigned to work. |
| **2** | The induction training shall be imparted through audio-visual medium, and shall be minimum of 2 hour duration. |
| **3** | Evaluation to be carried out after training and training shall be repeated in case of failure. |
| **4** | In-house induction training subjects shall include but not limited to: |

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| A | Briefing of the Project details. |
| B | Safety objectives and targets. |
| C | Site HSE rules. |
| D | Critical Safety Violations and consequences |
| E | Site near miss, Major hazards and risks, aspects & impact and mitigation measures related to the jobs to be performed by the person or group of person. |
| F | First aid facility. |
| G | Emergency Contact No. |
| H | Near Miss & Incident reporting. |
| I | Fire prevention and emergency response. |
| J | Rules to be followed in the labor colony (if applicable) |
| K | Use and maintenance of PPEs (i.e. Shoes/ Helmets/ Goggles/ Leg guard/ Apron etc.) |
| L | Accident case studies. |
| M | General traffic rules / Pedestrian rules. |
| N | House keeping |
| O | HSE & Environmental compliance requirement. |
| P | No smoking/alcohol/gambling/fights/theft/damaged to property and cell phone use restrictions. |

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| **5** | General: |

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| A | Proper safety wear & gear must be issued to all the workers being registered for the induction (i.e., Shoes/Helmets/Goggles/Leg guard/Apron etc.) |
| B | They must arrive fully dressed in safety wear & gear to attend the induction. |
| C | Any one failing to conform to this safety wear& gear requirement shall not qualify to attend. |
| D | On completing attending contractor's in-house HSE induction, each employee shall sign an induction training form (format no. HSEP: 14-F03) to declare that he had understood the content and shall abide to follow and comply with safe work practices. |
| E | They may only then be qualified to be issued with a personal I.D. card, for access to the work site subject to clearing the medical fitness test. |
| F | Each worker deployed by the agency shall be given 2-days induction training which shall include the medical examination and instructions related to |

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| | particular job, firefighting, first- aid and reporting of accidents. All employees shall be given safety training as per BOCW Act/Rules. |
| G | The contracting agency shall also impart job specific skill based safety training to all its employees (Minimum one day) on various related safety topics using internal/external safety professionals/consultants as per the matrix given below. However, training matrix list is not limited to topic mention below, more topic may add in future as decided by BHEL/ customer. Record of such trainings and attendance particulars shall be maintained in a register for ready reference to statutory authorities/engineer-in charge. |

**TRAINING MATRIX**

| Name of topic | Executives | Super visors | Skilled Workmen | Other Workers |
|---|---|---|---|---|
| Safety Induction | Y | Y | Y | Y |
| Accident_ Causes, factors, cost | Y | Y | Y | - |
| Industrial hazards & Accident Prevention | Y | Y | Y | - |
| Investigating, reporting, records | Y | Y | - | - |
| Personal Protective Equipment | - | Y | Y | Y |
| Construction Safety & Role of Supervisorypersonnel | - | Y | - | - |
| Permit to Work (PTW) | - | Y | Y | y |
| Statutory Provisions (BOCW Act/Rules,Factories Act 1948 etc.) | Y | Y | y | y |
| Material handling | - | y | Y | Y |
| Emergency Management | Y | Y | Y | - |
| Electrical Safety | - | Y | Y | - |
| Fire safety | Y | Y | Y | Y |
| First Aid & CPR (cardio pulmonaryresuscitation) | - | Y | Y | Y (Selected) |
| Safety in Welding & Cutting | - | - | Y | - |
| Safety Audit | Y | Y | - | - |
| Safety in Lifting Tools & Tackles | - | Y | Y | y |
| Safety in Working at height | - | Y | Y | Y |
| Safety in Confined space work | - | Y | Y | Y |
| Defensive Driving | - | Y* | Y* | Y* |

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| **9.2** | **HSE TOOLBOX TALK** |
| **1** | HSE tool Box talk shall be conducted by frontline foreman/supervisor of contractor to specific work groups prior to the start of work and shall be randomly attended by contractor engineers/ officials. The agenda shall consist of the following: |

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| A | Details of the job being intended for immediate execution. |

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| | B | The relevant hazards and risks involved in executing the job and their control and mitigating measures. |
| | C | Specific site condition to be considered while executing the job like high temperature, humidity, unfavorable weather etc. |
| | D | Recent non-compliances observed. |
| | E | Appreciation of good work done by any person. |
| | F | Any doubt clearing session at the end. |
| **2** | Tool box talk to be conducted before start of work in every shift. | |
| **3** | During toolbox talk, visual check-up of workers regarding health, any signs of fatigue, intoxication etc. shall be conducted and any suspected workers to be acted upon. | |
| **4** | Record of Tool box talk shall be maintained as per format no. HSEP:14-F04 | |
| **9.3** | **PRE JOB BRIEFING**<br>A separate documented daily pre job briefing must be conducted at the actual job/work site location with the supervisor and work crew, to cover working environment/conditions, safe work practices for the activities to be carried out, required PPE and review of the work package, JSA and permit requirements. Each crew member and the supervisor will sign off on the pre job briefing form, and form will be submitted to the HSE department at the end of each shift. | |
| **9.4** | **TRAINING ON HEIGHT WORK** | |
| **1** | Training on height work shall be imparted to all workers working at height by in-house/external faculty at least once every 3 months. | |
| **2** | The training shall be of minimum 2-hour duration, through audio-visual medium and followed by evaluation. In case of poor scoring, training shall be repeated. | |
| **3** | The training shall include following topics: | |
| | A | Proper use of PPEs – safety harness, lanyard, fall arrester, retractable fall arrester, life line, safety nets etc. |
| | B | Safe climbing through monkey ladders. |
| | C | Inspection of PPEs. |
| | D | Medical fitness requirements. |
| | E | Mock drill on rescue at height. |
| | F | Dos & Don'ts during height work. |
| | G | Accident case Studies |
| **9.5** | **HSE TRAINING DURING PROJECT EXECUTION** | |
| **1** | Other HSE training shall be arranged by BHEL/ contractor as per the need of the project execution and recommendation of BHEL/ HSE committee of site. Specifically: | |
| | A | **Regular on-the-job training for hazardous activities (Frequency: every 3 months) :-** The training shall cover all workers involved in hazardous activities including but not limited to: height work, hot work, lifting & |

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| | | rigging, confined space work, radiography, excavation, electrical work, storage/ preservation/ chemical handling, material handling, waste disposal etc. |
| | B | **Re-induction training (Frequency: every 6 months) :-** This training shall be conducted for each and every worker, and shall be a pre-requisite for renewal of Gate Pass/ ID card. For details, refer Clause 9.0. |

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| **2** | The training shall be of minimum 2-hour duration, through audio-visual medium and followed by evaluation. In case of poor scoring, training shall be repeated. |
| **3** | Contractor shall ensure a training calendar/ plan and nominate workers as per requirement for training. |
| **4** | The topics of the HSE training shall be as follows but not limited to: |

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| A | Hazards identification and risk analysis (HIRA) |
| B | Work Permit System |
| C | Incident investigation and reporting |
| D | Fire fighting |
| E | First aid |
| F | T & Ps fitness and operation |
| G | Electrical safety |
| H | Welding, NDE & Radiological safety |
| I | Storage, preservation & material handling. |

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| **5** | A matrix shall be maintained to keep an up-to-date record of attendance of training sessions carried out. |
| **6** | Each Skilled labour fitter, electrician, rigger, scaffolder, carpenter etc. will pass through the trade test (oral, written and/ or practical) conducted at site by the respective engineer. A pass sticker of qualified person to be marked on their ID Card/Gate Pass. |
| **7** | Training records of all workers along with attendance, signatures, faculty details etc. shall be maintained in soft/ hard copy. |
| **8** | HSE induction for Visitors: No visitors are allowed to visit the construction site without safety induction, mandatory PPEs and All official while on tour. |
| **9** | Safety Induction for all (Staff/ Engineers/ Sub-Contractor officials/ Supervisors): it is compulsory to provide safety induction and briefing about the site HSE Management systems, requirements and individual's roles and responsibility to carry out the activities is safe manner, before deploying them. |
| **9.6** | **HSE PROMOTION-SIGNAGE, POSTERS, COMPETITION, AWARDS ETC** |
| **1** | **Display of HSE posters and banners** |

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| | Contractor shall arrange appropriate HSE posters, banners, slogans in local / Hindi / English languages at work place, walkways, stair cases etc. understood by all workers. Posters should have minimum 60% graphic content and shall be weather proof. |
| **2** | **Display of HSE signage**<br><br>Appropriate HSE signage shall be displayed at the work area to aware workmen and passersby about the work going on and do's and don'ts to be followed. Signage for evacuation plan, emergency assembly location and route shall also be displayed. |
| **3** | **HSE Rewards & Incentive Scheme**<br><br>Contractor shall arrange competition (i.e. Slogan, poster, essay, extempore etc.) on HSE topic time to time (i.e. National Safety Day, BHEL Day, World Environment Day etc.) and winner will be suitably awarded. Monthly safety shall be observed by BHEL/Customer. Agency site in charge along with his safety team and workers are to compulsory participate in these monthly safety meetings. Agency has to display safety poster/ banners at stores/office/workplace and need to be changed from time to time. No. of safety poster shall be decided by BHEL. Implement a reward & incentive scheme for workers & supervisors displaying adherence to safety principles. Such workers shall be felicitated in a monthly function, attended by Contractor top management and BHEL representatives. Suitable gift shall be given to such workers for encouragement. |
| **4** | **HSE Awareness Programme for Officials**<br><br>Contractor shall arrange monthly HSE awareness programme on different topics including medical awareness for all engineers/ supervisors / officials working at site. This programme can be part of progress/ safety review meetings |

# 10.0 HSE COMMUNICATION AND PARTICIPATION

**10.1 REPORTING AND INVESTIGATION OF ACCIDENTS AND DANGEROUS OCCURRENCES:**

1 Reporting of accidents: Notice of any accident (the prescribed format is annexed to the manual) to a worker at the building or construction site that

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| a. | Causes loss of life; or |
| b. | Disables a worker from working for a period of 48 hours or more immediately following the accident; Shall forthwith be sent by Telegram, Telephone, Fax, Email 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 |
| | I. The Regional Labour Commissioner (Central);<br>II. The Board with which the worker involved was registered as a beneficiary;<br>III. Director General of Building and other construction (regulation of employment and conditions of service) Act/Rules; and<br>IV. The next of kin or other relative of the worker involved in the accident;<br>V. The Regional Labour Commissioner (Central);<br>VI. The Board with which the worker involved was registered as a beneficiary;<br>VII. Director General of Building and other construction (regulation of employment and conditions of service) Act/Rules; and<br>VIII. The next of kin or other relative of the worker involved in the accident; |

2 Further, notice of accident shall be sent in respect of an accident which

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| a. | Causes loss of life; or |
| b. | (a) Disables the injured worker from work for more that 10 days to<br>(1) The Officer-in-charge of the nearest Police Station;<br>(2) The District Magistrate or, if the District Magistrate by order so desires, to<br>(3) The Sub-Divisional Magistrate; |

3 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.

4 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

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| | | be given first-aid and immediately transferred to a Hospital or other place for medical treatment. |
| | 5 | All near-miss accidents shall be reported to BHEL Engineer and Safety Officer as per prescribed format. |
| | 6 | Reporting of dangerous occurrences: 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: |
| | 7 | 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; |
| | 8 | Falling of objects from height; |
| | 9 | 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; |
| | 10 | Contract work, excavation, collapse of transmission; |
| | 11 | Explosion of receiver or vessel used for storage at pa pressure than atmospheric pressure, of any gases or any liquid or solid used as building material; |
| | 12 | Fire and explosion causing damage to any place on construction site where building workers are employed; |
| | 13 | Spillage or leakage of any hazardous substance and damage to their container; |
| | 14 | Collapse, capsizing, toppling or collision of transport equipment; |
| | 15 | Leakage or release of harmful toxic gases at the construction site; |
| | 16 | 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; |
| | 17 | 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. |
| | 18 | Incident / injury statistics shall be maintained by all agencies cause wise. |
| | 19 | Investigation of accidents and dangerous occurrences |
| | 20 | Besides reporting, it shall be the responsibility of the contractor to constitute a team (members as per the gravity of the incident) of 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. |
| **10.2** | **HSE INCIDENT REPORTING, INVESTIGATION & CORRECTIVE ACTION** | |
| **1** | The contractor shall submit report of all incidents, fires and property damage etc to the Engineer immediately after such occurrence, but in any case not later than 24 hours of | |

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| | the occurrence. Such reports shall be furnished in the manner prescribed by BHEL. (Refer HSE procedure for incident investigation, analysis and reporting for details) |
| **2** | In addition, periodic reports on safety shall also be submitted by the contractor to BHEL from time to time as prescribed by the Engineer. Compiled monthly reports of all kinds of incidents, fire and property damage to be submitted to BHEL safety officer as per prescribed formats. |
| **3** | HSE incidents of site shall be reported to BHEL site Management as per Procedure for Incident Investigation and Reporting in format no. HSEP:14-F15. Corrective action shall be immediately implemented at the work place and compliance shall be verified by BHEL HSE officer and until then, work shall be put on hold by Construction Manager. |
| **4** | All incidents (near misses, property damage, first-aid cases, minor, major and fatal incidents) shall be reported to BHEL as they happen immediately through SMS and Hard/Soft copy as per Format No. HSEP:14-F15 |
| **5** | All incidents including near miss, minor, major and fatal incidents shall be recorded |
| **6** | All incidents shall be investigated for Root Causes and corrective actions ensured to prevent recurrence. |
| **7** | Work shall be put on hold in the area till corrective actions are verified by BHEL |
| **8** | The Root Cause Analyses and Corrective actions taken shall be recorded |
| **10.3** | **HSE EVENT REPORTING** |
| **1** | Important HSE events like HSE training, Medical camp etc. organized at site shall be reported to BHEL site management in detail with photographs for publication in different in-house magazines. |
| **2** | Celebration of important days like National Safety Day, World Environment Day etc. shall also be reported as mentioned above. |
| **10.4** | **MONTHLY HSE REPORTING** |
| **1** | All routine and non-routine HSE activities shall be reported to BHEL on monthly basis by the contractor. The reporting medium can be hard/soft as per BHEL requirement and format for the same shall be provided to the contractor. |
| **2** | The period of reporting shall be 25th of the preceding month to 24th of the present month and shall be submitted by the end of the calendar month. |
| **10.5** | **HSE COMMUNICATION** |
| **10.5.1** | **MONTHLY & WEEKLY HSE REPORTING** |

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| **A** | HSE information of Site shall be reported monthly and weekly through Monthly/Weekly Site HSE report (MSHR) as per format no. (HSEP:14-F05). |
| **B** | Weekly, Monthly safety meeting conducted by BHEL/Customer are to be attended compulsorily by site in charge, senior area engineers, safety officers. |
| **C** | In case Site-In-charge is not available on meeting day, next in command has to attend meetings. |
| **D** | Preparation of MSHR shall be done as per ”Guidelines for filling up Monthly HSE report” |

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| | **E** | The period of reporting shall be 25th of the preceding month to 24th of the present month and shall be submitted to Regional HQ by the end of the calendar month. |
| | **F** | The following documents and reports are to be maintained at site, but not limited to:<br>• HSE induction sign in roster<br>• Pre-employment Health Record Form 31-A.<br>• HSE Inspections and audit reports<br>• Environmental monitoring documentation<br>• Method Statements and JSA<br>• Training records<br>• HSE corrective action tracking sheets<br>• 3rd party inspection report of crane, lifting tools & tackles<br>• PPE inspections<br>• First report of incident<br>• Incident investigation reports<br>• Chemical inventory documentation<br>• MSDS of chemicals<br>• PTW and separate permits of critical activities<br>• Vehicle and equipment inspections<br>• Toolbox talk<br>• Pre job briefings<br>• Trade test details<br>• Safety statistics monthly<br>• Noise monitoring reports<br>• Written safety violations<br>• HSE committee and other MOM<br>• HSE Plan & Emergency Plan<br>• Weekly & Monthly HSE report to be submitted to OPGC |

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| **10.5.2** | **INCIDENT REPORTING** |
| **1** | HSE incidents of site shall be reported to Regional HQ and PS-HQ as per HSE procedure for incident investigation, analysis and reporting. |
| **2** | Corrective action shall be immediately implemented at the work place and compliance shall be verified by HSE officer until then work shall be put on hold by Construction Manager. |
| **10.5.3** | **HSE EVENT REPORTING** |
| **1** | Important HSE events like HSE training, Medical camp etc. organized at site shall be reported to PS Regional HQ in detail with photographs for publication in diff house magazines. |

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| **2** | Celebration of important days like National Safety Day, World Environment Day etc. shall also be reported as mentioned above. |
| **10.5.4** | **DAILY HSE ACTIVITY REPORTING**<br>Daily HSE activities shall be reported by contractor to BHEL as per Format No. HSEP:14-F31A |
| **10.5.5** | **HSE SUGGESTIONS**<br>All workers and employees shall be encouraged to provide suggestions for improvement in Health, Safety & Environment performance at site. The suggestions shall be recorded in a “Suggestions Register”. Suggestions found suitable for implementation shall be implemented and recognition / reward to be given to the submitter. |
| **10.5.6** | **HSE COMMUNICATON**<br>All HSE related communication from BHEL, customer (NTPC) / external statutory and regulatory agencies to be handled on priority. Same to be recorded and issues to be resolved in expeditious manner. |

# 11.0 SAFETY DURING WORK EXECUTION

**11.1 HSE SYSTEMS AND PROCEDURES**

BHEL Power Sector HSE Management System (HSEMS) shall be referred for carrying out HSE activities at site. Contractor shall get familiar with and follow the HSEMS documents provided by BHEL, as required for implementation of HSE, which are listed as follows:

**A HSE Procedures:**

All HSE Procedures as referred in various sub-clauses of this Section as given in Annexure 3

**B OPERATIONAL CONTROL PROCEDURES**

In order to reduce the risk associated with hazardous activities, all applicable OCPs (Operational control procedures) will be followed by contractor as per BHEL instructions, outcomes of Hazard Analysis & other requirements. This will be done as part of normal scope of work. Illustrative list of reference OCPs is given below.

**LIST OF REFERENCE OCPs**

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| Safe handling of chemicals | Safety in use of cranes | Hydraulic test |
| Electrical safety | Storage and handling of gas cylinders | Spray insulation |
| Energy conservation | Manual arc welding | Trial run of rotary equipment |
| Safe welding and gas cutting operation | Safe use of helmets | Stress relieving |
| Fire safety | Good house keeping | Material preservation |
| Safety in use of hand tools | Working at height | Cable laying/tray work |
| First aid | Safe excavation | Transformer charging |
| Food safety at canteen | Safe filling of hydrogen in cylinder | Electrical maintenance |
| Illumination | Vehicle maintenance | Safe handling of battery syst |
| Handling and erection of heavy metals | Safe radiography | Computer operation |
| Safe acid cleaning | Waste disposal | Storage in open yard |
| Safe alkali boil out | Working at night | For sanitary maintenance |
| Safe oil flushing | Blasting | Batching |
| Steam blowing | DG set | Piling rig operation |
| Safe working in confined area | Handling & storage of mineral wool | Gas distribution test |
| Safe operation of passenger lift, material hoists & cages | Drilling, reaming and grinding(machining) | Cleaning of hot well / deaera |
| Electro-resistance heating | Compressor operation | O&M of control of AC plant & system |
| Air compressor | Passivation | Safe Loading of Unit |
| Safe EDTA Cleaning | Safe Chemical cleaning of Pre boiler system | Safe Boiler Light up |
| Safe Rolling and Synchronization | Safe Duct Fabrication | Alignment |

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| | Prevention of Infectious diseases like Coronavirus |

However, these are only reference OCPs and following shall be ensured with information of BHEL:

a. The cost implications to implement these OCPs shall be borne by the contractor
b. The reference OCPs shall be suitably modified by contractor as per specific requirements.
c. In case any other OCP is found to be applicable during the execution of work at site, then contractor will prepare and follow those as well, within quoted rate.

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| **11.2** | **WORK PERMIT SYSTEM** |
| **1** | The following activities shall come under Work Permit System<br>i. Height working<br>ii. Hot working<br>iii. Confined space Work<br>iv. Excavation more than 2-meter depth<br>v. Radiography<br>vi. Heavy / Complex / Critical Lifting Activity<br>vii. Night / Holiday Work<br>viii. Material Loading / Unloading<br>ix. Grating, Safety Net, Safety Facility Removal<br>x. Live Electrical Maintenance etc. - Lockout / Tag<br>xi. Beam / truss/ duct/ structure alignment permit |
| **2** | HSEP12: HSE Procedure for Work Permit System" shall be followed while implementing permit system. Where customer is having separate Work Permit System the same shall be followed. |
| **3** | Permit applicant shall apply for general work permit and other permits as referenced above of particular work activity at particular location before starting of the work with Method Statement and HIRA/Job Hazard Analysis. |
| **4** | In case any Permit requirement is missing, work will not be allowed to proceed till all safeguards as required by the Permit and additional safety requirements to ensure safe execution of job are available. |
| **5** | Signatories shall periodically visit the area to confirm the availability of required safeguards. |
| **6** | Permit signatory (including contractor's package in-charge and safety officer) shall check that all the control measures necessary for the activity are in place and issue the permit to the permit holder. Only then the permit shall be issued. |
| **7** | Permit holder shall implement and maintain all control measures during the period of permit. He will close the permit after completion of the work. The closed permit shall be archived in HSE Department of site. |

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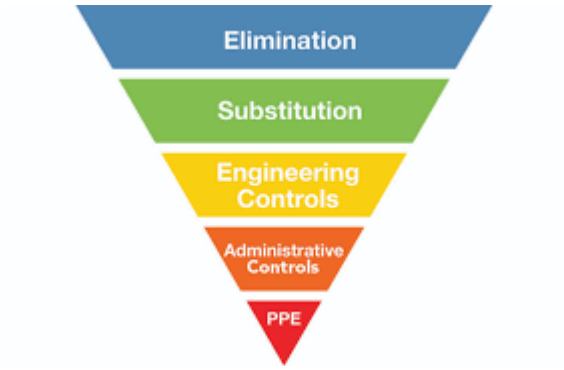
| **8** | Agency has to prepare and maintain all permit system documents treating it as their normal scope of work. These work permits are to be approved by BHEL/Customer before starting work and need to be closed on completion of specific jobs. All work permits will be specific period. Permits are to be displayed on job spot and in case job is spreaded in different locations, photocopies of permits are to be kept with area engineers/supervisors. |
| **11.3** | **SAFETY DURING HAZARDOUS OPERATIONS**<br>**The philosophy of hierarchy of controls as below shall be followed**<br>  <br>It shall be ensured that there are multiple protections against any accident/ incident. For example, for height work there shall be safe platforms and walkways, Safety Nets and Lifelines for hooking double lanyard Safety harness by workers.<br><br>Monitoring and modifying worker behavior shall be part of ensuring safety. All personnel should be competent and trained for the job.<br><br>Brief Safety guidelines for various hazardous activities are indicated below, besides the mandatory requirements based on Hazard Identification studies, HSE Procedures, Operational Control Procedures, Work Permits, applicable Indian Standard Codes and other provisions detailed in this document. Constant supervision at all times to be maintained by Execution & Safety Team to ensure implementation of these provisions. |
| **11.4** | **POWER SUPPLY & UPKEEP OF INSTALLATION –** |
| **1** | Only licensed person shall maintain and operate power installations. |
| **2** | All distribution boxes shall be locked and the key controlled by site management of concerned contractor. |
| **3** | Electrical appliance shall have proper earthling and for appliances equal to & more than 415V shall have two separate earthling as per IS: 3043:1987 |
| **4** | All temporary connection should be provided through 30mA ELCB/RCCB using 3 core double insulated cable and only 3 pin industrial plug top will be used for connection. |
| **5** | The working condition and sensitivity of ELCB/RCCB shall be checked periodically. |
| **6** | All fuses and fuse wires shall be of standard size and rating. |
| **7** | All power supplies through cables shall be underground or overhead with height > 3mtrs. |

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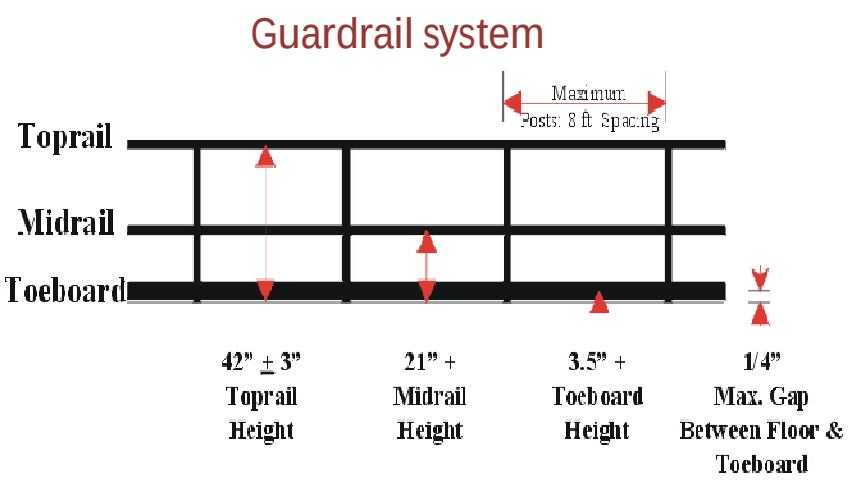
| **9** | TAG IN/ TAG OUT must be in force in Switch Room and all Distribution Boxes for live power line. The authorized person's name and contact no shall be displayed |
| **11.5** | **WORK AT HEIGHT:** |
| **1** | Height work is defined as any activity carried out 1.8 m above ground/ excavation |
| **2** | All height workers to be trained in height work and shall be tested and cleared in vertigo test. No untrained/ medically checked person shall be allowed to work at height. |
| **3** | Height workers shall be identifiable through Gate Pass and helmet marking. |
| **4** | All height workers shall wear double lanyard safety harness. The primary lanyard is never unhooked until the secondary lanyard is secure. Under no circumstances, worker to have both lanyards unhooked while at height. |
| **11.6** | **PRECAUTIONS AGAINST THE FALL OF MATERIALS AND PERSONS AND COLLAPSE OF STRUCTURE: -** |
| **1** | Adequate precautions should be taken such as the provision of fencing, or barriers to protect any person who might be injured by the fall of materials, or tools or equipment being raised or lowered. Cradle may be used for lifting materials or men- however this shall be made of MS angles and flats only and duly certified by the HSE officer. Operators may also use bags or box or sound ropes for lifting small tools. |
| **2** | Guardrails (including scaffolding) erected over/adjacent working areas must have the guardrails screened (opening < 0.5), to prevent material from falling outside the platform/decking. |
| **3** | Guardrails must be able to withstand a 200 pound force exert in any one direction. |
| **4** | Where necessary to prevent danger, guys, stays or supports should be used or other effective precautions should be taken to prevent the collapse of structures or parts of structures that are being erected, maintained, repaired, dismantled or demolished. |
| **5** | All openings through which workers are liable to fall should be kept effectively covered or fenced and indicated in the most appropriate manner. As far as practicable, guard-rails and toe-boards in accordance with Indian laws and regulations as depicted below: |
| **6** | **Guardrails and toe**-board/barricades and sound platform conforming to IS:4912-1978 should be provided.<br>  |

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| **7** | Use of retractable fall arrestor to be ensured in critical/ tricky areas. |
| **8** | Safety Net as per IS: 11057:1984 should be used extensively for prevention/ arrest of men and materials falling from height. The safety nets shall be fire resistant, duly tested and shall be of ISI marked and the nets shall be located as per site requirements to arrest or to reduce the consequences of a possible fall of persons working at different. |
| **9** | Reaching beyond barricaded area without lifeline support, moving with support of bracings, walking on beams without support, jumping from one level to another, throwing objects and taking shortcut must be discouraged. |
| **10** | Use of Rebar steel for making Jhoola and monkey-ladder (Rods welded to vertical or inclined structural members), temporary platform etc. must be avoided. Jhoola should be made with angles and flats and tested like any lifting tools before use. |
| **11** | Monkey Ladder should be properly made and fitted with cages. |
| **12** | Lanyard must be anchored always and in case of double lanyard, each should be anchored separately. |
| **13** | In case of pipe-rack, persons should not walk on pipes and walk on platforms only. |
| **14** | In case of roof work, walking ladder/ platform should be provided along with lifeline and/ or fall arrestor. |
| **15** | Empty drums must not be used. |
| **16** | For chimney or structure painting, both hanging platform and men should be anchored separately to a firm structure along with separate fall arrestor. Rope ladder should be discouraged. |
| **17** | Guardrails shall be provided to protect workers from falling from elevated work places. The rails are generally made of MS pipes of suitable dia. Rebar shall not be used for any handrails, ladder or cover purpose. Wherever the guard-rails and toe-boards cannot be provided:<br>*(a)* adequate safety nets or safety sheets shall be erected and maintained; or<br>*(b)* adequate safety harnesses shall be provided and used and or<br>*(c)* adequate fall arrestor shall be provided and used.<br><br>As mentioned under PPE clause, all these PPEs shall be defect free and regularly inspected for any defect. The full body safety harness shall have double lanyard only with max 1.8m length.<br><br>The monkey ladders shall have sufficient fall arrestors. Adequate lifelines of 8mm steel wire rope shall be provided across the work area.<br><br>The HSE officer shall recommend appropriate PPEs after analyzing hazards and risks involved.<br><br>Wherever necessary, life-line (8mm SS) and fall arrestor along with Polyamide rope or Retractable lifeline should be provided. Lifelines shall be connected to independent & |

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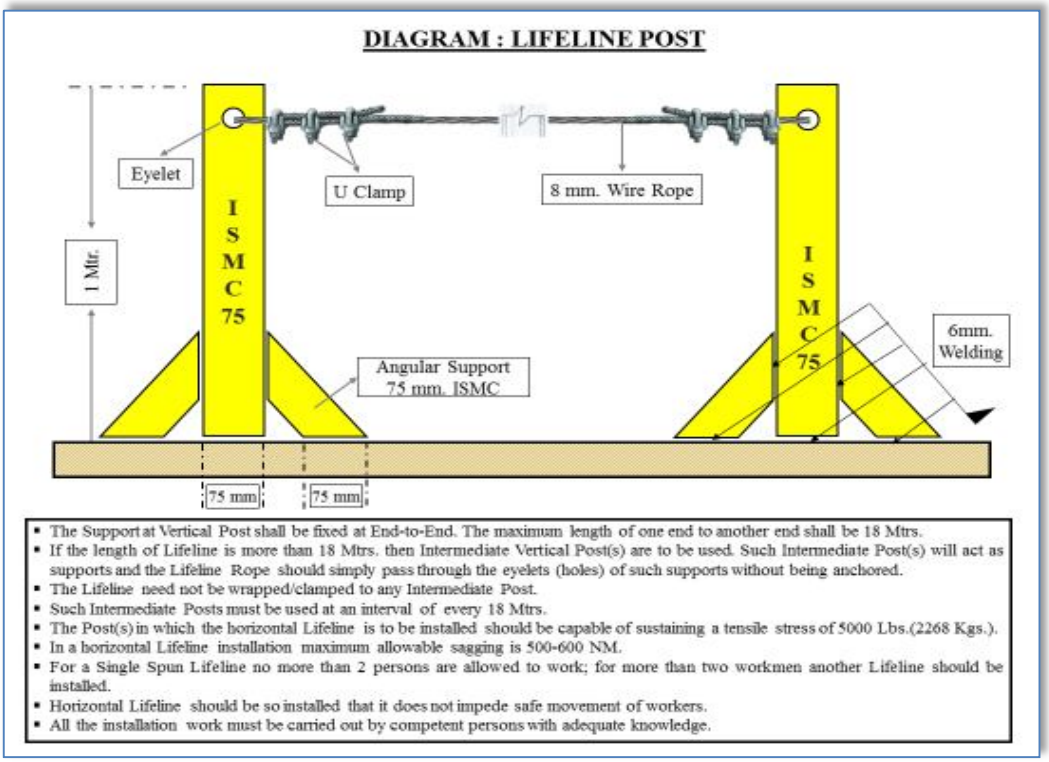
| | rigid structure. Lifeline is not to be installed on a structure which is temporary/ hanging for example a load being aligned.<br>  <br> |
| **11.7** | **SAFETY NETS: -** |
| **1** | All safety net systems shall meet the requirements of Indian Standard (IS: 5175) |
| **2** | Double Net System with one higher mesh size and lower mesh size to be used whenever work at height is in progress. Safety nets to be of 02 layers. |
| **3** | Safety net mesh openings shall have a maximum size of 6 inches x 6 inches and be secured at each crossing to prevent elongation of the opening. All nets must meet IS: 5175 standard. |
| **4** | Safety nets must be installed with sufficient clearance to prevent contact with the surface or structures under them |
| **5** | Safety nets shall be installed as close as possible to the working level but in no case more than 25 feet below the working level. |
| **6** | The safety nets shall extend out at least 8 ft. from the side of the open edge. |
| **7** | Material, equipment and other items that fall into the net are to be promptly removed. |
| **8** | Safety nets are to be inspected before use and then daily for wear or damage caused by falling materials. |
| **9** | Safety net installation shall be inspected by a competent person. |
| **10** | Safety nets must be installed below the working decks of the super structure for protection from falls of personnel and material. |

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| **11** | Safety nets and safety net installations must be drop-tested at the jobsite:<br>• After initial installation and before being used.<br>• Whenever relocated.<br>• After major repair.<br>• At 6-month intervals if left in one place. |
| **12** | The drop test consists of a 400-pound bag of sand 28-32 inches in diameter dropped into the net from the highest surface at which employees are exposed to fall hazards, but not from less than 42 inches above that level. |
| **13** | When the employer can demonstrate that it is unreasonable to perform the drop-test described above, the employer or a designated competent person shall certify that the net and net installation have sufficient clearance and impact absorption by preparing a certification record prior to the net being used as a fall protection system. The certification must include: |
| **14** | Identification of the net and net installation. |
| **15** | Date that it was determined that the net and net installation were in compliance. |
| **16** | Signature of the person making the determination and certification. |
| **11.8** | **NIGHT SHIFT WORK EXECUTION/ ACTIVITY**<br>Night shift operation shall be avoided to the extent possible, so shall be any complicated or heavy job. However, prior administrative approval shall be obtained from BHEL for such operation and a detailed work plan developed. The following shall be ensured: |
| **1** | Adequate illumination along access, work area and egress |
| **2** | Supervision |
| **3** | Issue of strict instruction to workmen not to stray away from the work area and earmarked approach |
| **4** | Non-deployment of women workforce |
| **5** | Non-deployment of fatigued workforce |
| **6** | Vacating the area immediately on completion of the job |
| **7** | Informing first-aid facility and ambulance in advance |
| **11.9** | **SAFETY WHILE WORKING AT HEIGHTS** |
| **1** | 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. |

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| **2** | 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. |
| **3** | 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. |
| **4** | Safety nets shall also be provided for saving them from fall from heights and such equipment should be in accordance with BIS standards. |
| **5** | 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. |
| **6** | The safety net should be in accordance with BIS Standards. |
| **7** | 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. |
| **8** | 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. |
| **9** | The only permissible personal fall arrest system is an industry approved safety harness. Employees can use positioning belts with two-D ring attachment points as long as they are used in conjunction with a safety harness. Safety harnesses must be secured to an overhead object of substantial capacity capable of supporting weight. In order to accomplish this and ensure 100% protection, the worker may need to use two lanyards. The primary lanyard is never unhooked until the secondary lanyard is secure. |
| **11.9.1** | **WORKING PLATFORMS** |
| **1** | Working platforms, gangways and stairways shall be so constructed that they do not sag unduly or unequally and if the height of the platform gangways provided is more than 3.6 m above ground level or floor level, |
| **2** | They shall be closely boarded and shall have adequate width which shall not be less than 750 mm and be suitably fenced. |
| **3** | Every opening in the floor or a building or in a working platform shall be provided with suitable means to prevent the fall of persons or materials by providing suitable fencing or railing whose minimum height shall be 90 cm. |
| **4** | Suitable scaffolds shall be provided for workmen for all works that cannot safely be done from the ground, or from solid construction except in the case of short duration of work which can be done safely from ladders. The scaffolds shall be duly checked and tagged by certified scaffolding inspector. |
| **5** | Safety related to chutes (i.e. used for removal of material shall be closed on all sides except their opening during construction & use) shall be ensure during execution / erection. |

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| **11.10** | **SAFETY IN THE USE OF HAND TOOLS AND POWER-OPERATED TOOLS** |
| **11.10.1** | **General provisions** |
| **1** | All hands and power tools and similar equipment, shall be maintained in safe condition. |
| **2** | All job-made/field-made tools are prohibited, unless designed with engineered stamp. |
| **3** | When power operated tools are designed to accommodate guards, they shall be equipped |
| **4** | with such guards, when in use; |
| **5** | Belts, gears, shafts, pulleys, sprockets, spindles, drums, fly wheels, chains and other reciprocating, rotating or moving parts of the equipment shall be similarly guarded; |
| **6** | 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; |
| **7** | 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. |
| **8** | 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. |
| **11.10.2** | **WALKWAYS AND PLATFORMS** |
| **1** | Walkways and platforms, at least two in each orthogonal direction, shall be provided inside the tower at distribution pipe level. walkways shall be at least 1000mm wide with 50 mm (minimum) safety toes along each edge. These walkways and platforms shall provide safe and clear access to all sprayers and all distribution pipes. A FRP platform of 1500 mm clear width shall be provided around the tower periphery which will be a means of access to next walkways and all end valves. Access ways shall be clear of all obstructions such as distribution pipe support beams, drift eliminator support beams, etc. The walkways shall be provided with transverse slots or other opening which will permit the free passage of air and water. |
| **2** | Contractor shall provide necessary approach & Platforms for all the instruments required during commissioning and testing. These approach platforms shall be provided to meet all required safety norms and these shall be of permanent nature. |
| **11.11** | **SCAFFOLDING SAFETY** |
| **11.11.1** | **SCAFFOLDS**<br><br>The contractor shall take all precautions to prevent any accidental collapse of scaffolding or fall of persons from scaffolding. The contractor should ensure that scaffoldings are designed by a competent person and it erection and repairs should be done under the expert |

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| | 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. |
| **1** | Every Scaffolds in their component shall be adequate construction, made of sound material & free from any defect and safe for the purpose for which it is intended for use. |
| **2** | The safe and efficient erection, use, dismantling, and storage of scaffolds, ladders and elevated work platforms are considered important objectives in maintaining a safe work environment. This procedure provides the guidelines for erection, use, dismantlement, and storage of scaffolding and elevated work platforms. |
| **3** | There is no such thing as a temporary scaffold. All scaffolds must be erected and maintained to conformed standard (IS 3696 & IS 4014). |
| **4** | The Scaffold Tagging defines satisfactory, incomplete or defective scaffolds. |
| **5** | Management must ensure or have each worker who performs work while on a scaffold trained by a person qualified in the subject matter to recognize the hazards associated with the type of scaffold being used and to understand the procedures to control or minimize those hazards. |
| **6** | Agency has to engage and retain trained scaffolding inspectors from statutory authorities/institutes in sufficient numbers right from job starting till job completion. |
| **7** | Scaffolding inspectors have to issue fitness certificates for each scaffolding and apply tags for safe use for respective job application to take care of load, heights etc. |
| **8** | Scaffolding pipes, clamps, safety nets, floor grills for working platforms are to be made of good quality with proper certifications as per IS Codes. |
| **9** | Scaffoldings to be used by sub-agencies should be of good quality |
| **10** | All Indian Standard (IS Code) related to Scaffolding Safety shall ensure/implemented during execution. |
| **11** | No Scaffold shall be erected, added, altered or dismantled except under the supervision of HSE Official. |
| **12** | In case of Scaffolding can't be used during execution, necessary warning notice/ scaffolding Tag shall be used all display at scaffold. |
| **13** | Adequate measure is taken to prevent displacement of standard of scaffold either by providing base plate or sole plate, as necessary. |
| **14** | All the safety measure related with scaffold platform shall ensure before use. Board, plank and decking used in working platform shall be adequate, uniform size & strength. |
| **15** | Adequate measure shall be taken to prevent injury which may be caused by fall of material or object by using safety Nets, temporary barricading area or other suitable means. |
| **16** | No material, concrete, other debris shall be allowed to accumulate at any platform on a Scaffold. |

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| **17** | No worker shall be permitted to work on scaffold that has been damaged or weakened unless adequate safety measure have been taken to ensure the safe use of scaffold. |
| **18** | There shall be no opening in any working platform allowing access to such working platforms. However, in case opening in platform is unavoidable, necessary safety measure along with safety net, safety belt etc shall be provided for protection against falling of object or worker. |
| **19** | Safe Access shall be provided for movement of worker from one working platform to another working platform. |
| **20** | Each side of working platform must be covered with suitable & safe guard and toe guard of adequate strength to prevent fall of any materials, tools & Workers. |
| **21** | In café of any rectification, alteration or modification in a scaffold or part thereof, needed to suit its use, shall be made in consultation with the BHEL HSE Official or Competent Authority. |
| **22** | The Contractor shall ensure all the necessary measures to prevent workers from coming into contact with the electrical wire or any dangerous equipment. |
| **23** | No part of the building shall be used as a support or part of scaffolding unless such a part of building is made of sufficient strength if any. |
| **24** | Hanging scaffolding shall not be used in areas of general movement. |
| **25** | After use, scaffolding shall be removed after clearing the area and taking necessary Work Permit for Safety Facility Removal. |
| **11.11.2** | **SCAFFOLD TAGGING**<br><br>Scaffolds being erected, modified or dismantled must be tagged as suitable for use. The scaffolds can only be accessed by those involved with the process.<br><br>**GREEN** scaffold tag- shall be fixed when scaffold is complete and safe for use, signed and dated by the scaffolding competent person daily.<br><br>**RED** scaffold tag – to be fixed if scaffold is defective and cannot be used, or is still under erection.<br><br>Examples of scaffold tags:<br><br> <br> |

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| **11.11.3** | **LADDER SAFETY** |
| **1** | Safe means of access shall be provided to all working places. |
| **2** | Every ladder shall be securely fixed and extended about 1 meter above top platform. |
| **3** | No portable single ladder shall be over 9 m in the length while the width between side rails in rung ladder shall in no case be less than app.29.2 cm for ladder up to and including 3 m in length. For longer ladders this width shall be increased at least ¼'' for each additional foot of length. |
| **4** | Monkey ladders shall be protected with cage(s). |
| **11.12** | **RADIOGRAPHY:** |
| **1** | Wherever the process requires examination by radiography, |
| **2** | CONTRACTOR /sub-contractor shall use approved radiography contractor for the work on site. |
| **3** | Site radiography shall be carried out after advance notification to the HSE officer and client personnel. All radiography on the site shall be subject to receipt of client/BHEL work permit and shall normally be performed outside of normal working hours. No ionizing radiation sources shall be left unsupervised whilst on site. |
| **4** | A minimum of 2 qualified persons from the radiography contractor are required for each activity involving ionizing radiation. Adequate warning signs shall be posted on barriers and the work area shall be marked off at a safe distance with tape or hard barricades prior to starting radiography by concerned job sub-contractor. |
| **5** | All personal executing radiography operations shall carry calibrated radiation monitoring devices at all times. |
| **6** | The storage of radioactive sources on the site is prohibited, they shall be present only for the time required to complete the work. Whilst not in use, radiation sources and their container shall be secured in a safe location with adequate warning signs displayed as per AERB guidelines. |
| **11.13** | **WELDING & GAS CUTTING SAFETY** |
| **1** | When possible, items to be welded, cut, heated, etc. shall be moved to a safe location free of combustible or flammable material. If this is not possible, then all combustibles/flammables that can be removed from the area shall be removed within a 35-foot circumference and a positive means of confining arcs and sparks generated by the process shall be taken and additional person(s) shall be stationed as fire watch for the area(s) still exposed, along with obtaining the Hot Work Permit as applicable. |
| **2** | Appropriate fire-fighting equipment is to be available in close proximity of any welding and gas cutting operations at all times. |
| **3** | Drums, tanks, and similar containers that have contained flammable or toxic material shall not be welded, cut, or heated until they have been made safe by water filling, thorough |

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| | cleansing, or similar accepted practices. The container shall also be ventilated during the welding, cutting, or heating process. |
| **4** | Proper ventilation is required for any welding or torch operations performed in a confined space. |
| **5** | Any welding or gas cutting operations performed on metals of toxic compounds or coating such as zinc, stainless steel, lead, cadmium, chromium, and beryllium shall be properly ventilated and/or proper respiratory protection shall be worn by any person that could be exposed to fumes, vapors, and gasses created by the welding and gas cutting processes. |
| **6** | Wherever it is practical, all arc welding operations shall be shielded to prevent direct light rays or sparks from contacting persons in the vicinity or from reaching areas normally used to travel through or into the vicinity. Where this is not practical, persons who shall be in the area are to use proper eye and skin protection. Other persons who are not participating in the welding or gas cutting operations are not to be allowed into the hazard zone. |
| **7** | Welders and other employees who are exposed to arc welding radiation shall wear suitable clothing and protective apparel to prevent burns and other types of ultraviolet radiation damage to the skin. |
| **8** | Arc welding machines shall be shut down when being moved or when they are not in continuous use. |
| **9** | Electrode holders left unattended shall have electrodes removed and shall not be left where they might contact employees or conducting objects. |
| **10** | Arc welding power supply cable shall be of proper rating and material, e.g. copper. |
| **11** | Welders shall guard against allowing materials adjacent to or behind them to reflect radiation back toward them or towards others in the area. Reflected radiation can cause skin burns and eye flash burns. |
| **12** | Compressed gas cylinders shall always be secured from tipping or falling, whether in use, in storage or in transit. The cylinders shall always be secured upright, except during times when actually being hoisted or carried. |
| **13** | Valve caps shall be in place when cylinders are not in use. Valve caps shall never be used for lifting the cylinder vertically. |
| **14** | Regulators shall be removed when cylinders are not in use or are in transit, unless the cylinder is firmly secured on a special carrier designed for this purpose. |
| **15** | Cylinders being transported by a powered vehicle shall be secured in an upright position. Gas cylinders are not allowed to be used in man-basket when occupied. |
| **16** | Cylinders containing oxygen or fuel gasses shall not be taken into confined spaces. |
| **17** | Oxygen cylinders shall be stored a minimum of (6) meters from fuel gas cylinders or shall have an approved firewall between them. |
| **18** | Torches shall only be lit by approved strikers; never with matches, cigarette lighters, or hot work. |

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| **19** | While carrying out job at height, the sparks or molten slag shall be prevented from falling down by putting a fire-resistant (non-asbestos) sheet or even MS Sheet. If such cannot be provided, the passage of falling sparks or molten slag shall be barricaded till ground floor and any cable/ tubes/ any other objects interfering in the passage shall either be removed or covered with Fire-resistant sheet or M S Sheet. |
| **20** | Separate sheds for all kinds of gases with clear demarcation/partition of empty & full cylinders/partly filled cylinders of gases are to be by agency. This clause is to be added. |
| **21** | Welding cable must be free from any repair or splices. However in case of any broken cable use, a minimum distance of 10 feet from the cable end to which the electrode holder is connected shall be used, except that cables with standard insulated connectors or with splices whose insulating quality is equal to that of the cable are permitted. |
| **22** | All safety precautions shall be taken for welding and cutting operations as per IS-818. |
| **23** | Flashback arrestors, ISI marked, shall be ensured at both cylinder and torch ends. |
| **24** | Pressure gauges shall be ensured and in working condition |
| **25** | Cylinders shall be protected from falling splinters by proper metallic cover |
| **11.14** | **RIGGING (Safe Rigging Practices):-** |
| **1** | Review the planned operation and requirements with the operator and rigging crew. |
| **2** | Ensure a pre-lift meeting is conducted with crane operator, tagline operator, signal personnel, and Safety Manager. |
| **3** | Designate a qualified person from the rigging crew to observe clearance of the equipment and give timely warning for all operations where it is difficult for the operator to maintain the desire clearance by visual means. |
| **4** | Clear the lift area of all unnecessary personnel. |
| **5** | Hydras shall only be allowed for loading & unloading works & shall not be allowed to move with load. Hydras are not allowed for materials transport. |
| **6** | Cranes, D-Shackles, Slings all lifting equipment are to tested by statutory authorities/approved by Third Party agency. Agencies with in their cost has to do it at least once in a year or as per applicable clauses regarding frequency of testing, inspection, fitness certification requirement. |
| **7** | Rigging equipment shall not be loaded in excess of its recommended safe working load. Rigging equipment, when not in use, shall be removed from the original work area so as not to present a hazard to employees. |
| **8** | To enhance HSE culture and create safe working environment at project site Rigging Handbook/ Leaflet shall be provided to all Riggers & their gangs. Rigger hand book/ Leaflet attached as Annexure-7. |

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| **11.15** | **LIFTING SAFETY** |
| **1** | It will be the responsibility of the contractor to ensure safe lifting of the equipment, taking due precaution to avoid any incident and damage to other equipment and personnel. |
| **2** | All the cranes and lifting tools & tackles shall be inspected on daily basis and as well as monthly by expert and as per the law, third party for annual certification. These shall be tested and certificates of fitness shall be obtained from 3rd party State Govt. approved competent agency before deploying at site and later periodically. The last date of Third Party Inspection and the next Due date shall be conspicuously displayed on all cranes. A copy of certificate shall be pasted on operator's cabin of all the lifting equipment. |

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| A | The manufacturer's instruction for maintenance shall also be followed. All safety measures shall be followed. |
| B | All tools tackles, lifting appliances, material-handling equipment etc. used by the contractor shall be of safe design and construction. |
| C | The operators, slingers and signalers shall be qualified as per IS 13367 (part-1):2003 "Safe use of cranes- code of practices". |
| D | There shall be a person responsible for co-ordination among cranes where multiple cranes are used, and lifting over 75% of the crane capacity to be avoided. |

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| **11.16** | **CRITICAL LIFTS** |
| **1** | A written rigging procedure and plan must be prepared for: |
| **2** | Lifts or movements over 50 tons |
| **3** | Lifting over 75% of crane capacity |
| **4** | Erection of process columns, towers or vessels, NSSS and turbine/generator systems. |
| **5** | Lifts over operating units/equipment |
| **6** | Other instances deemed prudent by the Company. |
| **7** | Lifts or movements of unusual difficulty, geometry or rigging. |
| **8** | Where required by contract. |
| **9** | Lifting a Personnel Basket. |
| | **Note: - Tandem operation for materials handling/ erection/ lifting/ lowering from heights needs to be approved by BHEL/ Customer.** |
| **11.17** | **LIFTING OPERATIONS** |
| **1** | All the cranes and lifting tools & tackles shall be inspected on daily basis and as well as formal monthly by expert and as per the law third party for annual certification. These shall be tested and certificates of fitness shall be obtained from 3rd party state govt. approved competent agency before deploying at site and later, periodically. The last date of Third Party |

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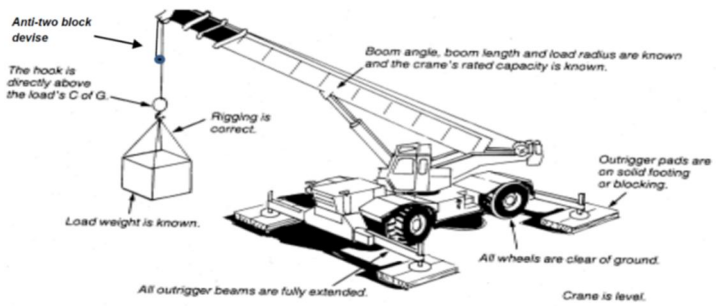
| | Inspection and the next Due date shall be conspicuously displayed on all cranes. A copy of certificate shall be pasted on operator's cabin of all the lifting equipment. |
| **2** | The manufacturer's instruction for maintenance shall also be followed. All safety measures shall be followed. All tools tackles, lifting appliances; material-handling equipment etc used by the contractor shall be of safe design and construction. The operators, slingers and signalers shall be qualified as per IS 13367 (part-1):2003 "Safe use of cranes- code of practices". |
| **11.18** | **CRANE APPLIANCE/EQUIPMENTS:** |
| **1** | On every crane or piece of hoisting equipment notices of all rated load capacities, recommended operating speeds, and any hazard warnings or special instructions shall be conspicuously posted. All instructions and warning shall be visible from the equipment operator's station. |
| **2** | Cranes shall have an Anti-Two-block safety device installed |
| **3** | All mobile cranes shall have overload and backup alarms |
| **4** | Load angle indicators and limit switch: - |
| **5** | All areas within swing radius of cranes that are potentially accessible by pedestrian, vehicular, or equipment movement shall be barricaded to prevent anyone or any vehicle or equipment from being struck by the crane or hoisting equipment, or its load(s). |
| **6** | No part of the lifting equipment or its load shall be within the distance as specified in the Indian Electricity Act from an energized power line |
| **7** | Cranes shall have annual certified third party inspection and be inspected before use by the operator. Any defects shall be corrected before use. Logs of crane inspection shall be kept with the crane. |
| **8** | Make certain that the rigging personnel, material, and equipment have the necessary capabilities for the job and are in safe condition. |
| **9** | Communicate with person(s) directly responsible for accomplishing the work and / or work area to establish requirements/responsibilities and make certain that all preparatory work is complete. |
| **10** | Mats/Pads must be used on all lifting equipment, equipped with out riggers. |
| **11** | Pick and carry must have the load secured to the rig in front. |
| **12** | Proper crane setup:<br>  <br> |

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| **11.19** | **HOISTING APPLIANCE/EQUIPMENT** |
| | Motors, gearing, transmission, electric wiring and other dangerous parts of hoisting appliances should be provided with efficient safe guards.<br><br>**Fencing of Machinery**<br>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. |
| **11.20** | **CYLINDERS STORAGE AND MOVEMENT (OR COMPRESSED GAS CYLINDER)** |
| **1** | Hose lines shall be adequately protected, inspected and tested for leaks in line with the safety Requirements. Flash back arrestor /NRV must be used at both ends of the hoses and all hose should be free from damage and fixed properly preferably using crimping clamps. Leakage test must be done before every use by soap solution and physical inspection of hose must be carried out regularly. Only trolley attached with wheel will be used for cylinder transportation in which cylinders must be kept secured with chain. Only Industrial type regulator fitted with two stage double dial pressure gauze is allowed to be used. |
| **2** | All gas cylinders shall be stored in upright position. |
| **3** | Suitable trolley shall be used. |
| **4** | There shall be flash-back arrestors conforming to IS-11006 at both cylinder and burner ends. |
| **5** | Damaged tube and regulators must be immediately replaced. |
| **6** | No of cylinders shall not exceed the specified quantity as per OCP |
| **7** | Cylinders shall be moved by tilting and rolling them on their bottom edges. |
| **8** | They shall not be intentionally dragged, struck or permitted to strike each other violently. |
| **9** | When cylinders are transported by powered vehicle they shall be secured in a vertical position. |
| **11.21** | **PAINTING**<br>Painting requirements – prior to commencement of painting job, provide a detailed procedure to be implemented by all concerned employees and sub-contractor involved in painting activities. |
| **11.22** | **DEMOLITION WORK** |
| | Contractor and Subcontractor must take prior permission from BHEL/ Customer (NTPC) and statutory body (if required) before any demolition work is commenced and also during the process of the work the following shall be ensured: |
| **1** | All roads and open areas adjacent to the work site shall either be closed or suitably protected. |
| **2** | No electric cable. or apparatus which is liable to be a source of danger nor a cable or an apparatus used by the operator shall remain electrically charged. |

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| **3** | All water supply line, Gas line etc. shall be put off and suitably capped before start of demolition work. |
| **4** | All practical steps shall be taken to prevent danger to persons employed from the risks of fire or explosion or flooding. No floor, roof or other part of the building shall be so overloaded with debris or materials as to render them unsafe. |
| **5** | All the laying material in exterior opening shall be removed before commencing any demolition work. |
| **6** | Ensure Safety / protection of adjacent structure, wall, partition if any during demolition work. |
| **7** | Ensure continues inspection to observe any hazard related to Floors or Walls or Loosen Material etc. during the demolition work. All the hazard observed shall be compliance immediately. |
| **8** | Ensure adequate display of Warning Sign, Safety Posters, barricading at the demolition area. |
| **9** | No persons other than Building workers & other persons essential to the operation of demolition work shall be permitted to enter a demolition zone along with substantial barricades. |
| **11.23** | **TOOLS & PLANTS** |
| **1** | All T&Ps/ MMEs should be of reputed brand/appropriate quality & must have valid test/calibration certificates bearing endorsement from competent authority of BHEL. Contractor to also submit monthly reports of T&Ps deployed and validity test certificates to BHEL safety Officer as per the format/procedure of BHEL. |
| **2** | All requisite tests and inspection of handling equipment, tools & tackle shall be periodically done by the contractor by engaging only the Competent Persons as per law. |
| **3** | Defective equipment or uncertified shall be removed from service. |
| **4** | Any equipment shall not be loaded in excess of its recommended safe working load. |
| **11.24** | **CHEMICAL HANDLING** |
| **1** | Displaying safe handling procedures for all chemicals such as lube oil, acid, alkali, sealing compounds etc. at work place where it is necessary to provide and/or store petroleum products or petroleum mixture & explosives, the contractor shall be responsible for carrying out such provision / storage in accordance with the rules & regulations laid down in the relevant petroleum act, explosive act and petroleum and carbide of calcium manual, published by the chief inspector of explosives of India. All such storage shall have prior approval if necessary from the chief inspector of explosives or any other statutory authority. The contractor shall be responsible for obtaining the same. |
| **2** | MSDS (Material Safety Data Sheets) for all chemicals shall be prominently displayed near respective storage areas |
| **3** | Availability of running service water near the activity area should be ensured. |
| **4** | Suitable and safe place for draining and neutralization of used chemicals should be kept identified. |

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| **5** | Chemical must be away from heat/steam and must be keep away from sunlight. |
| **6** | Disposal plan of chemicals must be ensured if required. ( Disposal plan can jointly prepared with BHEL/ Customer (NTPC). |
| **7** | **EMERGENCY PROVISIONS:**<br>a. Flushing and washing water supplies: Ample supplies of tepid flushing and washing water supplies shall be provided at all possible points of discharge, spillage or escape of chemicals.<br>b. Adequate provisions shall be made for emergency treatment of the eyes, comprising eye wash bottles, located conveniently to places where discharge, spillage or escape of chemicals can occur.<br>c. Safety shower and eye washer shall be provided near the location of chemical handling place.<br>d. A suitable first aid treatment room with outside telephone facilities shall be provided within a reasonable distance of the place where chemicals are being used. Chemicals shall be stored with proper identification and with necessary caution boards.<br>e. The protective clothing and apparatus required for emergency use shall be made available also near the acid cleaning area.<br>f. If signs of skin irritation occur the persons should be removed from contact and referred for medical opinion/ emergency. In the event of the splashing of the chemical to skin, the affected area should be washed thoroughly avoiding spreading contamination to the face and eyes.<br>g. Temperature limitations specified for various steps/ area should not be exceeded wherever applicable. |
| **8** | Posters & Danger boards sign for chemicals. |
| **11.25** | **CHEMICAL CLEANING** |
| **1** | The Contractor shall provide adequate safety and protective equipment for all his employees and ensure that they are worn at all times of danger. Specialized treatment equipment (such as required for first aid when using hydrofluoric acid/chemical) must be provided at the place of handling acid/chemical. |
| **2** | The hazardous substances and chemicals shall be stored in a cool, well ventilated, dry and covered space with restricted entry only |
| **3** | The loading, unloading, issue and use of these materials shall be strictly in accordance with the Material Safety Data Sheet (MSDS) and under strict supervision. Every supply shall accompany a MSDS as per standard purchase order clause. |
| **4** | The site HSE team shall maintain MSDS of all these items and the same shall be shared with the stores or the user as and when required. |
| **5** | Each container shall be labeled. |
| **6** | Damaged containers are replaced or repaired immediately. |

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| **7** | The stores shall check the expiry date of perishable chemicals while receiving and store in such a fashion so as to follow First-in-first-out queue. |
| **8** | There shall be enough space for movement of material and people in the stores. |
| **9** | Bulk chemical storage areas with secondary containment shall be provided so as to arrest spillage from spreading. |
| **10** | Dispose the cleanup waste to an industrial waste site or approved temporary storage location. |
| **11** | There shall be sufficient fire extinguishers and sand buckets in the stores and at point of use. In case of any spillage, dry sand shall be put on the spill and soaked sand shall be disposed as per the procedure for hazardous waste. |
| **12** | Control measures on use of flammable and combustible fluids shall be undertaken to limit quantities in storage area and cabinets. |
| **13** | There shall be provision of water preferably flowing one and a face shower at stores and point of use. |
| **14** | The persons handling these items shall strictly wear appropriate PPEs like Gum Boots & helmets, rubber/neoprene gloves, apron, required transparent face Mask shield etc. |
| **15** | No smoking signage should be displayed. |
| **16** | Availability of First Aid Box containing dilute ammonium hydroxide, 50% Sodium bicarbonate solution, eye lotion, Bandage, Tincture iodine, Cotton, Burnol etc. should be ensured |
| **11.26** | **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. |
| **1** | As specified by the appropriate authority and only Permissible explosives shall be used. |
| **2** | Smoking and open flames shall not be permitted near explosives and detonators storage magazine. |
| **3** | All the local laws, rules & regulations and relevant statutory provisions, shall be complied with. |
| **11.27** | **ELECTRICAL SAFETY** |
| **1** | Only electricians licensed by appropriate statutory authority shall be employed by the contractor to carry out all types of electrical works. |
| **2** | All electrical supply shall be provided through ELCB of 30mA sensitivity. |
| **3** | The working condition and sensitivity of ELCB shall be checked periodically. |

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| **4** | Providing adequate no. of 24 V sources and ensure that no hand lamps are operating at voltage level above 24 Volts. |
| **5** | Fulfilling safety requirements at all power tapping points. |
| **6** | High/ Low pressure welders to be identified with separate colour clothing. No welders will be deployed without passing appropriate tests and holding valid welding certificates. Approved welding procedure should be displayed at work place. |
| **7** | The contractor shall not use any hand lamp energized by Electric power with supply voltage of more than 24 volts in confined spaces like inside water boxes, turbine casings, condensers etc. |
| **8** | All portable electric tools used by the contractor shall have safe plugging system to source of power and be appropriately earthed. Details of earth resource ad their test date to be given to BHEL safety officer as per the prescribed formats of BHEL |
| **9** | The contractor shall use only properly insulated and armored cables which conform to the requirement of Indian Electricity Act and Rules for all wiring, electrical applications at site. |
| **10** | BHEL reserves the right to replace any unsafe electrical installations, wiring, cabling etc. at the cost of the contractor. |
| **11** | All electrical appliances used in the work shall be in good working condition and shall be properly earthed. |
| **12** | No maintenance work shall be carried out on live equipment. |
| **13** | The contractor shall maintain adequate number of qualified electricians to maintain his temporary electrical installations. |
| **14** | Area wise Electrical safety inspection is to be carried out on monthly basis as per “Electrical Safety Inspection checklist’ and the report is to be submitted to BHEL safety officer |
| **15** | Adequate precautions shall be taken to prevent danger for electrical equipment. No materials on any of the sites of work shall be so stacked or placed as to cause danger or inconvenience to any person or the public |
| **16** | The contractor shall carefully follow the safety requirement of BHEL/ the purchaser with the regard to voltages used in critical areas. |
| **17** | Lockout/ Tag out Permit shall be taken for work on live installations |
| **18** | Double earthling protection must be provided for every electrical equipment and earthing value should be less than 1 Ohm |
| **19** | Deployment of trained, experienced & licensed electrician as well as licensed electrical supervisor must be ensured at site as per the Indian Electricity Rules, 1956. |
| **20** | All PPE’ s used while being involved in electrical work must be as per IS Standards available for electrical work |
| **21** | All motor/ rotatory equipment shall be with key operated switch. |

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| **22** | Adequate/ Good Quality electric tester must be used to check the availability of Low Voltage (up to 415V). |
| **23** | Adequate/ - Good quality Insulation tester must be used for charging of electrical equipment's or LV/MV/HV power cables |
| **24** | Adequate ELCB feeder must be used for checking of ELCB/ RCCB. |
| **25** | Adequate/ Suitable quality earth rods must be used before coming in close contact of shutdown equipment's for any maintenance. |
| **26** | Rubber mat must be used whenever applicable (i.e. electric panel/ connection shed/room etc) |
| **27** | Whenever applicable fuse pullers must be used for insertion & removal of fuses along with electrical gloves. |
| **28** | Cable locator to be used before excavation at the workplace. |
| **29** | High Voltage buried cables to work with electrical safety TAG above the ground for alarm/attention. |
| **30** | Suitable Fire Extinguisher must be used during Electrical Fire accident. (i.e. dry type fire extinguisher etc.) |
| **11.28** | **FIRE SAFETY (Viz. Fire Extinguisher & Other Appliances of Fire Fighting)** |
| **11.28.1** | **Fire prevention, protection & preparedness –** |
| **1** | The Fire Prevention, Protection and Prepardness Program is an integral part of the overall HSE Program. Effort and consideration must be given to safety, life and potential for delays in construction schedules and plant startup, as well as protection of property on a given project. |
| **2** | The purpose of which is to prevent –<br>• Inception of fire<br>• Loss of life or personal injury<br>• Loss of Property<br>• Interruption of operations |
| **3** | Site-in-charge / Safety Officer will make periodical review of the site Fire Protection, Prevention Preparedness Programme, Site conditions and available fire protection equipment. It is very imperative that the Sub-contractor along with CONTRACTOR to establish good contact with Local fire station for availability of Fire tender in case of emergencies, in addition to their own fire equipment. |
| **4** | Fire Protection, Prevention and Preparedness Inspections - The Contractor /Sub-Contractor will be required to make frequent fire prevention inspections of his work site and operating facilities. Deficiencies will be corrected at once. |
| **5** | Area where Hot work activities are carried out (Gas cutting / Welding/ any other spark producing work) above a working spot, a GI / fire-resistant non-asbestos sheet or suitable |

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| | material shall be placed to prevent the fall of hot sparks. A bucket of water shall be kept nearby while doing hot work |
| **6** | Hot work shall be preferably carried out in a designated area with a standing Hot Work Permit, to be renewed monthly. The designated area shall have fire extinguishers. |
| **7** | Any hot work outside designated area shall require a Hot Work permit and fire watch. |
| **8** | Emergency telephone number to be displayed at all conspicuous places. |

**Fire Extinguisher Chart**

| Extinguisher | | Type of Fire | | | | |
|---|---|---|---|---|---|---|
| Colour | Type | Solids (wood, paper, cloth, etc) | Flammable Liquids | Flammable Gasses | Electrical Equipment | Cooking Oils & Fats |
| | Water | ✓ Yes | ✗ No | ✗ No | ✗ No | ✗ No |
| | Foam | ✓ Yes | ✓ Yes | ✗ No | ✗ No | ✓ Yes |
| | Dry Powder | ✓ Yes | ✓ Yes | ✓ Yes | ✓ Yes | ✗ No |
| | Carbon Dioxide (CO2) | ✗ No | ✓ Yes | ✗ No | ✓ Yes | ✓ Yes |

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| **11.28.2** | **General flammable material storage requirements:** |
| **1** | All flammable material shall be stored in deigned areas and/or in flammable storage cabinets, as necessary. |
| **2** | Fire extinguishers shall be located nearby and have unobstructed access |
| **3** | Numbers and types of Fire Extinguishers shall be ensured as per Annexure-4. |
| **4** | Providing appropriate firefighting equipment at designated work place and nominate a fire officer/warden adequately trained for his job. |
| **5** | Contractor shall provide enough fire protecting equipment of the types and numbers at his office, stores, temporary structure in labor colony etc. Such fire protection equipment shall be easy and kept open at all times. |
| **6** | The fire extinguishers shall be properly refilled and kept ready which should be certified at periodic intervals. The date of changing should be marked on the Cylinders. |
| **7** | All other fire safety measures as laid down in the “IS Codes for fire safety at construction site” issued by safety coordinator of BHEL shall be followed. |

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| **8** | Non-compliance of the above requirement under fire protection shall in no way relieve the contractor of any of his responsibility and liabilities to fire incident occurring either to his materials or equipment or those of others. |
| **9** | Emergency contacts nos must be displayed at prominent locations |
| **10** | Tarpaulin being inflammable should not be used (instead, only non-infusible covering materials shall be used) as protective cover while preheating, welding, stress relieving etc. at site. |
| **11** | Fire extinguishers shall be inspected at least annually by a certified person and visually inspected monthly and documented by the Contractor |
| **12** | No smoking shall be allowed at or in the vicinity of operations, which constitute fire hazards and shall be conspicuously posted with No smoking or open flame signs. |
| **13** | The contractor shall educate his or his contractors' men working in the vicinity of fire risk, on how to operate this equipment and know in particular circumstances which type of extinguishers is to be used |
| **11.29** | **EXCAVATION**<br>All safety precautions shall be taken for foundation and other excavation marks as per IS-3764.Wherever there is open excavation in ground, they shall be fenced off by suitable railing and danger signals installed at night so as to prevent persons slipping in to the excavations.<br>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.<br>**The following safety measures are to be ensured before and during excavation:** |
| **1** | Check for underground utilities like electrical / telephone cables, sewage, water lines and proper care has to be exercised to protect and prevent damage to it. |
| **2** | Proper and adequate slope is maintained while excavating. |
| **3** | Adequate shoring or sheeting is done wherever require to prevent soil sliding. |
| **4** | Safe access through ladder or steps for exit & entry to excavation. |
| **5** | No material /excavated soil is kept within one meter from the edge. |
| **6** | Safe way is planned and provided for movement of HEM /transport equipment near excavation. |
| **7** | Safety helmet and shoes/gum boots are provided and worn by the workmen at excavation works. |
| **8** | Dewatering arrangement is made where water seepage is prevailed. |
| **9** | Stop blocks are provided to avoid vehicles reversing into the excavated trenches. |
| **10** | Danger signs /Caution boards are displayed at work spot. |

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| **11** | Barricading is provided at excavated pits. |
| **12** | Ensure adequate illumination at workplace where excavation works are carried out. |
| **13** | Ensure adequate safety for worker in the affected zone or in the work area of excavation from collapse. |
| **14** | All struts, brasses and walls if any in excavation shall be adequately secured along with all safety measures so as to prevent any accident. |
| **15** | No loose material shall be kept very close to excavated area, possibility of falling into excavated area, a safe distance or at least 1 meter shall be maintained. |
| **16** | To carry out safe excavation, it is to ensure any hazard related to excavation shall be compliance or all the safety measure to avoid unsafe condition to such excavation. |
| **17** | Suitable warning sign or safety poster shall be displayed at prominent places to create awareness among workers. |
| **18** | Ladders, staircases or ramps are provided, as the case may be, for safe access to and egress form excavation where the depth of such excavation exceeds one point 1.5 m and such ladders, staircases or ramps comply with the relevant national standards (IS Code). |
| **19** | Any machinery used in excavation work shall be positioned and operated in such a way that such machinery will not endanger the operator of such machinery or any other person in/worker the vicinity. |
| **20** | Suitable breathing apparatus shall be provided to a building worker while working in compressed air environment for his use at excavation work and such breathing apparatus shall be maintained in good working condition at all times. |
| **21** | Signal man along with whistles shall be made available at all times at the locations as are necessary for the safety of persons at excavation area for vehicle movement. |
| **22** | Adequate number and types of fire extinguishers, in accordance with relevant national standards, shall be provided and made readily available to fight any outbreak of fire at an excavation or tunneling work. |
| **23** | Fire extinguishers with vaporizing liquids and high pressure carbon dioxide shall not be used in tunnels or other confined spaces. |
| **24** | All portable electrical hand tools and inspection lamps used underground or in a confined space shall be operated at a voltage not exceeding 24 V. |
| **25** | Adequate numbers of differential ground fault circuit breakers shall be installed for every electrical distribution system and its sub-systems used at an excavation work. |
| **26** | There shall be no exposed live wire in working areas at an excavation work which are accessible to building workers other than those authorized to work on such live lines. |
| **27** | Ensure NO entry to person who has consumed alcoholic drink. |
| **11.30** | **BATCHING PLANT** |
| **1** | Installation of external Electric moto-vibrators in the feeding hopper of all batching plants to reduce human intervention. |
| **2** | Installation of safety devices like pull-chord on both the sides of conveyor for stopping the conveyor in emergency |
| **3** | Workers carrying cement / sand to be given appropriate PPEs like respiratory masks & gloves. |
| **4** | Conveyor belt/rotating parts must be guarded properly. |

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| **5** | Safety awareness shall be inculcated in workmen about the risk involved in rotating parts. |
| **6** | The agency shall ensure to erect the batching plant as per original drawing including installation of all safety devices as provided by manufacturer and witnessed by BHEL in-charge before starting of machine in future. |
| **7** | Adequate/ Suitable safety norms must be followed at ASH Silo. (If required Checklist shall be prepared at Project site). |
| **11.31** | **HSE PREPAREDNESS FOR ADVERSE CLIMATES AND WEATHER** |
| **1** | The contractor shall ensure HSE precautions for adverse weather and climatic conditions, epidemics & pandemics as per Annexure 5 |
| **2** | In addition, site to remain updated on possible adverse weather conditions through reliable sources and all precautions taken accordingly. |
| **11.32** | **ENVIRONMENTAL CONTROL & SOCIAL RESPONSIBILITY** |
| **1** | Environment protection has always been given prime importance by BHEL. Environmental damage is a major concern of the principal contractor and every effort shall be made, to have effective control measures in place to avoid pollution of Air, Water and Land and associated life. Banned substances like asbestos and Chlorofluorocarbons such as carbon tetrachloride and trichloroethylene shall not be used. Waste disposal shall be done in accordance with the guidelines laid down in the project specification. |
| **2** | Any chemical including solvents and paints, required for construction shall be stored in designated bonded areas around the site as per Material Safety Data Sheet (MSDS). |
| **3** | In the event of any spillage, the principle is to recover as much material as possible before it enters drainage system and to take all possible action to prevent spilled materials from running off the site. The contractor shall use appropriate MSDS for clean-up technique |
| **4** | All contractors shall be responsible for the cleanliness of their own areas. |
| **5** | Regular dust suppression using sprinklers shall be carried out in respective area. |
| **6** | The contractors shall ensure that noise levels generated by plant or machinery are as low as reasonably practicable. Where the contractor anticipates the generation of excessive noise levels from his operations the contractor shall inform to Construction Manager of BHEL accordingly so that reasonable & practicable precautions can be taken to protect other persons who may be affected. |
| **7** | It is imperative on the part of the contractor to join and effectively contribute in joint measures such as tree plantation, environment protection, contributing towards social upliftment, conversion of packing woods to school furniture, enhancing good relation with local populace etc. |
| **8** | The contractor shall carry out periodic air and water quality check and illumination level checking in his area of work place and take suitable control measure. |
| | **EXCESSIVE NOISE:** |
| **A** | Adequate measures shall be taken against the harmful effects of an excessive noise; |
| **B** | Use of earplugs/muffs and anti-vibration gloves shall be ensured to protect the workers from the impact of exposure to such dangers; |
| **C** | The noise level in no case shall exceed as prescribed under the Indian standard. |
| **11.33** | **HOUSEKEEPING** |
| **1** | The contractor shall ensure that their work area is kept clean, tidy and free from debris generated by their activities. All debris/scrap should be stored in separate bins. The work |

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| | areas must be cleaned on a daily basis and a full cleaning session of each area shall be conducted on a weekly basis. All equipment, materials and vehicles shall be stored in an orderly manner. Access to emergency equipment, exits, telephones, safety showers, eye wash stations, fire extinguishers, pull boxes, fire hoses, etc. shall not be blocked or otherwise disturbed, restricted or delayed. |
| **2** | Keeping the work area clean/ free from debris, removed scaffoldings, scraps, insulation/sheeting wastage /cut pieces, temporary structures, packing woods etc. will be in the scope of the contractor. Such cleanings have to be done by contractor within quoted rate, on daily basis by an identified group. If such activity is not carried out by contractor / BHEL is not satisfied, then BHEL may get it done by other agency and actual cost along with BHEL overheads will be deducted from contractor's bill. Such decisions of BHEL shall be binding on the contractor. |
| **3** | Proper housekeeping to be maintained at work place and the following are to be taken care of on daily basis. |
| **4** | All surplus earth and debris are removed / disposed of from the working areas to identified locations. |
| **5** | Unused/Surplus cables, steel items and steel scrap lying scattered at different places/elevation within the working areas are removed to identified locations. |
| **6** | Different work places for easy collection of scrap/waste. Scrap chute shall be installed to remove scrap from high location. |
| **7** | Workmen shall be educated through tool box talk about the importance of housekeeping and encourage not to litter. |
| **8** | Labour camp area shall be kept clear and materials like pipes, steel, sand, concrete, chips and bricks, etc. shall not be allowed in the camp to obstruct free movement of men and machineries. |
| **9** | Fabricated steel structures, pipes & piping materials shall be stacked properly. |
| **10** | No parking of trucks/trolleys, cranes and trailers etc. shall be allowed in the camp, which may obstruct the traffic movement as well as below LT/HT power line. |
| **11** | Utmost care shall be taken to ensure over all cleanliness and proper upkeep of the working areas |
| **12** | Keeping the work area clean/ free from debris, removed scaffoldings, scraps, insulation/sheeting wastage /cut pieces, temporary structures, packing woods etc. will be in the scope of the contractor. Such cleanings have to be done by contractor within quoted rate, on daily basis by an identified group. If such activity is not carried out by contractor / BHEL is not satisfied, then BHEL may get it done by other agency and actual cost along with BHEL overheads will be deducted from contractor's bill. Such decisions of BHEL shall be binding on the contractor. |
| **13** | Dedicated Housekeeping gangs shall be deployed, who shall be provided all required PPEs and safety training. |
| **14** | Mass housekeeping shall be carried out for half a day in a week. |
| **15** | Sufficient waste bins shall be provided at different work places for easy collection of scrap/waste. Scrap chute shall be installed to remove scrap from high locations. |
| **16** | Fabricated steel structures, pipes & piping materials shall be stacked properly. |
| **17** | Utmost care shall be taken to ensure over all cleanliness and proper upkeep of the working areas. |

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| **11.34** | **ACCESS TO AND FROM THE WORKPLACE** |
| **1** | Safe, clean, well lit, unencumbered access and egress to and from work areas shall be maintained at all times in normal operating conditions. |
| **2** | The number and location of accesses and egresses from and to the workplace shall be adapted to the number of people likely to be present at any time, and therefore to evacuate from the workplace in case of emergency. |
| **3** | If access and egress to work areas are restricted due to operational conditions (e.g. access restricted due to pressure testing, etc.), alternative access and egress ways must be implemented, so far as is reasonably practicable. If this is not reasonably practicable, all concerned organizations and persons must be informed of the access restrictions, and work scheduling must be adapted in consequence. |
| **4** | Temporary access to height or into ground openings shall be of purpose made material such as scaffolds, stair cases/towers and ramps, which incorporate guardrails. |
| **11.35** | **WASTE MANAGEMENT** |
| **1** | There are operations on construction projects that may create hazardous waste, which would require handling, storage, transferring, and transporting. Therefore, hazardous waste guidelines apply for Hazardous Waste Planning: |
| **2** | Take suitable measures for waste management and environment related laws/legislation as a part of normal construction activities. Compliance with the legal requirements on storage/ disposal of paint drums (including the empty ones), Lubricant containers, Chemical Containers, and transportation and storage of hazardous chemicals will be strictly maintained. |
| **11.35.1** | **MINIMUM REQUIREMENTS:** |
| **1** | Contractor must designate a Material Manager who is responsible for checking delivered materials as potential hazardous waste and informing the Contractor's Safety Manager. |
| **2** | Contractor who create, may be expected to create or could accidentally create a material that could be classified to be hazardous waste must provide Disposal number (or equivalent) and other pertinent information on file. |
| **3** | All hazardous waste or waste which could be considered hazardous waste, as determined by the methodology and definitions from environmental regulators must be stored and collected in special areas and properly disposed of by the Contractor. |
| **4** | No waste haulers, disposers, recyclers, or scavengers will be allowed on the site without the permission of the owner. It will be the responsibility of the Contractor to provide copies of all licenses, permits, and authorizations to the. |
| **5** | No waste may be removed from the site by any person without the authorization of the Contractor. No waste may be brought onto the site and disposed of using the Contractor's systems or facilities. |
| **6** | Take suitable measures for waste management and environment related laws/legislation as a part of normal construction activities. Compliance with the legal requirements on storage/ disposal of paint drums (including the empty ones), Lubricant containers, Chemical Containers, and transportation and storage of hazardous chemicals will be strictly maintained. |
| **7** | Details of E-Waste, Hazardous Waste, biomedical waste etc. and their disposal plan, shall be submitted to BHEL every 6 months as per Formats No HSEP:14-F17 and HSEP:14-F18. |

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| **11.36** | **BINS AT WORK PLACE** |
| **1** | Sufficient rubbish bins shall be provided close to workplaces. |
| **2** | Bins should be painted yellow and numbered. |
| **3** | Sufficient nos. of drip trays shall be provided to collect oil and grease. |
| **4** | Sufficient qty. of broomsticks with handle shall be provided. |
| **5** | Adequate strength of employees should be deployed to ensure daily monitoring and service for waste management. |
| **11.37** | **STACKING AND STORAGE PRACTICE** |
| **1** | Contractor Agency shall ensure stacked material is bonded on a stable and level footing capable of carrying the mass of the stack. Adequate clearances shall be provided between the sides of the stack and top to facilitate unimpeded access to service equipment like overhead wiring, cranes, forklifts and firefighting equipment, and hoses. Circular items shall be sufficiently choked with wedges not with odd bits of materials. Free-standing stacks of gunny bags and sacks such as Cement bags shall be stacked to prescribe safe stacking heights with layers formed for stable bonding, preventing slippage causing accidents. Stacking against walls shall not be permissible. |
| **2** | Contractor shall maintain the premises and surrounding areas in clean and clear manner with safe access and egress. There shall be sufficient and adequate storage racks, shelving, bins and pallets and material handling equipment to stack his construction materials such as Pipes, Structural and his construction enabling materials. Unwanted materials shall be promptly moved away for efficient material movement. |
| **3** | Any temporary store shed will be built in conformity with fire safety requirements. The stores must be provided with adequate lighting arrangement (Flame proof / intrinsically safe depending upon the Zone category) and must be equipped with sufficient fire extinguishing arrangement. “No Smoking” and other relevant signage must be displayed conspicuously at strategic locations and safety precautions must be strictly enforced. |
| **11.38** | **OVERHEAD PROTECTION** |
| **1** | 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. |
| **2** | 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. |
| **11.39** | **STORAGE AND COLLECTION** |
| **1** | Different types of rubbish/waste should be collected and stored separately. |
| **2** | Paper, oily rags, smoking material, flammable, metal pieces should be collected in separate bins with close fitting lids. |
| **3** | Rubbish should not be left or allowed to accumulate on construction and other work places. |
| **4** | Do not burn construction rubbish near working site. |
| **11.40** | **SEGREGATION** |
| **1** | Earmark the scrap area for different types of waste. |
| **2** | Store wastes away from building. |
| **3** | Oil spill absorbed by non-combustible absorbent should be kept in separate bin. |
| **4** | Clinical and first aid waste stored and incinerated separately. |

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| **11.41** | **DISPOSAL** |
| **1** | Sufficient containers and scrap disposal area should be allocated. |
| **2** | All scrap bin and containers should be conveniently located. |
| **3** | Provide self-closing containers for flammable/spontaneously combustible material. |
| **4** | Keep drainage channels free from choking. |
| **5** | Make schedule for collection and disposal of waste. |
| **11.42** | **WARNING AND SIGNS** |
| **1** | Appropriate sign to be displayed at scrap storage area |
| **2** | No toxic, corrosive or flammable substance to be discarded into public sewage system. |
| **3** | Waste disposal shall be in accordance with best practice. |
| **4** | Comply with all the requirements of Pollution Control Board (PCB) for storage and disposal of hazardous waste. |
| **11.43** | **TRAFFIC MANAGEMENT SYSTEM** |
| **11.43.1** | **SAFE WORKPLACE TRANSPORT SYSTEM** |
| **1** | Traffic routes in a work place shall be suitable for the persons or vehicles using them. This shall be sufficient in number and of sufficient size. This shall reflect the suitability of traffic routes for vehicles and pedestrians. |
| **2** | Where vehicles and pedestrians use the same traffic routes there shall be sufficient space between them. Where necessary all traffic routes must be suitably indicated. Pedestrians or vehicles must be able to use traffic routes without endangering those at work. There must be sufficient separation of traffic routes from doors, gates and pedestrian traffic routes. |
| **3** | For internal traffic, lines marked on roads / access routes and between buildings shall clearly indicate where vehicles are to pass. |
| **4** | Temporary obstacles shall be brought to the attention of drivers by warning signs or hazard cones. |
| **5** | Speed limits shall be clearly displayed for each kind of vehicle. |
| **6** | Speed ramps preceded by a warning signs or marker are necessary. |
| **7** | The traffic route should be wide enough to allow vehicles to pass and re-pass oncoming or parked traffic and it may be advisable to introduce on-way system or parking restrictions. |
| **8** | Safest route shall be provided between places where vehicles have to call or deliver. |
| **9** | Avoid vulnerable areas/items such as fuel or chemicals tanks or pipes, open or unprotected edges and structures likely to collapse. |
| **10** | Safe areas shall be provided for loading and unloading. |
| **11** | Avoid sharp or blind bends. If this is not possible hazards should be indicated e.g. blind corner. |
| **12** | Ensure road crossings are minimum and clearly signed. |
| **13** | Entrance and gateways shall be wide enough to accommodate a second vehicle without causing obstruction. |
| **14** | Set sensible speed limits which are clearly sign posted. |

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| **15** | Where necessary ramps should be used to retard speed. This shall be preceded by a warning sign or mark on the road. |
| **16** | Forklift trucks shall not pass over road hump unless of a type capable of doing so. |
| **17** | Overhead electric cable, pipes containing flammable hazardous chemical shall be shielded by using goal posts height gauge posts or barriers. |
| **18** | **Road traffic** signs shall be provided on prominent locations for prevention of incidents and hazards and for quick guidance and warning to employees and public. Safety signs shall be displayed as per the project working requirement and guideline of the state in which project is done. Vehicles hired or used shall not be parked within the 15m radius of any working area. Any vehicle, that is required to be at the immediate/near the vicinity, shall be approved by the person in-charge of the site. |
| **11.43.2** | **TRAFFIC ROUTE FOR PEDESTRIANS** |
| **1** | Where traffic routes are used by both pedestrians and vehicles road shall be wide enough to allow vehicles and pedestrians safely. |
| **2** | Separate routes shall be provided for pedestrians to keep them away from vehicles. Provide suitable barriers/guard at entrances/exit and the corners or buildings. |
| **3** | Where pedestrian and vehicle routes cross, appropriate crossing shall be provided. |
| **4** | Where crowd is likely to use roadway e.g. at the end of shift, stop vehicles from using them at such times. |
| **5** | Provide high visibility clothing for people permitted in delivery area. |
| **11.43.3** | **WORK VEHICLE**<br>Work vehicle shall be as safe stable efficient and roadworthy as private vehicles on public roads. Site management shall ensure that drivers are suitably trained. All vehicle e.g. heavy motor vehicle forklift trucks dump trucks mobile cranes shall ensure that the work equipment conforms to the following: |
| **1** | A high level of stability. |
| **2** | A safe means of access/egress. |
| **3** | Suitable and effective service and parking brakes. |
| **4** | Windscreens with wipers and external mirrors giving optimum all round visibility. |
| **5** | Provision of horn, vehicle lights, reflectors, reversing lights, reversing alarms. |
| **6** | Provision of seat belts. |
| **7** | Guards on dangerous parts. |
| **8** | Driver protection - to prevent injury from overturning and from falling objects/materials. |
| **9** | Driver protection from adverse weather. |
| **10** | No vehicle shall be parked below HT/LT power lines. |
| **11** | Valid Pollution Under Control certification for all vehicles |
| **11.43.4** | **DAILY CHECK BY DRIVER** |
| **1** | There should also be daily safety checks containing below mentioned points by the driver before the vehicle is used. |

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| Brakes | Mirrors | Warning signals |

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| | Tires | Windscreen waters | Specific safety system i.e. control interlocks | |
| | Steering | Wipers | | |

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| **2** | Management should ensure that drivers carry out these checks. |
| **11.43.5** | **TRANSPORTATION OF PERSONNEL AND MATERIALS BY VEHICLES** |
| **1** | All drivers shall hold a valid driving License for the class of vehicle to be driven and be registered as an authorized BHEL driver with the Administration Department. |
| **2** | Securing of the load shall be by established and approved methods, i.e. chains with patented tightening equipment for steel/heavy loads. Sharp corners on loads shall be avoided when employing ropes for securing. |
| **3** | All overhangs shall be made clearly visible and restricted to acceptable limits |
| **4** | Load shall be checked before moving off and after traveling a suitable distance. |
| **5** | On no account is construction site to be blocked by parked vehicles Drivers of vehicles shall only stop or park in the areas designate by the stringing foreman. |
| **6** | Warning signs shall be displayed during transportation of material. |
| **7** | All vehicles used by BHEL shall be in worthy condition and in conformance to the Land Transport requirement. |
| **11.43.6** | **MAINTENANCE** |
| | All Vehicles used for transportation of man and material shall undergo scheduled inspections on frequent intervals to secure safe operation. Such inspections shall be conducted in particular for steering, brakes, lights, horn, doors etc. Site management shall ensure that work equipment is maintained in an efficient, working order and in good repair. Inspections and services carried out at regular intervals of time and or mileage. No maintenance shall be carried below HT/LT power lines. |
| **11.44** | **EMERGENCY PREPAREDNESS AND RESPONSE PLAN**<br>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.<br>This plan covers fire, medical and other environmental incidents. It aims at controlling the emergency and generally mitigating the adverse effects of a major Incident. This plan is applicable to all activities carried at the project site. Determination of hazard potential and identification and assessment of hazards is the first part in emergency planning. This requires systematic study of the site / plant to identify emergencies that can occur. |
| **1** | Emergency preparedness and response capability of site shall be developed as per Emergency Preparedness and Response plan issued by BHEL |
| **2** | Availability of adequate number of first aiders and fire warden shall be ensured with BHEL and its contractors |
| **3** | All the contractor's supervisory personnel and sufficient number of workers shall be trained for fire protection systems. Enough number of such trained personnel must be available during the tenure of contract. Contractor should nominate his supervisor to coordinate and implement the safety measures. |
| **4** | Assembly point shall be earmarked and access to the same from different location shall be shown |

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| **5** | Fire exit shall be identified and pathway shall be clear for emergency escape. |
| **6** | Appropriate type and number of fire extinguisher shall be deployed as per Fire extinguisher deployment plan and validity shall be ensured periodically through inspection |
| **7** | Adequate number of first aid boxes shall be strategically placed at different work places to cater emergency need. Holder of the first aid box shall be identified on the box itself who will have the responsibility to maintain the same. |
| 8 | First aid center shall be developed at site by contractor (i.e. working area) with first aid facilities & trained staffs. |
| **9** | Emergency contact numbers (format given in EPRP) of the site shall be displayed at prominent locations. |
| **10** | Tie up with fire brigade shall be done in case customer is not having fire station. |
| **11** | Tie up with hospital shall be done in case customer is not having hospital. |
| **12** | Disaster Management group shall be formed at site |
| **13** | Mock drill shall be arranged at regular intervals. Monthly report of the above to be given to BHEL safety Officer as per prescribed BHEL formats |
| **14** | Mock drill shall be conducted on different emergencies periodically to find out gaps in emergency preparedness and taking necessary corrective action |
| **15** | The contractor shall ensure that an Emergency Management Plan is prepared to deal with emergencies arising out of:<br>• Fire and explosion;<br>• Collapse of lifting appliances and transport equipment;<br>• Collapse of building, sheds or structure etc.;<br>• Gas leakage or spillage of dangerous goods or chemicals;<br>• Drowning of workers, sinking vessels, and<br>• Landslides getting workers buried; floods, storms and other natural calamities. |
| **16** | 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. |
| **17** | It is also required that there is a tie-up with the hospitals and fire stations located in the neighborhood for attending to the casualties promptly and emergency vehicle kept on standby duty during the working hours for the purpose. |
| **18** | 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 BHEL, telephonically initially and followed by a written report, shall be made by the contractor. |

# 12.0 HSE INSPECTION

Inspection on HSE for different activities being carried out at site shall be done to ensure compliance to HSEMS requirements. The contractor shall maintain and ensure necessary safety measures as required for inspection and tests HV test, Pneumatic test, Hydraulic test, Spring test, Bend test etc. as applicable, to enable inspection agency for performing Inspection. If any test equipment is found not complying with proper safety requirements then the Inspection Agency may withhold inspection, till such time the desired safety requirements are met.

Formats & Checklists as indicated in this document including those referred in Annexure 7 and part of the HSE Systems & Procedures referred to shall be used for inspections a minimum, and maintained for records. BHEL shall reserve the right to modify any Format in this document or introduce new Formats as per requirement.

**Contractor shall identify separate worker gang to resolve HSE issues.**
Any non-conformances identified during inspection observed shall be addressed immediately.

In case immediate closure of non-conformities is not possible:

a. work to be halted in the area
b. Non-conformance to be generated and submitted to responsible person and BHEL.
c. non-conformance to be resolved through responsible agency / person

Only after closure of non-conformances, work to be allowed to resume.

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| **12.1** | **DAILY HSE CHECKS**<br>Both the Site Supervisors and safety officer of Contractor are to conduct daily site Safety inspection around work activities and premises to ensure that work methods and the sites are maintained to an acceptable standard. The following are to form the common subjects of a daily safety inspection:<br>1. Personal Safety wears & gear compliance.<br>2. Complying with site safety rules and permit-to-work (PTW).<br>3. Positions and postures of workers.<br>4. Use of tools and equipment etc. by the workers.<br><br>The inspection should be carried out just when work starts in beginning of the day, during peak activities period of the day and just before the day's work ends. |
| **12.2** | **INSPECTION OF PPE** |
| **1** | PPEs shall be inspected by HSE officer at random once in a week as per format no. HSEP:14-F06 for its compliance to standard and compliance to use and any adverse observation shall be recorded in the PPE register. |
| **2** | The applicable PPEs for carrying out particular activities are listed below. |
| **12.3** | **INSPECTION OF T&Ps & COLOR CODING** |
| **1** | A master list of T&Ps shall be maintained by each contractor. |
| **2** | All T&Ps being used at site shall be inspected by HSE officer once in a month as per format no. HSEP:14-F07 for its healthiness and maintenance. |

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| **3** | The T&Ps which require third party inspection shall be checked for its validity during inspection. The third party test certificate should be accompanied with a copy of the concerned competent person's valid qualification record. |
| **4** | BHEL shall be given advance intimation of Third Party Inspection. BHEL shall associate with Inspection as per discretion. |
| **5** | The validity of T&P shall be monitored as per "Status of T&Ps" format no. HSEP:14-F08 |
| **T&P COLOR CODING PROCEDURE:** | |
| **I** | Inspections and tests shall be documented by means of color coding which shall verify that inspections or testing are current and that all receptacles, portable Power tools, Lifting Tools & Tackles have been inspected and tested as required. The Proposed color codes used on the project shall be as follow (colour code may vary as per BHEL/Customer instruction): |

| GREEN | BLUE | YELLOW | RED |
|---|---|---|---|
| January | April | July | October |
| February | May | August | November |
| March | June | September | December |

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| **II** | The cycle of colors shall be Quarterly. The color code tape / Sticker shall be clearly visible to designate the period for which the inspections and tests were conducted. |
| **III** | Following the initial inspection, the equipment must be color-coded quarterly as per color-coding instructions that will be issued by the contractor. |
| **IV** | Fire extinguisher with the current month color-coding inspection sticker must be provided and secured in the platform. |
| **V** | All slings shall be regularly inspected in accordance with the requirement of the project for frequent and periodic inspections and removed from the job site if they fail to meet the minimum requirements of the project. |
| **VI** | The Contractor's Safety Officer shall ensure that all PPE is inspected prior to its issue. He is to ensure all contractor personnel are using safe and proper PPE equipment. Regular inspections on the PPE shall be carried out and personnel not adhering to those inspections shall be removed immediately from the site. |
| **12.4** | **INSPECTION OF CRANES AND WINCHES** |
| **1** | Cranes and winches shall be inspected by the operator through a daily checklist for its safe condition (as provided by the equipment manufacturer) before first use of the day. |
| **2** | Cranes and Winches shall be inspected by HSE officer once in a month as per format no. HSEP:14-F09 (A&B) for healthiness, maintenance and validity of third party inspection. |
| **3** | The date of third party inspection and next due date shall be painted on cranes and winches. |
| **4** | The operators/drivers shall be authorized by contractor based on their competency and experience and shall carry the I-card. |
| **5** | The operator should be above 18 years of age and should be in possession of driving license of HMV man & goods), vision test certificate and should have minimum qualification so that he can read the instructions and check list. |
| **6** | Ensure Proper protection shall be provided to the winch machine & operator against abnormal weather. |
| **7** | The power supply shall shut off, if the Crane and Winch is left unattended. Control levers shall be secured in the neutral position. |

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| **12.5** | **INSPECTION OF HEIGHT WORKING** |
| **1** | Any activity carried out at more than 1.8m height is classified as height work |
| **2** | Inspection of height working shall be conducted daily by Supervisors before start of work to ensure safe working condition including provision of<br>a. Fall arrestor<br>b. Lifelines – connected to rigid & independent structure<br>c. Safety nets deployed below all height work activities<br>d. Fencing and barricading<br>e. Warning signage<br>f. Covering of opening<br>g. Proper scaffolding with access and egress.<br>h. Illumination |
| **3** | For full duration of height work, constant supervision to be maintained by dedicated HSE personnel |
| **4** | Inspection on height working shall be conducted once in a week by HSE officer as per format no. HSEP:14-F10. |
| **5** | Medical fitness of height worker shall be ensured. |
| **6** | Height working shall not be allowed during adverse weather. |
| **12.6** | **INSPECTION OF WELDING AND GAS CUTTING OPERATION** |
| **1** | Supervisor shall ensure that no flammable items are available in near vicinity during welding and gas cutting activity. |
| **2** | Inspection during welding and gas cutting operations shall be carried out by HSE officer once a month as per format no. HSEP:14-F11. |
| **3** | Use of fire blanket to be ensured to avoid falling of splatters during welding or gas cutting operation at height. |
| **4** | Availability of fire extinguisher at vicinity shall be ensured |
| **12.7** | **INSPECTION OF ELECTRICAL INSTALLATION / APPLIANCES** |
| **1** | Ensure proper earthling in electrical installation |
| **2** | Use ELCB at electrical booth |
| **3** | Electrical installation shall be properly covered at top where required |
| **4** | Use appropriate PPEs while working |
| **5** | Use portable electrical light < 24 V in confined space and potentially wet area. |
| **6** | Monthly inspection shall be carried out as per format no. HSEP:14-F12. |
| **12.8** | **INSPECTION OF ELEVATOR** |
| **1** | Elevators shall be inspected by concerned supervisors once in a week as per format no. HSEP:14-F13. |
| **2** | All elevators shall be inspected by competent person and validity shall be ensured. |
| **3** | The date of third party inspection and next due date shall be painted on elevator. |
| **12.9** | **INSPECTION OF EXCAVATION**<br>Excavation activities shall be inspected as per Format HSEP:14-F13E |

# 13.0 HSE PERFORMANCE

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| **13.1** | Contractor shall be assessed on monthly basis for HSE Compliance by BHEL Safety In-charge at site. |
| **13.2** | The HSE compliance shall be based on Online HSE Evaluation System of BHEL as per Format No. HSEP:14-F33. |
| **13.3** | BHEL shall reserve the right to use this assessment for evaluating agency capacity for future tenders. |
| **13.4** | Suitable HSE reward system shall be developed at site level to promote HSE compliance amongst workmen by the contractor. |
| **13.5** | To decide HSE reward, performance towards HSE shall be evaluated for workmen and it shall be awarded regularly in public gathering. |
| **13.6** | If safety record of the contractor in execution of the awarded job is to the satisfaction of safety department of BHEL, issue of an appropriate certificate to recognize the safety performance of the contractor may be considered by BHEL after completion of the job |

# 14.0 HSE PENALTIES

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| **14.1** | Nonconformity of safety rules and safety appliances will be viewed seriously and BHEL has right to impose fines on the contractor for every instance of violation noticed. |
| **14.2** | As per contractual provision HSE penalties shall be imposed on contractors for non-compliance on HSE requirement as per format no. HSEP:14-F14. |
| **14.3** | The list in the format is only indicative. For any other violation, not listed in the format, the minimum penalty amount is to be decided as per BOCW act. |
| **14.4** | If principal customer/statutory and regulatory bodies impose some penalty on HSE due to the non-compliance of the contractor the same shall be passed on to them. |
| **14.5** | The penalty amount shall be recovered by Site Finance department from contractors from the RA/Final bill. |
| **14.6** | Any other non-conformity noticed not listed above will also be fined as deemed fit by BHEL. The decision of BHEL engineer is final on the above. The amount will be deducted from running bills of the subcontractor. The amount collected above will be utilized for giving award to the employees who could avoid incident by following safety rules. Also the amount will be spent for purchasing the safety appliances and supporting the safety activity at site. |
| **14.7** | If the Contractor fails in providing safe working environment as per BHEL HSE Plan for site operations by contractor / NTPC or continues the work even after being instructed to stop the work by the Engineer, I/C as provided in the relevant Clause of BHEL's contract with the customer. the Contractor shall be penalized till the instructions are compiled by Engineer I/C. |
| **14.8** | 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 laws as applicable from time to time. |
| **14.9** | If two or more fatal accidents occur at same BHEL/ NTPC site under the control of contractor during the period of contract and he has<br>I. not complied with keeping adequate PPEs in stock or<br>II. defaulted in providing PPEs to his workmen<br>III. not followed statutory requirements BHEL/ NTPC safety rules<br>IV. been issued warning notice/s by BHEL/ NTPC head of the project on non-observance of safety norms<br>V. not provided safety training to all his workmen, the contractor can be debarred from getting tender documents in BHEL/ NTPC for two years from the date of last accident. |
| **14.10** | The safety performance will also be one of the overriding criteria for evaluation of overall performance of the contractors by BHEL/ 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. |
| **14.11** | The Contractor will make available minimum quantity of all safety equipment's and safety PPEs of required specifications as per suggestive list included bidding documents as a part of "List of minimum T & P". Further Contractor will ensure availability of additional requirement |

<table>
<tr><td></td><td>for individual worker and safety equipment as per site requirement during execution of the contract till its completion.</td></tr>
<tr><td>14.12</td><td>The Contractor shall abide by the following during Construction and Erection activities:
<table>
<tr><td>I</td><td>Chain pulley block shall not be used for loads more than 2 (Two) ton.</td></tr>
<tr><td>II</td><td>Hydra shall not be used for material transport.</td></tr>
<tr><td>III</td><td>Cage shall necessarily be provided to Monkey ladders of height more than 4 m.</td></tr>
<tr><td>IV</td><td>Fencing shall be provided to all Electrical Distribution boards and transformers etc.</td></tr>
</table></td></tr>
</table>

# 15.0 OTHER REQUIREMENTS

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| **15.1** | In case of any delay in completion of a job due to mishaps attributable to lapses by the contractor, BHEL shall have the right to recover cost of such delay from the payments due to the contractor, after notifying the contractor suitably. |
| **15.2** | If the contractor fails to improve the standards of safety in its operation to the satisfaction of BHEL after being given reasonable opportunity to do so and/or if the contractor fails to take appropriate safety precautions or to provide necessary safety devices and equipment or to carry out instruction regarding safety issued by BHEL, BHEL shall have the right to take corrective steps at the risk and cost of the contractor after giving a notice of not less than 7 days indicating the steps that would be taken by BHEL. |
| **15.3** | If the contractor succeeds in carrying out its job in time without any fatal or disabling injury incident and without any damage to property BHEL may, at its sole discretion, favorably consider to reward the contractor suitably for the performance. |
| **15.4** | In case of any damage to property due to lapses by the contractor, BHEL shall have the right to recover the cost of such damages from the contractor after holding an appropriate enquiry. |
| **15.5** | The contractor shall take all measures at the sites of the work to protect all persons from incidents and shall be bound to bear the expenses of defense of every suit, action or other proceeding of law that may be brought by any persons for injury sustained or death owing to neglect of the above precautions and to pay any such persons such compensation or which may with the consent of the contractor be paid to compromise any claim by any such person, should such claim proceeding be filed against BHEL, the contractor hereby agrees to indemnify BHEL against the same. |
| **15.6** | The contractor shall not employ men below the age of 18 years and women on the work of painting with products containing lead in any form. Wherever men above the age of 18 are employed on the work of lead painting, overalls shall be supplied by the contractor to the workmen and adequate facilities shall be provided to enable the working painters to wash during the cessation of work. |
| **15.7** | The contractor shall notify BHEL of his intention to bring to site any equipment or material which may create hazard. |
| **15.8** | BHEL shall have the right to prescribe the conditions under which such equipment or materials may be handled and the contractor shall adhere to such instructions. |
| **15.9** | BHEL may prohibit the use of any construction machinery, which according to the organization is unsafe. No claim for compensation due to such prohibition will be entertained by BHEL. |

# 16.0 HSE AUDITS/ INSPECTION

| 16.1 | **INTERNAL HSE AUDIT** |
|---|---|
| **1** | Internal HSE Audit shall be carried out by HQ as per HSE audit calendar at least once in 3 months |
| **2** | Qualified HSE auditor shall be engaged for the internal HSE audit. |
| **3** | HSE checklist shall be used for carrying out audit and report shall be submitted to Head (HSE) of the Region with a copy to concerned site. Final audit report will be issued by Head (HSE) of the Region. |
| **4** | All non-conformities and observations on HSE shall be disposed off by site in a time bound manner. |
| **5** | Corrective action and Preventive action on HSE issues issued by Regional HQs shall be implemented by site and reported to HQ. |
| **16.2** | **EXTERNAL HSE AUDIT** |
| **1** | External HSE audit may be carried out by customer/consultant as second party audit or by certification body/government body as third party audit. |
| **2** | Contractor shall facilitate smooth conduct of HSE audit and make available all the necessary information data which are not confidential in nature. |
| **3** | All non-conformities and observations on HSE identified during external HSE audit shall be disposed of by contractor in a time bound manner and reported back the implementation status. |
| **4** | Corrective action and Preventive action on HSE issues raised by certification body issued by CONTRACTOR Regional HQs shall be implemented by site and reported to HQ. |
| **5** | Internal Safety Audit once in every six months by the BHEL and external safety audit as once in a year by third party shall be conducted by BHEL, with prior intimation to Customer and BHEL Safety Deptt. The audit report along with time bound action plan should be submitted to BHEL. |
| **6** | Apart from above, Electrical Safety Audit shall be conducted quarterly by a site team comprising Electrical engineer, Safety representative of Agency, BHEL and Customer representative covering the following and submit the report to BHEL/ Customer. |
| **7** | Electrical incidents investigation findings and remedial measures implemented. |
| **8** | Adequacy of power supply requirements. |
| **9** | Power distribution system in place and covered by temporary. |
| **10** | Electrical protection devices – ELCBs, O/L protections etc. |
| **11** | Earth or ground connection and earth pit maintenance shall be maintain. |
| **12** | Education and training of electrical personnel undertaken. |
| **13** | All non-conformities and observations on HSE identified during internal or external HSE audit shall be disposed of by site in a time bound manner and reported back the implementation status. |
| **14** | Corrective action and Preventive action on HSE issues raised by certification body issued by BHEL shall be implemented by site and reported to Site management. |

# 17.0 MONTHLY HSE REVIEW MEETING

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| **1** | BHEL shall hold HSE review meeting every month to discuss and resolve HSE issues of site and improve HSE performance. It will also discuss the incidents occurred since previous meeting, its root cause and Corrective action. The agenda is given below:<br>a. Implementation of earlier MOM points<br>b. HSE performance<br>c. HSE inspection<br>d. HSE audit and CAPA<br>e. HSE training<br>f. Health check-up camp<br>g. HSE planning for the erection and commissioning and installation activities in the coming month<br>h. HSE reward and promotional activities |
| **2** | The meeting shall be Site In-charge of Contractors and HSE officers of Contractors. |
| **3** | MOM on the discussion will be circulated to the concerned for implementation. |

# 18.0 FORMATS USED

**List OF FORMATS USED (Formats in Annexure-07). The frequency is indicative and can be modified as per requirement by BHEL**

| SL. No. | Format Name | Format No. | Frequency of check (if applicable) |
|---|---|---|---|
| 01 | Inspection of First Aid Box | HSEP:14-F01 | Weekly |
| 02 | Health Check Up | HSEP:14-F02 | With new Induction |
| 03 | HSE Induction Training | HSEP:14-F03 | With New Inductions |
| 04 | Tool Box Talk | HSEP:14-F04 | Daily before job start |
| 05 | Monthly Site HSE Report | HSEP:14-F05 | Monthly |
| 06 | Inspection of PPE | HSEP:14-F06 | Weekly |
| 07 | Inspection of T&Ps | HSEP:14-F07 | Monthly |
| 08 | Status of T&Ps | HSEP:14-F08 | - |
| 09 | Inspection of Cranes | HSEP:14-F09A | Monthly |
| 10 | Inspection of Winches | HSEP:14-F09B | Monthly |
| 11 | Inspection on Height Working | HSEP:14-F10 | Weekly |
| 12 | Inspection on Welding & Gas Cutting | HSEP:14-F11 | Monthly |
| 13 | Inspection on Electrical Installation | HSEP:14-F12 | Monthly |
| 14 | Inspection on Elevator | HSEP:14-F13 | Weekly |
| 15 | HSE Penalty | HSEP:14-F14 | - |
| 16 | Incident Reporting Format | HSEP:14-F15 | |
| 17 | Format for Inspection of Labor Colony | HSEP:14-F16 | Monthly |
| 18 | Format for Maintaining Records of E-waste Handled / Generated | HSEP:14-F17 | Annually |
| 19 | Format for Maintaining Records of Hazardous Waste at the Facility | HSEP:14-F18 | Annually |
| 20 | Inspection of Illumination Levels | HSEP:14-F19 | Weekly |
| **(Note: Serial Numbers from F20-F29 and F32 intentionally excluded)** | | | |
| 21 | Monthly HSE Planning & Review Format | | Monthly Twice |
| 22 | Daily HSE Reporting Format | HSEP:14-F31A&B | Daily |
| 23 | HSE Performance Evaluation Checklist | HSEP:14-F33 | Monthly (by BHEL) |

# 19.0 BHEL GENERAL SAFETY RULES



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| 3 | Safety in welding and gas cutting | 106-109 |
| 4 | Safety in the use of electricity | 110-113 |
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| 6 | Safety in the use of ladders and stairs | 117-120 |
| 7 | Safety in the use of lifting appliances and machines | 121-131 |
| 8 | Safety in the use of transport, earthmoving equipment and the other construction machinery | 132-134 |
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| 21 | Fire Extinguishers & other appliances of fire fighting | 173-174 |

**RESPONSIBILITIES OF CONTRACTORS FOR IMPLEMENTATION OF BHEL GENERAL SAFETY RULES:**

The Safety Rules for 2X660 MW NTPC TALCHER (EPC) Project, as outlined hereunder, while setting out a broad parameter of safety norms, are not exhaustive. The contractor and his agencies are advised to follow BHEL general Safety Rules along with all aforesaid condition mention in this HSE plan. However statutory provisions as amended from time to time for details and strict compliance therewith.

**FOR GREENFIELD PROJECTS:**

Building and Other Construction Workers (regulation of employment and conditions of service) Act, 1996 (briefly referred to as BOCW Act),

Building and other construction workers (regulation of employment and conditions of service) Central Rules, 1998 (briefly referred to as BOCW Rules) as adopted by the various State Governments,

**FOR EXPANSION, MODIFICATION, ALTERATION AND, OR CONSTRUCTION ACTIVITY WITHIN AN EXISTING PLANT OPERATING AS PER APPROVED SITE PLAN UNDER THE FACTORIES ACT;**

a. Factories Act, 1948,
b. Factories Rules, as adopted by the various State Governments
c. BOCW Act
d. BOCW Rules

**The contractor is also required to ensure compliance with all the relevant Acts/Rules in addition to above.**

It shall be incumbent on the contractor 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 BHEL/ 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 sub-agency on his behalf.

Safety cannot be ensured solely through Rules and Regulations or Codes. It is the responsibility of the Contracting Agency to ensure that basic safety principles are incorporated in the planning stage of their mobilization, execution, installation of machines, equipment, storage, etc., and initiate and maintain safety programs. It is desirable to have a planned programme and secure adequate cooperation of senior management, EICs, sub-contracting agencies, supervisory personnel and workers involved to ensure the implementation of the provisions of these Rules in true spirit so as to achieve the ultimate goal of accident prevention.

It shall also be the responsibility of the contracting agency to provide amenities and safety requirements on each construction job in order to reduce or to eliminate hazards of construction activities and also to provide necessary first aid facilities and coordinate for ambulance for prompt transportation of injured persons to a physician or hospital.

It is also mandated that the authorized representative of BHEL, namely, Project Director/ Construction Manager & 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.

Section wise checklist of provisions of BOCW Act/Rules is given hereunder for ready reference of the contractor. (This list has been prepared in chronological order with primary importance to Section of Act and secondary importance to Rules).

**MEETING FOR SAFETY AFTER AWARD OF THE CONTRACTOR**

Representatives of contracting agency along with safety Officer/executive shall meet the concerned EIC of the particular activity prior to start of construction activities for the purpose of discussing safety standards and requirements applicable to the work under contract. The person representing the agency should be a responsible person for all their site activities.

**SAFETY MESSAGE PROPAGATION:**

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| 1 | Contracting agencies shall arrange for display of safety hoardings depicting suitable safety cartoons/messages/ cautionary notices at appropriate places of project site to remind the workers to perform their duties safely. Minimum one safety message board/hoarding of appropriate size for every 10 workers |
| 2 | to be provided and maintained by the concerned agency. |
| 3 | Apart from safety hoardings, each agency should maintain a safety bulletin board at all their work locations. Such safety bulletin boards should depict the activities being planned for the day, good practices, permit details etc. |
| 4 | Safety suggestion boxes shall be kept at each contractor's office at site for obtaining safety suggestions from the workers. Best suggestions should be implemented and may be rewarded suitably to encourage the workers for safety. |

**COMPETENCY OF EMPLOYEES:**

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| 1 | Throughout the course of the contract, persons employed by agency shall be physically fit, qualified/experienced to perform their assigned duties/ jobs. |
| 2 | Employees shall not, knowingly be permitted to work in a manner that their ability or alertness is so impaired because of fatigue, illness or any other reason, that it may expose them and or others to injury. |
| 3 | No worker, vehicle operator shall be less than 18 years of age. And the vehicle operator shall have a valid license as per requirements of Motor Vehicle Act. |
| 4 | Contractor shall comply with all applicable state/central laws and codes related to employment of operators for Hoist, Shovel, Crane, Tractor, Bull-dozer, any other howling heavy equipment/vehicle. |

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| **1** | **Safety at workplace and equipment** |
| **1.0** | **GENERAL PROVISIONS:** |
| **1.1** | **Housekeeping:** |
| a | The contractor shall be primarily responsible for maintaining Good housekeeping and safety standards in the workplace; |
| b | Loose materials that are not required for use shall not be placed or left behind so dangerously as to obstruct workplaces or passageways; |
| c | All projecting nails shall be removed or bent to prevent injury; |
| d | Equipment, tools and small objects shall not be left lying unattended or unsecured from where they could fall or cause a person to trip; |
| e | 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; |
| f | 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; |
| g | Portable equipment shall be returned after use to their designated storage place. |
| **1.2** | **Means of access and egress shall consist of** |
| a | Adequate and safe means of access and egress shall be provided in all workplaces; |
| b | The means of access and egress shall be maintained in a safe condition; |
| **1.3** | **Lighting and ventilation** |
| a | All practical measures shall be taken to prevent smoke, fumes etc. from obscuring any workplace or equipment at which any worker is engaged; |
| b | 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; |
| c | 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; |
| d | 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; |
| e | Where natural lighting is not adequate to prevent danger, adequate and suitable lighting shall be provided as per IS: 3646 – Part II; |
| f | 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; |
| g | Where necessary to prevent danger to health from 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; |
| h | 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; |
| i | Special care shall be taken to ventilate the workplace where gas cutting, welding or other operations involving generation of dangerous fumes, vapors, mists, gases etc is likely; |

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| j | 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** | **Dangerous and harmful environment:** |
| a | 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; |
| b | 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; |
| c | No worker shall be allowed to enter any such space unless a responsible person has certified it safe and fit for the entry of such building workers. |
| **1.5** | **Fumes/gases due to Welding and gas-cutting operations: When welding or cutting operations are carried out in a confined space:** |
| a | 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; |
| b | Workers shall take necessary precautions to prevent unburned combustible gas or oxygen from escaping inside a tank or vessel or other confined space; |
| c | 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 |
| d | Gas-test shall be carried out ensure that the confined space is completely free from combustible gases and vapours. |
| **1.6** | **Dust, gases, fumes** |
| a | 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; |
| b | 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** | **Excessive noise:** |
| a | Adequate measures shall be taken against the harmful effects of an excessive noise; |
| b | Use of earplugs/muffs and anti-vibration gloves shall be ensured to protect the workers from the impact of exposure to such dangers; |
| c | 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** | **Corrosive substances:** |
| a | 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 |

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| | other construction work and in case of spillage of such substances on the building worker, immediate remedial measures shall be taken; |
| b | 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; |
| c | 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** | **Eye protection:** |
| a | 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; |
| b | 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** | **Overhead protection:** |
| a | 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; |
| b | 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; |
| c | 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** | **Lifting and carrying of excessive weight:** |
| a | 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; |
| b | 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** | **Protections against fall of persons –** |
| a | All scaffolds/working platforms at height of two meters or more shall be fenced; |
| b | 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; |
| c | Intermediate rails, ropes or chains shall be midway between the top and lower of edges of the top rail; |
| d | Sufficient number of stanchions or standard poles or uprights shall be maintained to ensure the required stability and resistance; |
| e | Guard-rails shall be free from sharp edges and be maintained in good repair; |
| f | Floor openings through which persons could fall, shall be guarded by covering or fencing; |
| g | 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; |
| h | 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; |

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| i | 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; |
| j | Covers for any openings shall not constitute any hindrance to traffic and, as far as practicable, be flush with the floor; |
| k | If covers constitute as grids, the bars shall be spread not more than 5 cm apart; |
| l | 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; |
| m | Elevated workplaces shall be provided with safe means of access and egress such as stairs, ramps or ladders according to suitability; |
| n | 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 |
| o | 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** | **Protection against fall of objects and materials:** |
| a | 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; |
| b | 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** | **Protection against entry of unauthorized persons:** |
| a | Construction zones in the site and built up areas alongside main traffic routes shall be barricaded; |
| b | 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** | **Head protection and other protection apparel:** |
| | Every building worker who is required to – |
| a | 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; |
| b | Work in water or in wet concrete or in other similar work, shall be provided with suitable waterproof; |
| c | Work in rain or in similar wet condition, shall be provided with waterproof coat with hat; |
| d | 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; |
| e | Every building worker engaged in handling sharp objects or materials at a building or other constriction work, which may cause hand injury, shall be provided with suitable hand gloves in accordance with the approved standards. |
| **1.16** | **Stability of structures:** |
| a | 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** | **Safety of Structures and equipment and other safety concerns** |
| a | 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 |

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| | and other pressure vessels, transport and material handling equipment, lifting appliances, vehicles etc., shall be operated and maintained as per approved norms and – |
| a 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; |
| a 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; |
| a 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. |
| b | 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; |
| c | Control of energy sources shall be ensured through Log-out/Tag-out practices. |
| **1.18** | **Slipping, tripping, cutting, drowning and falling hazards:** |
| a | 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; |
| b | 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; |
| c | 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; |
| d | 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; |
| e | Every open side or opening into or through which a building worker, vehicle or lifting appliance or other equipment's 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; |
| f | 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 equipment's or means shall be in accordance with the standards as laid down; |
| g | 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; |

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| **2.0** | **SAFETY IN MATERIAL HANDLING AND WASTE DISPOSAL** |
| **2.1** | **GENERAL PROVISIONS:** |
| a | 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; |
| b | 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; |
| c | 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; |
| d | 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; |
| e | 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; |
| f | Persons employed required to work on stored material in silos, hoppers and similar storage areas shall be equipped with lifelines and safety belts; |
| g | Non-compatible materials shall be segregated in storage; |
| h | Bagged materials shall be stacked by stepping back the layers and cross-keeping the bags at least every 10 bags high; |
| i | Materials shall not be stored on scaffolds or runways in excess of supplies needed for immediate operations; |
| j | 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 tampered back 5 cm in every foot of height above the 1.25 m level; |
| k | 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; |
| l | 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 unstaring 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; |
| m | 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; |
| n | The material or articles shall not be stacked against partition or walls o f 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; |
| o | 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; |

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| p | Where the building workers are on stack exceeding one point five meters in height, safe means of access to the stack shall be provided; |
| q | All stacking or unshackling operations shall be performed under the supervision of a responsible person for such stacking or unstacking; |
| r | The stacking of construction materials or articles shall not be made near the site of excavation, shaft, pit or any other such opening; |
| s | Stacks that may lean heavily or become unstable or collapse are barricaded shall be avoided; |
| t | 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. |
| **2.2** | **LUMBER:** |
| a | Used lumber shall have all nails withdrawn before stacking; |
| b | Lumber shall be stacked on level and solidly supported sills; |
| c | Lumber piles shall not exceed 6 m in height provided that lumber is handled manually, shall not be stacked more than 5 m height; |
| d | Lumber shall be so stacked as to be stable and self-supporting. |
| **2.3** | **STACKING OF CEMENT AND BAGS CONTAINING OTHER MATERIALS:** |
| a | 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; |
| b | While removing bags from the stack pile the stability of such stack pile shall be ensured; |
| c | Bags containing cement or lime shall be stored on a firm ground; |
| d | The materials like bricks, tiles or blocks shall also be stored on a firm ground; |
| e | Reinforcing steel shall be stored according to its shape, size and length and stack of reinforcing steel kept as low as possible; |
| f | No pipe shall be stored on rack or in stack where such pipe is likely to fall by rolling; |
| g | The angle of repose shall be maintained where loose materials are stacked; |
| h | 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. |
| **2.4** | **DISPOSAL OF DEBRIS AND WASTE MATERIAL:** |
| a | It shall be ensured that debris is |
| a-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; |
| a-ii) | Kept sufficiently moist to bring down the dust under control; |
| a-iii) | Not thrown inside or outside from any height of such building or other construction work; |
| b | 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; |

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| c | 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; |
| d | 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; |
| e | All scrap lumber, waste material and rubbish shall be removed from the immediate work area as the work progresses; |
| f | Disposal of waste material or debris as per the guideline issued by CPCB in compliance of Rule 10 sub-rule 1(a) of C & D Waste Management Rules, 2016). |
| g | All bio-degradable material shall be disposed off in the pit for making compost. Pellets can also be made from bio-degradable material |
| h | All solvent wastes, oil rags and flammable liquids shall be kept in fire resistant covered containers until removed from the work site. |
| **2.5** | **HANDLING GAS CYLINDERS:** |
| a | 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. |
| **2.6** | **RIGGING EQUIPMENT FOR MATERIAL HANDLING:** |
| a | 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; |
| b | Rigging equipment shall not be loaded in excess of its recommended safe working load, as prescribed in the Indian standards; |
| c | 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; |
| d | 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; |
| e | Welded alloy steel chain slings shall have permanently affixed-durable identification standing size, grade, rated capacity and manufacturer. |
| **2.7** | **FENCING OF MOTORS ETC** |
| a | 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; |
| b | 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; |
| c | 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. |

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| **2.8** | **PROTECTION AGAINST LIGHTNING** |
| a | Where necessary, installations shall be protected against lightning, provided further that; |
| b | No bare conductors or bare current-carrying parts of equipment be permitted to be installed unless adequate precautions are taken to prevent direct pr indirect contact; |
| c | 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 exits; |
| d | 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; |
| e | It will constitute a standard practice to switch off portable tools while shifting from one place to another or while leaving them behind unattended; |
| f | The contractor shall ensure that a system is in place to always keep tools well maintained. |
| **2.9** | **VEHICULAR TRAFFIC** |
| a | 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; |
| b | 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; |
| c | 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). |
| **2.10** | **USE OF SAFETY BELT OR OTHER FALL ARREST SYSTEMS:** |
| a | Wherever any work at a height of 3 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: |
| b | Safety belt, lanyard, life lines and devices for the attachment of such life lines shall conform to the approved standards; |
| c | 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; |
| d | 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; |
| e | 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. |
| **2.11** | **safety net and its use** |
| a | Every safety net shall be of adequate strength, made of sound material and suitable for use and conform to the approved standards; |
| b | 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; |

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| c | Use of multi-layer safety net to be ensured to avoid fall of material/objects. |
| **2.12** | **STORAGE OF SAFETY BELTS AND NETS, ETC:** |
| a | 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. |
| **2.13** | **SAFETY HELMETS AND SAFETY FOOTWEAR** |
| a | 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; |
| b | 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. |

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| **3.0** | **WELDING AND GAS CUTTING OPERATIONS** |
| **3.1** | **GAS WELDING:** |
| **3.1.1** | **GENERAL PROVISIONS:** |
| a | 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; |
| b | The welders shall not be allowed to wear clothing that is not free from grease, oil and other flammable material; |
| c | Adequate precautions shall be taken to protect persons working or passing near welding operations from dangerous sparks and radiation; |
| d | 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 |
| d-i) | Exhaust ventilation, or |
| d-ii) | Respiratory protective equipment; |
| d-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. |
| e | The oxygen pressure for welding shall always be high enough to prevent acetylene flowing back into the oxygen cylinder; |
| f | Acetylene shall not be used for welding at a pressure exceeding 1 atmosphere gauge; |
| g | Adequate precautions shall be taken to prevent: |
| g-i | Fire being stated by sparks, |
| g-ii | Slag or hot metal; and |
| g-iii | Damage to fiber ropes from heat, sparks, slag or hot metal; |
| h | Precautions shall be taken to prevent flammable vapours and substances from entering the working area; |
| **3.2** | **WELDING AT PLACES WITH FIRE RISKS:** |
| a | 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; |
| b | 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. |
| **3.3** | **WELDING IN CONFINED SPACE:** |
| | When welding or cutting operations are being carried out in a confined space; |
| a | Adequate ventilation, by means of exhaust fans or forced drought as the condition may require, shall be constantly provided; otherwise enough quantity of air shall be flown in by means of compressors to dilute the pollutants; |

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| b | 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; |
| c | 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 |
| d | When necessary to prevent danger, an attendant shall watch the welders from outside. |
| **3.4** | **WELDING ON CONTAINERS FOR EXPLOSIVE OR FLAMMABLE SUBSTANCES:** |
| a | Welding or cutting operations on containers in which they are explosives or flammable substances shall not be allowed; |
| a-i | Welding or cutting operations on any container that has held explosive or where flammable gases may have been generated, shall only be undertaken, |
| a-ii | After the container has been thoroughly cleansed by steam or other effective means; and |
| a-iii | Found by air tests to be completely free from combustible gases and vapours; or |
| a-iv | After the combustible gas in the container has been completely replaced by an inert gas or by water; |
| a-v | If an inert gas is used as laid down, after the vessel has been filled with gas, the gas shall continue to flow slowly into it thorough out the welding or cutting operations; |
| a-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. |
| **3.5** | **GAS CYLINDERS** |
| a | Gas cylinders shall be inspected, stored, handled and transported in conformity with the requirements of Gas Cylinders Rules, 1981; |
| b | When in use, cylinders shall be held in upright positions by straps, collars or chains; |
| c | Devices referred shall be such that the cylinders can be rapidly removed in an emergency; |
| d | Welders shall not temper with or attempt to repair safety devices and valves on gas cylinders; |
| e | 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; |
| f | Only acetylene cylinders or approximately equal pressure shall be coupled; |
| g | No gas shall be taken from a cylinder unless a pressure reducing regulator has been attached to the valve; |
| h | Only the right pressure reducing regulator shall be used for the gas in the cylinder; |
| i | Cylinder valves shall be kept free from gases, grease, oil, dusts and dirt; |
| j | 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. |
| **3.6** | **HOSE** |
| a | Only hose especially designed for welding and cutting operations shall be used to connect an oxy- acetylene torch to gas outlet; |
| b | Hose lines for oxygen and for oxy-acetylene shall be of different colors and preferably of different size; |

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| c | Hose connections shall be sufficiently light to withstand without leakage a pressure twice the maximum delivery pressure of the pressure regulators in the system; |
| d | Care shall be taken that hose does not become kinked or tangled, stepped on or run-over or otherwise damaged; |
| e | Any length of hose in which a flashback has burned, shall be discarded; |
| f | No hose with more than one gas passage shall be used; |
| g | Only soapy water shall be used for testing hose for leaks. |
| **3.7** | **TORCHES** |
| a | When torches are being changed, the gases shall be shut off at the pressure reducing regulators and not by crimping hose; |
| b | Torches shall be lit with friction lighters or other safe source but not with matches. |
| c | Electric welding equipment: |
| d | 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; |
| e | Welding circuit shall be so designed as to prevent the transmission of high potential from the source of supply to the welding electrodes; |
| f | The maximum open circuit voltage shall be in accordance with Indian Standards; |
| g | Electrode conductors or cables shall not be excessive in length and shall not be longer than necessary to perform the work; |
| h | 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; |
| i | Cable shall be supported so as not to create dangerous obstruction; |
| j | 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; |
| k | Ventilating slots in transformer enclosures shall be so designed that no live part is accessible through any slot; |
| l | Frames of arc welding machines shall be effectively earthed; |
| m | In hand-operated arc welding machines, cables and cable connectors used in arc welding circuits shall be effectively insulated on the supply side; |
| n | The outer surface electrode holders of hand-operated arc welding machines, including the jaw so far as practicable, shall be effectively insulated; |
| o | 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; |
| p | Only heavy-duty cable with unbroken insulation shall be used; |
| q | Circuit connections shall be waterproof; |
| r | When lengths of cable have to be joined, only insulated connectors shall be used on the earth line and the electrode holder line; |
| s | Connections to welding terminals shall be made at distribution boxes, socket outlets, etc. by bolted joints; |

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| t | Welding terminals shall be adequately protected against accidental contact by enclosures, covers or other effective means; |
| u | Electrode holder shall |
| u-i | Have adequate current capacity; |
| u-ii | Be adequately insulated to prevent shock, short-circuiting or flashovers. |
| **3.8** | **OPERATIONS** |
| a | 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; |
| b | 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; |
| c | **When arc welding is done in damp confined spaces;** |
| c-i | Electrode holders shall be completely insulated; and |
| c-ii | The welding machines shall be outside the confined space; |
| d | Welders shall take adequate precautions |
| d-i | To prevent any part of their body from completing an electric circuit |
| d-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 |
| d-iii | To prevent wet or damaged clothing, gloves and boots from touching any live part; |
| e | Welding circuits shall be switched off when not in use; |
| f | Electrodes shall only be inserted in the holder with insulating means such as insulating gloves; |
| g | Electrode and return leads shall be adequately protected against damage; |
| h | Live parts of electrode holders shall be inaccessible when they are not in use; |
| i | Electric arc-welding equipment shall not be left unattended with current switched on. |

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| **4.0** | **SAFETY IN THE USE OF ELECTRICITY** |

| 4.1 | GENERAL PROVISIONS |
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| a | 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; |
| b | 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; |
| c | 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; |
| d | All electrical appliances and current carrying equipment used shall be made of sound material and adequately earthed; |
| e | All temporary electrical installations shall be provided with earth leakage circuit breakers; |
| f | 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; |
| g | 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: |
| g-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; |
| g-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); |
| h | 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: |
| h-i | Be of adequate mechanical strength to withstand working conditions in construction operations; and |
| h-ii | Be not liable to damage by water, dust or electrical, thermal or chemical action to which they me subjected to in construction operations; |
| i | All parts of electrical installations shall be so constructed, installed and maintained as to prevent the danger of electric shock; fire and external explosion; |
| j | It shall be made impossible for circuit breakers to be opened or closed inadvertently, by gravity or by mechanical impact; |
| k | Before operation of OCBs, oil level must be checked and the event of short, extra quantity must be filled; |
| l | 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; |
| m | First-aid boxes, instruction for restoration of persons affected by electric shock shall be made; |

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| n | Arrangement shall be made for sufficient number of CO2 /chemical powder type fire extinguishers/sand buckets etc.; |
| o | No electrical circuits shall ever be overloaded to the dangerous extent or beyond the rated capacity; |
| p | In confined areas, only 24 volt supply shall be used for every equipment, including hand-held portable tools and hand lamps; |
| q | All electrical appliances and outlets shall be clearly marked to indicate their purpose and voltage. |
| **4.2** | **FUSES** |
| a | 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; |
| b | Effective measures shall be taken to ensure that persons removing or inserting fuses will not be endangered, in particular by any adjacent live parts; |
| c | In case of blow of fuses only after finding out and correcting of the fault, new fuses shall be provided in the circuit. |
| **4.3** | **SWITCHES** |
| a | All switches shall be of enclosed type and so installed and earthed as to prevent danger in their operation; |
| b | Use of switches, which may connect or disconnect circuit through gravity, shall not be used. |
| **4.4** | **MOTORS** |
| a | All motors shall be equipped with a switch; |
| b | 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; |
| c | Motors shall be so installed as to ensure that they can be adequately cooled; |
| d | Motors shall be effectively protected against over current; |
| e | 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; |
| f | Earthing shall be connected to all motors, generators etc. as prescribed in the Indian Electricity Rules, amended from time to time. |
| **4.5** | **CONNECTIONS** |
| a | At points where conductors are joined, branched or led into apparatus, they shall be: |
| a-i | Mechanically protected, and |
| a-ii | Properly maintained; |
| b | Conductors shall be joined, branched or led into an apparatus through junction boxes, bushings, glands or equivalent connecting devices; |
| c | Junction boxes or plug-out-socket couplings shall be used for joining cables wherever practicable; |

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| d | 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; |
| e | Cable joints, junction boxes and connectors shall be protected as far as practicable, against traffic, fall of ground, water and other sources of damage; |
| f | Whenever armored cables are joined, the junction boxes shall be bridged by a suitably conducive bond between the armoring of the cables. |
| **4.6** | **TRANSPORTABLE AND PORTABLE ELECTRICAL EQUIPMENT:** |
| a | The supply of electricity to portable apparatus shall not exceed 250v; |
| b | Hand-held and portable machines shall be equipped with a built-in switch to switch off power in case of emergency; |
| c | Hand-held electrically operated tools shall be provided with built-in switch to disconnect the circuit when the tool is not being used; |
| d | Portable electrical tools, unless flameproof, shall not be used in flammable or explosive atmosphere; |
| e | Only three-core cable shall be used for single-phase operated tools with the third core connected to earth |
| **4.7** | **HAND LAMPS** |
| a | Hand lamps shall be equipped with strong cover of glass or other transparent material; |
| b | Portable lamp holders shall have: |
| b-i | All current –carrying part s enclosed; |
| b-ii | Insulated handle; and |
| b-iii | They shall operate at 24 v; |
| **4.8** | **INSPECTION, MAINTENANCE** |
| a | All electrical equipment shall be inspected before it is taken into use to ensure that it is suitable for its purpose of use; |
| b | 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; |
| c | 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; |
| d | Electrical conductors and equipment shall be repaired by the electrician only as far as practicable, no work shall be done live conductors or equipment; |
| e | Before any work is begun on conductors or equipment that does not have to remain live; |
| e-i | The current shall be switched off; |
| e-ii | Adequate precautions shall be taken to prevent the current from being switched on again; |
| e-iii | The conductors or the equipment shall be tested to ascertain that they are dead; |
| e-iv | The conductor and equipment shall be earthed and short-circuited; and |

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| e-v | Neighboring live parts shall be adequately protected against accidental contact; |
| f | After work on conductors and equipment, the current shall only be switched on again on the orders of a competent person; |
| g | Electricians shall be provided with adequate tools, and person protective equipment, such as rubber gloves, mats etc.; |
| h | All conductors and equipment shall be considered to live unless there is certain proof to the contrary. |
| **4.9** | **WORK IN THE VICINITY OF ELECTRICAL INSTALLATION** |
| a | When work is to be done in the neighborhood 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; |
| b | 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; |
| c | No work shall be done in dangerous proximity to a conductor or an installation until it has been made dead; |
| d | Before work begins, work permit shall be obtained from the Engineer in-charge if live electricity lines/circuit are passing in close vicinity; |
| e | Before the current is restored, the contractor shall ensure that no work remain on the work site; |
| f | If conductor or an installation in the neighborhood of which work is to be done cannot 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; |
| g | If mobile equipment has to be employed in the neighborhood 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. |

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| **5.0** | **SAFETY IN THE USE OF HAND TOOLS AND POWER-OPERATED TOOLS** |
| **5.1** | **GENERAL PROVISIONS** |
| a | All hands and power tools and similar equipment, shall be maintained in safe condition. |
| b | When power operated tools are designed to accommodate guards, they shall be equipped with such guards, when in use; |
| c | Belts, gears, shafts, pulleys, sprockets, spindles, drums, fly wheels, chains and other reciprocating, rotating or moving parts of the equipment shall be similarly guarded; |
| d | 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; |
| e | 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. |
| f | 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. |
| **5.2** | **HAND TOOLS** |
| a | The contractor shall not issue or permit the use of unsafe hand tools; |
| b | Wrenches including adjustable pipe end and socket wrenches shall not be used when saws are sprung to the point that slippage occurs; |
| c | Impact tools such as drift pins, wedges and chisels shall be kept free of mushroomed heads; |
| d | The wooden handles of tools shall be kept free of splinters or cracks and shall be kept tight on the tools. |
| **5.3** | **POWER OPERATED TOOLS** |
| a | Electric power operated tools shall be either of the approved double-insulated type or shall be grounded; |
| b | The use of electric cords for hoisting or lowering loads shall not be permitted; |
| c | Pneumatic power tools shall be secured to the hose or whip by some positive means to prevent the tool from becoming accidentally disconnected; |
| d | Safety clips or retainers shall be securely installed or maintained on pneumatic impact (percussion) tools to prevent attachments from being accidentally expelled; |
| e | 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; |
| f | 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; |

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| g | The manufacturer's safe operating for hoses, pipes, valves, filters and other fittings shall not be exceeded; |
| h | Only personnel who has been trained in the operation of the particular tool shall be allowed to operate power-actuated tools; |
| i | 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; |
| j | 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; |
| k | 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; |
| l | Loaded tools shall not be left unattended; |
| m | 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; |
| n | 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; |
| o | No fastener shall be driven into a palled area caused by an unsatisfactory fastening; |
| p | Only non-sparking tools shall be used in an explosive or flammable atmosphere; |
| q | All tools shall be used with the correct shield, guard or attachment as recommended by the manufacturer. |
| **5.4** | **ABRASIVE WHEELS AND TOOLS** |
| a | All grinding machines shall be supplied with sufficient power to maintain the spindle speed at safe levels under all conditions of normal operation; |
| b | Grinding machines shall be equipped with suitable safety guards; |
| c | The maximum angular exposure of the grinding wheel periphery and sides shall not be more than 900, except that when the work requires contact with the wheel below the horizontal plane of the spindle, the angular exposure shall not exceed 1200. In either case, the exposure shall begin not more than 650 above the horizontal plane of the spindle. Safety guards shall be strong enough to withstand the bursting of the wheel; |
| d | 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; |
| e | Cup type wheels used for external grinding shall be protected by either revolving cup guard or a band type guard; |
| f | 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 1800; |
| g | Portable abrasive wheel used for internal grinding shall be provided with suitable safety flanges; |

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| h | 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; |
| i | All abrasive wheels shall be closely inspected and ring tested before mounting to ensure that they are free from cracks or defects; |
| j | 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; |
| k | All employees using abrasive wheels shall be protected by suitable eye protection equipment. |
| **5.5** | **WOODWORKING TOOLS** |
| a | All fixed power driven woodworking tools shall be provided with a disconnect switch that can either be locked or tagged in the off-position; |
| b | 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 re tensioned for a different speed, the marking shall be corrected to show the new speed; |
| c | 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; |
| d | 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. |

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| **6.0** | **SAFETY IN THE USE OF LADDERS AND STAIRS** |
| **6.1** | **GENERAL ASPECTS OF SAFETY RELATED TO USE OF LADDERS** |
| a | 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; |
| b | 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; |
| c | A ladder or step ladder shall not stand on loose bricks or other loose packing and have a level and firm footing; |
| d | 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. |
| **6.2** | **MATERIALS FOR LADDERS** |
| a | 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; |
| b | 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; |
| c | 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; |
| d | Every ladder shall be - |
| d-i | Secured so as to prevent undue swaying; |
| d-ii | Equally and properly supported on each of its upright; |
| d-iii | So used as not to cause undue sagging; and |
| d-iv | Placed as nearly as possible at an inclination of four in one; |
| e | The use of all ladders and stepladders shall conform to the approved standards; |
| f | 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 rebutted into the uprights; |
| g | 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; |
| h | Rungs of metal ladders shall be kept clean so as to prevent them from becoming slippery; |
| i | Portable ladders shall not exceed 9 m in length; |
| j | 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; |
| k | Defective ladders that cannot be satisfactorily repaired shall be tagged Not Fit For Use and destroyed; |
| l | Wooden ladders shall not be painted, but oiled or covered with clean varnish or other transparent preservatives; |

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| m | 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; |
| n | 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; |
| o | 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; |
| p | 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; |
| q | 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; |
| r | A ladder having only one upright or a missing or dangerously defective rung shall not be used; |
| s | 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; |
| t | 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; |
| u | A ladder shall not be placed in front of a door that opens towards it unless the door is fastened or locked or guarded; |
| v | 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; |
| w | Metal ladders shall not be used in the vicinity of live electrical equipment; |
| x | 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. |
| **6.3** | **PORTABLE STEPLADDERS** |
| a | The length of portable stepladders shall not exceed 6 m and their back legs shall be adequately braced; |
| b | Stepladders exceeding 1.5 m in length shall have two or more cross-ties; |
| c | 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; |
| d | When in the open position, treads of stepladders shall be horizontal. |
| **6.4** | **PORTABLE TRESTLE LADDERS** |
| a | The height of the trestle ladders shall not exceed 5.5 m; |
| b | 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; |
| c | The front and back legs shall be joined at the top by bolted steel hinges of adequate dimensions or other effective means; |
| d | Both legs of trestle ladders shall be equipped with sufficient number of steel crossties. |
| **6.5** | **EXTENSION LADDERS** |

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| a | The length of extension ladders shall not exceed 15 m; |
| b | 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; |
| c | The rungs of overlapping sections shall coincide so as to form double treads and shall be equipped with one or more extension ropes; |
| d | Extension ropes shall be securely anchored and run over suitable pulleys. |
| **6.6** | **MECHANICAL LADDERS** |
| a | Mechanical ladder is that ladder, which is a mechanically extendable ladder, mounted on a wheeled frame; |
| b | Mechanical ladder shall be equipped with guard-rails and toe-boards and a cage of heavy-gauge steel mesh; |
| c | If mechanical ladder has no railed platform or cage, workers using it shall be secured by suitable safety belt; |
| d | 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. |
| **6.7** | **FIXED LADDERS** |
| a | Uprights of fixed ladders shall be at least 40 cm and shall be set an angle of 150 to the vertical; |
| b | 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; |
| c | There shall be at least 7.5 cm clearance between the ladder and the nearest fixed object; |
| d | 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; |
| e | The length of the runs of fixed ladder shall not exceed 9 m; |
| f | Landing platform shall be provided for each 9 m or fraction thereof; |
| g | As far as practicable, runs shall be staggered; |
| h | Runs from which a person could fall from more than 6 m shall be enclosed in a cage of heavy-gauge mesh or hoops; |
| i | Fixed ladders shall be firmly bolted or welded in position. |
| **6.8** | **STAIRS** |
| a | Stairs shall be of adequate strength to withstand safely the loads that they will have to carry; |
| b | Stairs used for the purpose of construction work shall have a clear width of at least 60 cm; |
| c | Stairs made of perforated material shall not have openings exceeding 1.2 cm in width; |
| d | No step of a stairway shall depend for its support solely on nails, spikes, screws or other similar fixing; |
| e | No stairway with missing or dangerously defective steps shall be used; |
| f | 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; |

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| g | Movable and removable stairs shall be adequately secured in the position of use; |
| h | In all building structures permanent stairs shall be constructed as soon as practicable; |
| i | 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. |

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| **7.0** | **SAFETY IN THE USE OF LIFTING APPLIANCES & GEARS** |
| **7.1** | **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 - |
| a | 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 |
| b | Maintained in good repair and working condition; |
| c | 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; |
| c-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; |
| c-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; |
| d | Every lifting appliance shall be provided with adequate and efficient brakes which shall be: |
| d-i | Capable of preventing fall of suspended load (including any test load), |
| d-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; |
| e | Provided that nothing contained above shall apply to steam-winch that can be operated as safely as with brakes. |
| **7.2** | **CONTROLS OF EVERY LIFTING APPLIANCE SHALL BE SO;** |
| a | 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; |
| b | Positioned with due regard to ergonomic considerations for proper operation of such appliance; |
| c | 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; |
| d | 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; |
| e | Wherever automatic brakes are provided, they shall automatically come to the neutral position in case of power failure. |
| **7.3** | **TEST AND PERIODICAL EXAMINATION** |
| **7.3.1** | **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; |
| **7.3.2** | **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 |

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| | the opinion that the lifting appliance cannot continue to function safely, he shall forthwith give notice in writing of his opinion to the contractor. |
| **7.4** | **AUTOMATIC LOAD INDICATOR** |
| a | 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; |
| b | 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. |
| **7.5** | **INSTALLATION:** |
| a | Fixed lifting appliances shall be installed by a competent person in a manner that Such appliances cannot be displaced by the load, vibration or other influences; |
| b | The operator of such appliance is not exposed to danger from loads, ropes or drums; |
| c | The operator can either see over the zone of operation or communicate with all loading and unloading points by signal, or other communication system; |
| d | Adequate clearance is provided between parts or loads of lifting appliances and between the fixed objects such as walls and posts, or electrical conductors; |
| e | The lifting appliances; when exposed to wind loading, are given sufficient additional strength, stability and rigidity to withstand such loading safely; |
| f | 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. |
| **7.6** | **WINCHES** |
| a | Winches shall not be used if their control levers operate with excessive friction or play; |
| b | Double gear winches shall not be used unless a positive means of locking the gearshift is provided; |
| c | There shall be no load other than the fall and the hook assembly on the winch while changing gears on a two-gear winch; |
| d | Adequate protection shall be provided to the winch operator against abnormal weather; |
| e | 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; |
| f | Control levers shall be secured in the neutral position and, whenever possible, the power shall shut off if the winch is left unattended. |
| **7.7** | **IN USE OF EVERY STEAM-WINCH** |
| a | 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; |
| b | Extension control levers which tend to fall off their own weight shall be counter-balanced; |
| c | Winch operators shall not be permitted to use the which 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; |
| d | 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; |

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| **7.8** | **ELECTRIC WINCHES SHALL NOT BE USED FOR BUILDING WORK WHERE** |
| a | The electromagnetic brake is unable to hold the load; or |
| b | One or more control points either hoisting or lowering are not operating properly. |
| **7.9** | **BUCKETS:** |
| a | It shall be ensured that tip-up buckets are equipped with a device that effectively prevents accidental tipping. |
| **7.10** | **IDENTIFICATION AND MARKING OF SAFE WORKING LOAD:** |
| a | Every lifting appliance and loose gear shall be clearly marked for its safe working load and identification by stamping or other suitable means; |
| b | 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; |
| c | The lowest angle to the horizontal, to which the derrick may be used, shall be legibly marked; |
| d | 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; |
| e | 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: |
| e-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 |
| e-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. |
| **7.11** | **LOADING OF LIFTING APPLIANCES AND LIFTING GEARS** |
| a | 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; |
| b | 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; |
| c | No pulley block shall be used unless the safe working load and its identification are clearly marked on such block. |
| **7.12** | **OPERATOR'S CAB OR CABIN SHALL** |
| a | Be made of fire resistant material; |
| b | Have a suitable seat, a foot rest and protection from vibration; |
| c | Afford the operator an adequate view of the area of operation; |
| d | Afford the necessary access to working parts in the cab; |

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| e | Afford the operator adequate protection against the weather; |
| f | Be adequately ventilated; and |
| g | Be provided with a suitable fire extinguisher. |
| **7.13** | **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 |
| a | No person under eighteen years of age shall be in control of any lifting machine, scaffold winch, or give signals to the operator; |
| b | Precaution shall be taken by the trained operator to prevent lifting appliance from being set in motion inadvertently; |
| c | The operation of lifting appliances shall be governed by signals in conformity with the approved standards; |
| d | The operator's attention shall not be distracted while he is working; |
| e | 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; |
| f | During the hoisting operation, effective precaution shall be taken to prevent any person from standing or passing under the load in such operation; |
| g | Operator shall not leave lifting appliance unattended while power is on or the load is suspended to such appliance; |
| h | No person shall ride on a suspended load of any lifting appliance; |
| i | Every part of a load in course of being hoisted or lowered shall be adequately suspended and supported to prevent danger; |
| j | Every receptacle used for hoisting bricks, tiles, slates or other material shall be suitably enclosed as to prevent the fall of any such material; |
| k | 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; |
| l | No material shall be raised, lowered or slewed with any lifting appliance in such a way as to cause sudden jerks to such appliance; |
| m | In hoisting a barrow, any wheel of such barrow shall not use be as a means of support unless adequate steps have been taken to prevent the axle of such wheel from slipping out of its bearing; |
| n | Long objects like planks or girders shall be provided with tag line to prevent any possibility of danger while raising or lowering such objects; |
| o | 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; |
| p | When hoisting of load is done in an enclosed space, neither the lifting material nor the boom shall project outside the enclosed space; |
| q | 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. |

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| **7.14** | **HOISTS** |
| a | Hoist towers shall be designed according to the relevant national standards; |
| b | 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 shifts; |
| c | 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; |
| d | The guides of hoist platforms shall offer sufficient resistance to bending and to bucking in the case of jamming, by providing a safety catch; |
| e | 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; |
| **f** | **A clear space shall be provided –** |
| f-i | 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 |
| f-ii | Below the lowest stopping place of such cage or platform; |
| g | Adequate covering shall be provided above the top of hoist shafts to prevent materials from falling into such shifts; |
| h | Outdoor hoist towers shall be erected on adequately firm foundations and securely braced, guyed and anchored; |
| i | 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; |
| j | 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; |
| k | All gearing on a hoisting engine shall be securely enclosed; |
| l | Steam piping of hoisting engine shall be adequately protected against accidental contact of such piping with a building worker; |
| m | Electrical equipment of a hoisting engine shall be effectively earthed; |
| n | 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; |
| o | A hoisting engine shall be protected by suitable cover against weather and falling objects; |
| p | A hoisting engine set up in a public thoroughfare shall be completely enclosed; |
| q | 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; |
| r | The motion of a hoist shall not be reversed without first bringing it to rest to avoid any harm from such reverse motion; |

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| s | A hoist not designed for the conveyance of persons shall not be set in motion from the platform of such hoist; |
| t | 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; |
| u | 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; |
| v | 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; |
| w | On platform of a hoist, the wheel barrows or truck shall be efficiently blocked in safe positions; |
| x | 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; |
| y | 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 |
| y-i | 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; |
| y-ii | 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; |
| y-iii | The counter weights of a hoist shall run between guides; |
| y-iv | At every level of work the building workers shall be provided with adequate platforms for performing such work; |
| y-v | 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; |
| y-vi | 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; |
| y-vii | On a hoist carrying goods and other materials such notice shall state that such hoist is not meant for carriage of persons. |
| **7.15** | **FENCING AND MEANS OF ACCESS TO LIFTING APPLIANCES** |
| a | Safe means of access shall be provided to every part of lifting appliances; |
| b | 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; |
| c | The handling place on such platform shall be maintained free from obstruction and slipping; and |
| d | 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. |

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| **7.16** | **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. |
| **7.17** | **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. |
| **7.18** | **CONSTRUCTION AND MAINTENANCE OF LIFTING GEAR** |
| a | Every lifting gear shall be – |
| a-i | of good design and construction, sound material and adequate strength to perform the work for which it is used; |
| a-ii | free from patent defects; and |
| a-iii | properly maintained in good repair and working order; |
| b | 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; |
| c | 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; |
| d | Rings, hooks, swivels and end links attached to a chain shall be of the same materials as that of such chain; |
| e | The voltage of electric supply to any magnetic lifting device shall not fluctuate by more than plus or minus 10%. |
| **7.19** | **TEST AND PERIODICAL EXAMINATION OF LIFTING GEARS** |
| a | 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 it's any part liable to affect its safety and such gear alter such test shall subsequently be retested for the use of its owner at least once in every five years; |
| b | A lifting gear in use shall thoroughly examined once at least in every twelve months by a competent person; |
| c | A chain in use shall be thoroughly examined at least once every month by a responsible person for its use; |
| d | Certificates of initial and periodical test and examinations of loose gears shall be obtained in the form annexed. |
| **7.20** | **ROPES** |
| a | No rope shall be used for building or other construction work unless - |
| a-i | It is of good quality and free from patent defects; and |
| a-ii | In the case of wire rope, it shall be tested and examined by a competent person in the manner annexed; |
| a-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 there month; |

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| b | 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; |
| c | 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; |
| d | 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; |
| e | A thimble or loop splice made in any wire rope sling shall conform to the following standards, namely: |
| e-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 cased, such strands shall be tucked against the lay of the rope; |
| e-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; |
| e-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 |
| e-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-halt 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; |
| e-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. |
| **7.21** | **HEAT TREATMENT OF LIFTING GEARS** |
| a | 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: |
| a-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 |
| a-ii | All other such chains rings hooks shackles and swivels shall be so annealed at least once in every twelve months; |
| b | Provided that the clause (a) above shall not apply to - |
| b-i | Pitched chins, working on sprocket or sprocket wheels; |
| b-ii | Rings, hooks and swivels permanently attached to pitched chains, pulley blocks or weighing machines, and |
| b-iii | Hooks and swivels having ball bearings or other case hardened parts; |
| c | A chin 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; |
| d | 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 |

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| | chain or loose gear and that such repair shall be made under the direction of the competent person; |
| e | 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. |
| **7.22** | **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. |
| **7.23** | **REGISTER OF PERIODICAL TEST, EXAMINATION AND CERTIFICATION THEREOF** |
| a | 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; |
| b | Certificate in respect of each of the following shall be obtained from a competent person: |
| b-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; |
| b-ii | In case of test, examination and re-examination of loose gears; |
| b-iii | In case of test and examination of wire ropes; |
| b-iv | In case of heat treatment and examination of loose gears; |
| b-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 |
| c | Produced on demand and retained for at least five years after the date of the last entry made in such register; |
| d | 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. |
| **7.24** | **VACUUM AND MAGNETIC LIFTING GEAR** |
| a | 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; |
| b | A 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; |
| c | 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. |
| **7.25** | **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. |
| **7.26** | **CARRYING OF PERSONS BY MEANS OF LIFTING APPLIANCES ETC.** |

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| a | No building worker shall be raised, lowered or carried by a power driven lifting appliance, except |
| a-i | On the drive's platform in the cage of a crane; or |
| a-ii | On as hoist; or |
| a-iii | On an approved suspended scaffold; |
| b | Provided that a building worker may be raised, lowered or carried by a power driven lifting appliance: |
| b-i | In circumstances where the use of a hoist or of a suspended scaffold shall not reasonably be practicable, or |
| b-ii | On an aerial cableway or aerial ropeway, provided further that the following requirements are met: |
| b-iii | That the appliance referred to above can be operated from one position only and that |
| b-iv | Any winch used in connection with the appliance shall also comply with the requirements as laid down above. |
| c | The appliance referred to above shall not carry any person except: |
| c-i | In a chair or cage, |
| c-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 |
| c-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. |
| **7.27** | **HOISTS CARRYING PERSONS** |
| a | No building worker shall be carried with the help of a hoist unless it is provided with a cage which: |
| a-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 |
| a-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; |
| b | 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; |
| c | 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 gave may travel. |

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| **7.28** | **ATTACHMENT OF LOADS** |
| a | 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; |
| b | 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; |
| c | 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; |
| d | 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 |
| **7.29** | **TOWER CRANES** |
| a | No person other than the operator trained and capable to work at heights shall be employed to operate tower cranes; |
| b | The ground on which a tower crane stands shall have adequate bearing capacity; |
| c | 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; |
| d | Tower cranes shall be sited where there is a clear space available for erection, operation and dismantling of such cranes; |
| e | 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; |
| f | 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; |
| g | 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; |
| h | 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. |
| **7.30** | **QUALIFICATION OF OPERATOR OF LIFTING WINCHES AND OF SIGNALER ETC.** |
| a | 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 |
| a-i | Sufficiently competent and reliable; |
| a-ii | Possesses the knowledge of the inherent risks involved in the operation of lifting appliance; |
| a-iii | Medically examined periodically as specified and |
| a-iv | Is above eighteen years of age. |

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| **8.0** | **SAFETY IN THE USE OF TRANSPORT, EARTHMOVING EQUIPMENT & OTHER CONSTRUCTION MACHINERY** |
| **8.1** | **EARTHMOVING EQUIPMENT AND VEHICLES** |
| a | All vehicles and earthmoving equipment shall be made of good material, proper design and sound constructional and be sufficiently strong for the purpose for which such equipment are properly used in accordance with standard safe operating practices; |
| b | 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: |
| c | All transport or earth moving equipment and vehicles shall be inspected at least once a week by a responsible person and in case any defend is noticed in such equipment or vehicle it shall be immediately taken out of use; |
| d | Power trucks and tractors shall be equipped with effective brakes, headlights and tail lamps and maintained in good repair and working order; |
| e | Side stanchions on power trucks and trailers for crying heavy and long objects shall be |
| e-i | Of sound construction and free from defects; |
| e-ii | Provided with tie chains attached to the top across the loads for preventing such stanchions from spreading out; and |
| e-iii | Kept in position while loading and unloading; |
| e-iv | Safe gangways provided for to and fro movement of building workers engaged in loading and unloading of lorries, trucks, trailers and wagons; |
| e-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; |
| e-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; |
| e-vii | No unauthorized person shall ride the transport equipment employed in such work; |
| e-viii | A driver of a transport equipment shall maneuver such equipment under the direction of a signaler; |
| e-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; |
| e-x | Vehicles and earth moving equipment shall not be left on a slope with the engine of such vehicles or equipment running; |
| e-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. |
| **8.2** | **POWER SHOVELS AND EXCAVATOR** |
| a | 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; |

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| b | 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 |
| c | Fitted with an automatic safe working load indicator; |
| d | 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. |
| **8.3** | **BULLDOZER** |
| a | Operator of every such bulldozer before leaving the dozer shall take the following steps: |
| a-i | Apply the brakes; |
| a-ii | Lower the blade and sipper and |
| a-iii | Put the shift lever into neutral; |
| a-iv | Dozer left on level ground at the close of the work for which such bulldozer is used; |
| a-v | The blade of a bulldozer kept low when such bulldozer is moving uphill; |
| a-vi | The bulldozer blades not used as brakes except in an emergency. |
| **8.4** | **SCRAPERS** |
| a | A tractor and scraper shall be joined by safety line at the time of its operation; |
| b | The scraper bowls shall be propped while blades of such scraper are being replaced; |
| c | A scraper moving downhill shall not be left in gear. |
| **8.5** | **MOBILE ASPHALT LAYERS & FINISHERS** |
| a | A mixture elevator shall be located within a wooden or sheet metal enclosure with a window for observation, lubrication and maintenance; |
| b | Bitumen scoops shall have adequate covers; |
| c | 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; |
| d | A sufficient number of fire extinguishers shall be kept in readiness at such workplace where fire hazards may exist; |
| e | The materials shall be loaded on the elevator after the drying drain has warmed up of such elevator; |
| f | No open light shall be used for ascertaining the level of asphalt; |
| g | Inspection opening shall not be opened till there is a pressure in the boiler, which may cause injury to building workers. |
| **8.6** | **PAVERS:** |
| | Pavers shall be equipped with guards suitable to prevent building workers from walking under the skip of such pavers. |
| **8.7** | **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. |
| **8.8** | **GENERAL SAFETY IN RESPECT OF POWERED CONSTRUCTION MACHINERY** |

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| a | Every vehicle or earthmoving equipment shall be equipped with - |
| a-i | Silencers; |
| a-ii | Tail lights |
| a-iii | Power and hand brakes; |
| a-iv | Reversing alarm; and |
| a-v | Search light for forward and backward movement, which are required for safe operation of such vehicle or earthmoving equipment; |
| b | The cab of vehicle or earthmoving equipment shall bee kept at least one meter from the adjacent face of a ground being excavated; |
| c | When cranes of 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. |

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| **9.0** | **SAFETY IN THE PROVISION OF RUNWAYS AND RAMP** |
| **9.1** | **USE OF RUNWAYS AND RAMPS:** |
| a | 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; |
| b | 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. |
| c | Use of runways and ramps by vehicles: |
| c-i | All runways and ramps shall be of sound construction, strength and securely braced and supported; |
| c-ii | 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 sided of such runway or ramp and such runways or ramps or ramps shall be designed in accordance with the approved standards. |
| **9.2** | **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. |
| **9.3** | **USE OF RUNWAYS OR RAMPS BY WHEELBARROWS, ETC.** |
| a | 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; |
| b | 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. |

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| **10** | **SAFETY IN HANDLING AND USE OF EXPLOSIVES** |
| **10.1** | **GENERAL PROVISIONS:** |
| a | 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; |
| b | No person other than authorized and competent one shall be allowed to handle and use explosives; |
| c | 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. |
| d | No person other than authorized and competent one shall be allowed to handle and use explosives. |
| e | 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. |
| f | No person shall be allowed to handle or use explosives while under the influence of intoxicating liquors or dangerous drugs. |
| g | The explosives shall be accounted for at all times. No explosives or blasting agents shall be abandoned. |
| h | No fire shall be fought where the fire is in the imminent danger of contact with explosives. All employees shall be removes to a safe area and the fire area shall be guarded against intruders. |
| i | 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. |
| j | 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: |
| k | Short-circuiting of detonators in holes, which have been primed and shunted until wired into the blasting circuit. |
| l | The suspension of all blasting operations and removal of persons from the blasting area during the approach and progress of an electric storm. |
| m | 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. |
| n | 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. |
| o | Explosives, blasting agents and blasting supplies that are obviously deteriorated or damaged shall not be used. |

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| p | Delivery and issue of explosives shall only be made authorized persons into authorized magazines or approved temporary storage or handling areas. |
| q | Blasting operations in the proximity of overhead power lines, communication lines, utility services, or other services and structures shall not be carried on until the operators and/or owners have been notified and measures for safe control have been taken. In such situations controlled blasting shall be restored to. |
| r | All loading and firing shall be directed and supervised by competent persons thoroughly experienced in this field. |
| s | Loaded boreholes shall not be left unattended after the end of the shift. |
| t | Suitable and sufficient means of egress to ground level shall be provided in all cases of excavations, trenches, all other places where explosives are handled above or below ground level. |
| u | At an appropriate time before the final blasting warnings, workers in the area shall be removed to a designated safe place. |
| v | An unmistakable, audible, final warning shall be sounded one minute prior to the detonation of explosives; after completion, when the person in charge has established that safe conditions prevail, an “all clear” shall be sounded. |
| w | To prevent persons entering any danger zone during blasting operations notices shall be given to all concerned. |
| x | Notices referred above shall indicate: |
| x-i | that explosives are in use; |
| x-ii | the audible warning sound and the “all clear” and state when they will be sounded; and |
| x-iii | the warning flags in use, including an “all clear” flag. |
| y | Precautions against lightning shall be provided in accordance with the Indian Electricity Act and Indian Explosives Act and Rules and regulations framed there under. |
| z | Package containing explosives shall not be dragged, dropped or handled roughly. |
| aa | Non-sparking tools shall be used to open keys. |
| bb | The explosives shall not be carried in the box or otherwise on any individual. |
| cc | Nothing shall be inserted in the open end of the blasting cap except fuses. |
| dd | dd. Deteriorated or damages explosives shall not be used but shall be disposed or destroyed strictly in accordance with the approved methods and in the doing so the manufacturers or the appropriate authority’s instructions shall be followed. |
| ee | lightning shall be in accordance with Indian Electricity Act/Rules |
| **10.2** | **TRANSPORTATION OF EXPLOSIVES** |
| a | Keep safe distance and to use non-sparking tools while opening packages containing explosives; |
| b | Stop the use of explosives and handling thereof while the weather conditions are not suitable for such use or handling; |

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| c | 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 – |
| c-i | Suspension of all blasting operations and evacuation of persons; |
| c-ii | All warning signs shall be displayed within 200 m of blasting operations and in case putting up a sign at 200 m is impractical, the contractor shall consult the Engineer-in-charge for alternatives; |
| c-iii | All loading and firing shall be directed and supervised by competent persons thoroughly experienced in the field; |
| c-iv | To prevent persons entering any danger zone during blasting operations, notices shall be given to all concerned; |
| d | In addition to these provisions, all measures and precautions that are required to be observed for use, handling, storing or transportation of explosives under the Rules framed under the Explosives Act, 1884 (4 of 1884) shall be observed; |
| e | All the relevant statutory provisions, local laws and rules and regulations shall be complied with. |
| f | Where the magazine is located near the construction site and blasting operation continues daily, actual requirement of explosives shall be drawn from the magazine and transported to the site. Any leftovers shall be returned to the magazine each time after the blast. In case of work at scattered places and for a small duration, portable magazines shall be used and kept within a fence in safe place and properly guarded. |
| g | For carrying higher quantity (more than 5 kg of explosives) specially designed insulated containers shall be used. These containers shall be constructed of finished wood not less than 5cm thick or plastic not less than 6mm thick or pressed fiber not less than 10mm thick. There shall be no metal parts (not even nails, bolts, screws etc.) and the containers shall be provided with suitable non-conductive carrying device, such as rubber, leather or canvas handle or strap. |
| h | Vehicles to be used for transportation explosives shall be in good working condition and shall have a tight wooded or non-sparking metal (copper, brass and the like) floor with sides and ends high enough to prevent the explosives from failing off the vehicle. In open bodied vehicles, the explosives shall be covered with a waterproof and fiber tarpaulin. |
| i | Electrical wiring in vehicle shall be fully insulated so as to prevent the danger of short- circuiting and at least two fire extinguishers of carbon dioxide type shall be carried. The vehicle shall be properly marked indicating adequate warning to the public in regard to the nature of cargo. |
| j | No metals except approved metal truck shall be allowed to come in contact with cases of explosives, metal, flammable, or corrosive substance shall not be transported with explosives. As far as possible, transportation of any material along with explosives shall be prohibited. |
| k | Smoking shall be prohibited in the vehicle carrying explosives. |
| l | No unauthorized person shall be allowed in the vehicle, carrying explosives. |
| m | Loading and unloading of explosives shall be done carefully. |
| n | Explosives and detonators or blasting caps shall not be permitted to be transported in the same vehicle. |

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| o | Detonators and other explosives for blasting shall be transported to the site of work in the original containers or in securely locked separate non-metallic containers and shall not be carried loose or mixed with other materials. |
| **10.3** | **STORAGE OF EXPLOSIVES AND BLASTING AGENTS** |
| a | Explosives and related materials shall be stored in approved facilities. |
| b | Blasting caps, electric blasting caps, detonating primers, and primed cartridges shall not be stored in the same magazine with other explosives or blasting agents. |
| c | Smoking and open flames shall not be permitted within 50 feet of explosives and detonators storage magazine. |
| d | No Explosives or blasting agents shall be permanently stored in any underground area until the area has been developed to the point where at least two modes of exit have been provided. |
| e | Permanent underground storage magazine shall be at least 300 feet from any shaft or other active underground working area. |
| f | Permanent underground magazines containing detonators shall not be located closer than 50 feet to any magazine containing other explosives or blasting agents. |
| **10.4** | **DRILLING AND LOADING** |
| a | Before planning out the drilling operations for blasting purposes, nature of stratum and the over burden shall necessarily be examined to avoid possibilities of landslides after blasting. |
| b | The face or rock shall be carefully examined before drilling to determine the presence of unfired explosives. No attempt shall be made to drill at a site if un-detonated explosives are suspected. In such case the boreholes shall be thoroughly cleaned before a cartridge is inserted. Wooden tamping rods (not pointed, but cylindrical throughout) shall be used in the charging the holes. The cartridge will be on the top. |
| c | The borehole shall be carefully checked for length, presence of water dust, etc. with a wooden temping pole or a measuring tape before loading. |
| d | Surplus explosives shall not be stacked near working areas during loading/unloading. |
| e | The line of detonating fuse extending into a borehole shall be cut from the spool before loading the remainder of the charge. |
| f | A bore shall not be loaded with explosives after springing (enlarging the hole with explosives) or upon completion of drilling without making sure it is cool and it does not contain any hot smoldering material. Temperatures in excess of 65o C are dangerous. |
| g | A bore near another hole loaded with explosives shall not be sprung. |
| h | No force shall be used for inserting cartridges or any explosives into a bore hold or pass any obstruction in a borehole. |
| i | No force shall be used for inserting a blasting cap or an electric blasting cap into explosive. The cap shall be inserted into a hole made with a pickers designed for the purpose. A hitch of the electric blasting cap leading wire shall be made on the primer cartridge so as to prevent pulling out the electric blasting cap from the explosive charge. In case of fuse, the fuse shall be tied to the explosive cartridge so that the blasting cap is not pulled out. Care shall be taken so that the blasting cap is not pulled out. Care shall be taken so that the electric blasting cap, leading wire or the length of the fuse does not get damaged during loading of the charge. |
| j | No attempt shall be made to slit, drop, deform or abuse the primer. |

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| k | Blasting caps or electric blasting caps shall not be connected to detonating fuse except by methods recommended by the manufacturers of caps. |
| l | Explosive cartridge shall not be cut, nor explosive removed from the cartridge for use. |
| m | Metallic devices of any kind shall not be used in tamping. Wooden tamping tools with not exposed metal parts except non-sparking metal connectors for jointed poled shall be used. Violent tamping shall be avoided. Primer shall not be tamped. |
| n | Care shall be taken to confine the explosives in the bore hold with sand, earth clay or other suitable combustible stemming material. |
| o | Kinking or injuring of fuse or electric blasting cap wires shall be avoided when tamping. |
| **10.5** | **ELECTRICAL SHOT-FIRING CIRCUIT** |
| a | In deciding the sizes of wires, fuses, circuits, blasting switches, etc., instructions issued by the manufacturers of these articles shall be followed, if they do not contradict with Indian Explosives Act or framed under it. |
| b | No person shall attempt to uncoil the wires and open out the short-circuited bare leading wires of the electric blasting cap during approach of dust storm or near any source of large charge of static electricity or near a radio transmitter. The manufacturer of the cap or the Inspectorate of Explosives shall be consulted regarding the distance from the transmitter beyond which electric short firing shall be conducted. |
| c | Firing circuit shall be kept completely insulated from the ground of the other conductors, such as wires, rails, pipes or other paths or stray current. |
| d | There shall not be any electric live wires or cables of any kind near electric blasting caps or other explosives except at the time and for the purpose of firing the blast. |
| e | All electric blasting caps shall be tested singly and also when connected in a circuit in series using only an approved type of circuit continuity tester or ohmmeter. |
| f | No attempt shall be made to use in the same circuit either electrical blasting caps made by more than one manufacturer or electric blasting caps of different design or function even if made by the same manufacturers unless such use is approved by the manufacturers. |
| g | No attempt shall be made to fire a circuit of electric blasting caps with less than the minimum current specified by the manufacturer of that electric blasting cap. |
| h | Care shall be taken to ensure that all wire ends to be connected are bright and clean. |
| i | The electric cap wires or leading wires shall be kept short circuited until ready to fire. |
| j | When energy for blasting is taken from power circuits the voltage shall not exceed 220v. The wiring controlling arrangements shall conform to the following: |
| k | The blasting switch shall be strictly according to the specifications, externally operated double-throw switch, which when locked in the open position will short circuit and ground the leading wires. The switch shall be installed at the location where the firing is to be controlled. |
| l | A 'safety' switch of the same type as the blasting switch shall be installed between the blasting switch and the firing circuit and lead lines, at a distance not to exceed 180cm from the blasting switch. |
| m | Both the safety switch and the blasting switch shall be locked in the open position immediately after the shot and before any person is permitted to return to the blasting area. Key to the switches shall remain in the possession of the blaster at all times. |

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| n | Rubber covered or other adequately insulated copper wires in good condition shall be used for firing lines and shall have solid cores of appropriate gauge. Sufficient firing line shall be provided to permit the blaster to be located at a safe distance from the blast. Single conductor lead lines shall be used. |
| o | Blasting operations in the proximity of overhead power lines, communication lines, utility lines, or other structures shall not be carried on until the operator or the owner, or both of such lines as been notified and precautionary measures deemed necessary, have been taken. |
| p | All holes loaded on a shift shall be fired on the same shift. |
| q | As far as possible, blasting shall be carried out using suitable exploder with 25 per cent excess capacity. Electric power from the mains shall be used only when it is absolutely necessary. |
| **10.6** | **SHOT-FIRING WITH SAFETY FUSE** |
| a | The fuse shall be carefully handled to avoid damaging the covering. In very cold weather the fuse shall be slightly warmed before using so as to avoid cracking the waterproofing. |
| b | Short fuse shall not be used. The length of a fuse shall not be less than 120cm. The rate of burning of the fuse shall be known and it would be necessary to make sure that it will take sufficient time in burning so as to enable all persons to reach a place of safety. The burning rate of the fuse shall not be more than 60 cm/min. |
| c | The fuse shall not be cut until the operation to insert the fuse into a blasting cap is ready. The fuse shall be cut off about 2.5 to 5 cm to ensure a dry end. It shall be cut squarely across with a clean and sharp blade. The fuse shall be seated lightly against the cap charge and care shall be taken to avoid twisting after it has been placed in position. |
| d | Blasting caps shall not be crimped by any means except by a cap crimper designed for the purpose. It shall be necessary to make sure that the cap is squarely crimped to the face. |
| e | The fuse shall be lighted with a fuse lighter designed for the purpose. If a match is used, the fuse shall be slit at the end and the match head held in then slit against the power core and then the match head rubbed against an abrasive surface to light the fuse. |
| f | The fuse shall not be lighted until sufficient stemming has been placed over the explosives to prevent sparks of live match heads from coming into contact with the explosives. |
| g | The explosives shall not be held in hands when lighting the fuse. |
| **10.7** | **UNDERGROUND WORK** |
| a | Only permissible explosives and in the manner as specified by the appropriate authority shall be used. |
| b | Excessive quantities of explosives shall not be taken underground at any time. Black blasting powder or pellet powder shall not be used with any other explosive in the same borehole. |
| **10.8** | **BEFORE AND AFTER FIRING** |
| a | Before firing, sufficient warning shall be given to enable the people working in the area to get off the danger zone. The danger zone shall be suitable cordoned off and flag men posted at important points. |
| b | No loose materials, such as tools, drilling implements etc. Shall be left on the rock surfaces to be blasted. |
| c | Blasting in the open shall be carried out during the fixed hours every day or on fixed days in the week. This information shall be amply publicized and the following precautions observed: |

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| d | On the project sites, where blasting operations are carried out, daily blasting hours shall be clearly printed on the sign-boards on all the roads approaching that area. |
| d-i | Road closing barriers should be provided to close the traffic on these roads, at least 400 meters away when the firing is to take place. |
| d-ii | The beginning of the firing shall follow loud sirens and similarly loud sirens shall succeed the completion of the firing. |
| e | The shot-firer shall not be allowed to return to the blasting site after firing, until at least 5 min have elapsed. In case of electric shot firing, the shot holes shall be examined after firing and in case of misfire no person shall be allowed to approach the blasting site for at least 5 min. In case of shot firing with safety fuse, utmost care shall be taken to count the number to ensure that all the shots have fired and in the event of misfire, no person shall be allowed to approach the blasting site for at least 30 min. In any case, a careful inspection for the remaining un-detonated explosive shall be made after firing the shots. All misfired shot holes shall be cross-marked. No other person than those duly authorized shall approach the holes until one of the following operations has been performed in respect of each of the misfired holes: |
| f | If the misfire is due to a faulty cable or faulty electrical connection the defect shall be remedied and the shot fired. |
| g | The stemming shall be floated out by use of water or air jet from hose until the hole has been opened to within 60 cm of the charge, whereupon water will be siphoned or pumped out, then a fresh new charge placed and duly detonated. Or |
| g-i | A careful search shall be made of unexploded material in the debris of the charge. |
| g-ii | If a shift charge is unavoidable, the person in-charge of one shift before leaving the work shall inform the person relieving him for the next shift of any cases misfired and shall point out their position duly cross marked and also state clearly what action has to be taken in the matter. |
| **Note:** | The rules are made considering statutory provisions and other National/International standards. However, if any statutory provision overruling these laws is made, the statutory provisions shall overrule the BHEL / NTPC Rules. |

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| **11** | **SAFETY IN EXCAVATION & TUNNELING WORK** |
| | **SAFETY IN EXCAVATION** |
| **11.1** | **GENERAL PROVISIONS** |
| a | Before undertaking any activity, the soil shall be tested and in case of availability of any explosive gas, necessary arrangements must be made to remove/dilute such gases and in case they are found to be toxic or poisonous, the workplace must be purged and continuous ventilation maintaining the contamination below the permissible level ensured; |
| b | The position of underground installations such as sewers, water pipes and electrical cables shall be verified and in case of their existence, they must be isolated; |
| c | If they cannot be isolated or removed or shutdown, they shall be fenced, hung up or otherwise protected. On every part likely to be visited by persons or where transport vehicles ply, the area shall be suitably fenced, guarded or barricaded to prevent fall of persons, vehicles or livestock into the excavated area; |
| d | Warning signs shall be erected and the in the night hours the area shall be illuminated to warn pedestrians and vehicular traffic; |
| e | Arrangements shall be made to prevent external vibrations due to rail/road traffic; |
| f | Blasting shall be carried out in accordance with the norms applicable in this regard. Special care shall be taken to control the impact of vibrations/tremor caused by blasting to protect excavations from cave-ins; |
| g | Arrangements shall be made to save other buildings/structures in the affected zone or in the vicinity of the area of excavation, from collapse; |
| **11.2** | **SHORING AND TIMBERING** |
| a | Site of excavations, where workers are exposed to danger from moving ground, shall be made safe by maintaining due slope not exceeding the angle of repose of different types of soil or otherwise by shoring, portable shields or other effective means; |
| b | All trenches in the soil, other than rock or hard compact soil more than 1.5 m deep into which men enter, shall be securely shored and timbered under the supervision of a competent person and only the trained workers shall be allowed to substantially alter or dismantle the shoring or timbering; |
| c | All struts, braces and walls in excavation shall be adequately secured so as to prevent their accidental displacement; |
| d | In all excavations in soft or fissured rock or hard soil exceeding 2 m in depth, except those which are sloped to within 1.5 m of the bottom into which men enter, shall be securely shored and timbered; |
| e | Where the sides of the excavations are sloped as outlined above, but not within the 1.5 m of the bottom, vertical sides shall be shored and the shoring shall extend at least 30 cm above the vertical sides. When open spaced sheathing is used, a toe-board shall be provided to prevent material rolling down the slope and falling into the excavated. |
| **11.3** | **SHEATHING** |
| a | The sheathing should be placed against the side of the trench so that length of each piece of sheathing is vertical. It should be held securely in place against the wales by ensuring that sheathing is kept firmly pressed against the wall of the trench. Where the trench excavated is loose, sandy or soft soil or soil which has been previously excavated or soil which is under |

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| | hydrostatic pressure, each piece of sheathing shall be driven into the bottom of the trench so as to firmly hold it in place; |
| b | Where two or more pieces of sheathing are used one above another, the sheathing shall be so arranged that the lower pieces of sheathing shall overlap the lowest wales supporting the piece of sheathing next above it. These pieces of sheathing shall be firmly driven into the soil and securely supported by wales and struts, as the trench is made deeper. |
| **11.4** | **WALES** |
| a | The wales shall be parallel to the bottom or the proposed bottom of the trench. Each wale shall be supported on cleats spiked to the sheathing or by posts set on the wales next below it and in the case of the lowest wale on the bottom of the trench itself. Where necessary, wedges may be provided between a wall and the sheathing it supports so that roughly uniformity is given to all individual pieces of sheathing. |
| **11.5** | **STRUTS** |
| a | Struts shall be horizontal and at right angles to the wales or sheathing supported thereby. Struts shall be cut to the proper length required to fit in tightly between the wales. Where necessary, the struts shall be held securely in place by wedges, driven between the struts and the wales; |
| b | Struts shall be placed on cleats spiked or bolted to the posts supporting the Wales. |
| **11.6** | **LOOSE SITE MATERIALS:** |
| | No loose material shall be kept very close to the excavation creating possibility of its fall into the excavated area. A safe distance of at least 1 m shall be maintained. |
| **11.7** | **PLANT & MACHINERY:** |
| | Movement of vehicles and heavy equipment shall be kept at a distance least equal to the depth of the excavation or at least 6 m for excavation deeper than 6 m and the workers shall be provided with proper tools. |
| **11.8** | **MEANS OF ACCESS** |
| a | For trenches deeper than 1.5 m, safe means of access and egress shall be provided at intervals of every 15 m. Where it is not possible to provide safe means of access and egress as above, ladders shall extend from the bottom of the trench to at least 90 cm above the ground; |
| b | Walkways, runways and sidewalks shall be kept clear of excavated materials or other obstructions and no side walls shall be undermined-undercut unless it is capable of carrying a minimum live load of 125 lbs. per square feet; |
| c | If planks are used for raising walkways, runways or sidewalks, they should be parallel to the length of the walk and fastened together against displacement; |
| d | Lone worker shall not be allowed to work in the excavated area. |
| **11.9** | **INSPECTIONS:** |
| | A competent person shall make inspections every day and necessary measures shall be taken to safeguard against possible cave-ins or slide or collapse of the excavations. |
| **11.10** | **NOTIFICATION OF INTENTION TO CARRY OUT EXCAVATION AND TUNNELING WORK** |

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| a | Within thirty days, prior to the commencement of such excavation or tunneling work, the contractor shall inform in writing the detailed layout plans, method of construction and schedule of such excavation or tunneling work to the Engineer in-charge of NTPC; |
| b | In case compressed air is used in such excavation or tunneling work or any work incidental to or required for such excavation or tunneling work, the technical details and drawings of all man-locks and medical-locks together with names and addresses of all construction medical officers duly qualified and so appointed by such contractor for the purpose of such excavation or tunneling work shall be sent to the Engineer in-charge. |
| **11.11** | **PROJECT ENGINEER** |
| a | The contractor undertaking any excavation or tunneling work shall appoint a Project Engineer for safe operation of such projects; |
| b | Such Project Engineer shall exercise overall control of the operations and the activities at such project and be responsible for carrying out the activities safely. |
| **11.12** | **RESPONSIBLE PERSON** |
| a | The contractor undertaking excavation or tunnel ling work at construction site of a building or other construction work shall appoint a responsible person for safe operation of such excavation or tunneling work; |
| b | The name and addresses of such responsible persons shall be forwarded to the Engineer in-charge; |
| c | Duties and responsibilities of the responsible person referred to above person shall include |
| c-i | To carry out smoothly such excavation or tunneling work; |
| c-ii | To inspect and rectify any hazardous situation relating to such excavation or tunneling work; |
| c-iii | To take remedial measures to avoid any unsafe practice or conditions relating to such excavation or tunneling work. |
| **11.13** | **WARNING SIGNS AND NOTICES** |
| a | Suitable warning signs or notices, required for the safety of building workers carrying out the work of an excavation or tunneling, shall be displayed or erected at conspicuous places in Hindi and in language understood by the majority of such building workers at such excavation or tunneling work; |
| b | Such warning signs and notices with regard to compressed air working shall include: |
| b-i | The danger involved in such compressed air work; |
| b-ii | Fire and explosion hazards; |
| b-iii | The emergency procedures for rescue from such danger or hazards. |
| **11.14** | **REGISTER OF EMPLOYMENT** |
| a | The contractor shall ensure that at a construction site of a building or other construction work where an excavation or tunneling work is being carried on, a register of employment of building workers carrying out such excavation or tunneling work is maintained and produced on demand; |
| b | Periods of work of such excavation or tunneling work shall be maintained in a register on day-to-day basis and such register shall be produced on demand |
| **11.15** | **ILLUMINATION** |

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| a | All contractors carrying out excavation or tunneling work at a construction site of a building or other construction work shall provide for emergency generators on such construction site to ensure adequate illumination at all work places where such excavation or tunneling work is being carried out; |
| b | In case of power failure, all workplaces where excavation or tunneling works are carried out shall be adequately illuminated |
| **11.16** | **PNEUMATIC TOOLS:** |
| | Supply lines to pneumatic tools used within a tunnel are fitted with water trap or safety chain or safety wire, as the case may be. |
| **11.17** | **STABILITY OF STRUCTURE DURING GENERAL EXCAVATION & TUNNELING:** |
| | The contractor shall ensure that where there is any doubt as to the stability of any structure adjoining the workplace or other areas to be excavated or where tunneling work is to be carried out |
| a | The Project Engineer shall arrange for measures like underpinning, sheet piling, shoring, bracing or other similar means to support such structure and to prevent injury to any building worker working adjacent to such structure or damage to property or equipment adjacent to such structure; |
| b | Where any building worker engaged in excavation is exposed to hazard of falling or sliding material or article from any bank or side of such excavation which is more than 1.5 m above his footing, such worker shall be protected by adequate piling and bracing against such bank or side; |
| c | The excavation and its vicinity shall be checked by a responsible person after every rain, storm or other occurrences carrying hazards and in case a hazard is noticed at such checking, adequate protection against slides and cave-in to prevent such hazard shall be provided; |
| d | Temporary sheet piling installed for the construction of a retaining wall after excavation shall not be removed, except on the advice of the responsible person after an inspection carried out by such responsible person; |
| e | Where banks of an excavation are undercut, adequate shoring shall be provided to support the material or article overhanging such bank; |
| f | Excavated material shall not be stored at least 0.5 m from the edge of an open excavation or trench and the banks of such excavation or trench shall be stripped of loose rocks and other materials which may slide, roll or fall upon a building worker working below such bank; |
| g | Adequate and suitable warning signs shall be put-up at conspicuous places at the excavation work to avoid any person falling into the excavations or trenches; |
| h | The responsible person shall ensure at the excavation that no building worker is permitted to work where such building worker may be struck or endangered by the excavation machinery or material or article used in such excavation. |
| **11.18** | **SAFE ACCESS AND EGRESS:** |
| | Ladders, staircases or ramps are provided, as the case may be, for safe access to and egress form excavation where the depth of such excavation exceeds one point 1.5 m and such ladders, staircases or ramps comply with the relevant national standards. |
| **11.19** | **TRENCHES** |
| a | A trench or excavation shall be protected against falling of a person by suitable measures if the depth of such trench or excavation exceeds 1.5 m and such protection shall be an |

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| | improved protection in accordance with the design and drawing of a Professional Engineer, where such depth exceeds 4 m; |
| b | Where the depth of a trench requires two lengths of sheet piling, one above the other, the lower piling shall be set inside the bottom strings or wales of the upper piling and such sheet piling shall be driven down and braced as the excavation continues; |
| c | All metal sheet piles used in excavation or a trench shall be welded end-to-end and secured by other similar means. |
| **11.20** | **POSITIONING AND USE OF MACHINERY:** |
| | Any machinery used in excavation and tunneling work shall be positioned and operated in such a way that such machinery will not endanger the operator of such machinery or any other person in the vicinity. |
| **11.21** | **BREATHING APPARATUS:** |
| | Suitable breathing apparatus shall be provided to a building worker while working in compressed air environment for his use at excavation or tunneling work and such breathing apparatus shall be maintained in good working condition at all times. |
| **11.22** | **SAFETY MEASURES FOR TUNNELING OPERATIONS** |
| a | Where there is a danger of falling or sliding of material from the roof face or wall of a tunnel, adequate measures such as shoring, supporting by means of rock bolts, segments or steel sets shall be taken for the safety of building workers; |
| b | The excavated areas shall be made safe by use of suitably designed and installed steel sets, rock bolts or similar other safe means; |
| c | The responsible person shall examine and inspect the workplaces in a tunnel before the commencement of work in such tunnel and at regular intervals thereafter to ensure safety of the building workers in such tunnel; |
| d | The portal areas of a tunnel with loose soil or rock, likely to cause injury to a person shall be adequately protected with supports. |
| **11.23** | **SURROUNDINGS OF A SHAFT** |
| a | Surroundings of a shaft used in excavation or tunnel work shall be protected from being washed away by construction of sufficient height; |
| b | Where a building worker is required to enter a shaft at an excavation or tunneling work, safe means of access shall be provided for such entry; |
| c | Every shaft at excavation or tunneling work shall be provided with a steel casing, concrete piping, timber shoring or other materials of adequate strength for the safety of building workers working in such shaft; |
| d | Such casing and bracing shall be provided to shafts at an excavation or tunneling work according to the appropriate design for such casing and bracing; |
| e | A reinforced concrete raft and beam shall be provided around the opening of a shaft at an excavation or tunneling work if the ground surrounding such opening is unstable or unsafe. |
| **11.24** | **LIFT FOR SHAFT:** |
| | Lift shall be provided for transport of building workers and materials or articles at an excavation or tunneling work required to descend more than 50 m in a shaft. |

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| **11.25** | **MEANS OF COMMUNICATION** |
| a | Reliable and effective means of communication such as telephone or walkie-talkie shall be provided and maintained in working order for arranging better and effective communication at an excavation or tunneling work at the following locations, namely: |
| a-i | Working chamber of an excavation; |
| a-ii | Intervals of hundred meters along the tunnel; |
| a-iii | Working chamber side of a man lock near the door of such man lock; |
| a-iv | Interior or each chamber of a man lock; |
| a-v | Location conspicuous lock attendant's situation; |
| a-vi | A compressor plant; |
| a-vii | A first-aid station, and |
| a-viii | Outside the portal or the top of a shaft; |
| a-ix | Such number of bells and whistles shall be made available at all times at the locations as are necessary for the safety of persons at such locations. |
| **11.26** | **SIGNALS:** |
| | The standard audio or video signals shall be used in excavation or tunneling work and conspicuously located or displayed near entrance to the workplace and in such other locations as may be necessary to bring such signals to notice of all building workers employed in such excavation or tunneling work. |
| **11.27** | **CLEARANCES** |
| a | The minimum lateral clearances of 0.5 m shall be maintained between any part of a vehicle and any fixture or any equipment used in an excavation or tunneling work after allowing the throw or swing of such fixture or equipment; |
| b | The overhead clearance for a locomotive drive at excavation or tunneling work shall not be less than 1.20 m above the seat of such driver and not less than 2 m above the platform where such driver stands or of any other dimension in accordance with the approved standard. |
| **11.28** | **SHELTERS:** |
| | The adequate number of shelters for the safeguard of the building workers are provided where, in the course of working, they are liable to be struck by a moving vehicle or other material handling equipment in a tunnel. |
| **11.29** | **USE OF INTERNAL COMBUSTION ENGINE:** |
| | No internal combustion engine shall be used underground in excavation or tunneling work unless such engine is so constructed that the air entering the engine gets cleared before entry and the engine emits no fumes or sparks. |
| **11.30** | **INFLAMMABLE OILS:** |
| | Inflammable oils with the flash point below the working temperature that is likely to be encountered in a tunnel shall not be used in excavation or tunneling work. |
| **11.31** | **COUPLING AND HOSES:** |

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| | All high-pressure hydraulic hoses and couplings shall be adequately protected against any possible damage in excavation or tunneling work. |
| **11.32** | **HOSE INSTALLATION:** |
| | All hydraulic lines and plants working at a temperature exceeding 750 c shall be protected by adequate insulation or otherwise against accidental human contact in excavation or tunneling work. |
| **11.33** | **FIRE RESISTANT HOSES:** |
| | No fire hydraulic hoses other than fire resistant hydraulic hoses are used when hydraulically activated machinery and equipment are employed in tunnels. |
| **11.34** | **FLAMEPROOF EQUIPMENT:** |
| | Only flameproof equipment of appropriate type as per approved standards shall be used where there is a danger of flammable or explosive atmosphere being prevalent inside the tunnel. |
| **11.35** | **STORING OF OIL AND FUEL UNDERGROUND:** |
| | All oils, greases or fuels stored underground in excavation or tunneling work shall be kept in tightly sealed containers and in fire resistant areas at safe distances away from explosive and other flammable chemical and appropriate flameproof installation shall be used in such storage areas. |
| **11.36** | **USE OF GASES UNDERGROUND** |
| a | Petrol or liquefied petroleum gas or any other flammable substances shall not be used or stored inside the tunnel except with the prior approval of the Project Engineer; |
| b | After the use of the petroleum or liquefied petroleum gas, or highly inflammable substances, all remaining petroleum or liquefied petroleum gas or highly inflammable substances shall be removed immediately from such tunnel; |
| c | No oxy-acetylene gas shall be used in a compressed air environment in excavation or tunneling work. |
| **11.37** | **WATER FOR FIRE FIGHTING** |
| a | Adequate number of water outlets shall be provided on excavation or tunneling work and readily made accessible throughout the tunnel for firefighting purposes and such water outlets shall be maintained for effective fire lighting; |
| b | All air locks shall be equipped with firefighting facilities at excavation or tunneling work; |
| c | An audible fire alarm shall be provided to warn the building workers whenever a fire breaks out on an excavation or tunneling work; |
| d | Adequate number and types of fire extinguishers, in accordance with relevant national standards, shall be provided and made readily available to fight any outbreak of fire at an excavation or tunneling work; |
| e | Fire extinguishers with vaporizing liquids and high pressure carbon dioxide shall not be used in tunnels or other confined spaces; |
| f | The instructions regarding steps to be followed to fight outbreak of fire, at an excavation or tunneling work, written in Hindi or local language understood by the majority of the building workers employed on such excavation or tunneling work, shall be displayed at conspicuous and vulnerable places of such excavation or tunneling work. |

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| **11.38** | **FLOODING** |
| a | Water tight bulkhead doors shall be installed at the entrance of a tunnel to prevent flooding during a tunneling work where more than one tunnel is driven from a shaft; |
| b | All necessary measures shall be taken to ensure that no building worker is trapped in any isolated section of a tunnel when any bulkhead door of such tunnel is closed; |
| c | Where there is likelihood of flooding or water rushing into a tunnel during a tunneling work, arrangements shall be made for immediate starting of water pumps to take out water of such flooding or water rushing and for giving alert signals to the building workers and other persons to keep them away from danger. |
| d | Airtight steel curtains shall be provided in areas liable to flooding at tunneling work and in case of descending tunnels, such curtains shall be provided in the top half of such tunnels to ensure the retention of pockets of air for rescue purpose. |
| **11.39** | **REST SHELTERS** |
| a | Where building workers employed in a compressed air environment in a tunneling work are required to remain at the work site for one hour or more after de-compression from pressure exceeding one bar, adequate and suitable facilities shall be provided for such building workers to rest; |
| b | Every man-lock, medical-lock and any other facility inside these locks in a tunneling work shall be maintained in a clean state and in good repairs; |
| c | A first-aid room shall be provided and readily available at a construction site of a tunneling work; |
| d | Each man-lock attendant at the station shall be provided with a first-aid box. |
| **11.40** | **PERMISSIBLE LIMIT OF EXPOSURE OF CHEMICALS** |
| a | The working environment in a tunnel or a shaft in which building workers are employed shall not contain any of the hazardous substances in concentrations beyond the permissible limits; |
| b | The responsible person referred to shall conduct necessary test before the commencement of a tunneling work for the day and at suitable intervals as fixed by the Engineer in-charge, to ensure that the permissible limits of exposure are not exceeded and a record of such test shall be maintained and made available for inspection. |
| **11.41** | **VENTILATION:** |
| | All working areas in a free air tunnel shall be provided with the approved ventilation system and the fresh air supplied in such tunnel shall not be less than 6 m3 per minute for each building worker employed underground in such tunnel and the free air-flow movement inside such tunnel not less than 9 m3 per minute. |
| **11.42** | **AIR SUPPLY INTAKE POINT:** |
| | The air intake points for all air compression shall be located at places where such intake air does not get contaminated with dust, fumes, vapor and exhaust gases or other contaminants. |
| **11.43** | **EMERGENCY GENERATORS** |
| | Every compressed air system in a tunnel shall be provided with emergency power supply system for maintaining continued supply of compressed air in such compressed air system, which shall be capable of operating air compressor and ancillary systems of such compressed air system; |

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| | The emergency power supply system shall be maintained and made readily available at all times. |
| **11.44** | **AIR MAINS:** |
| | Every air-main supplying air to the working chamber, man-lock or medical-lock used at an excavation or tunneling work shall be protected against accidental damage and where it is not practicable to provide such protection, a stand-by air-main shall be provided. |
| **11.45** | **BULKHEAD AND AIR LOCKS** |
| a | A bulk head or air tight diaphragms retaining compressed air, when used within a tunnel or a shaft, shall be constructed to withstand the maximum pressure at 1.25 the maximum working pressure of such bulk head or diaphragm and such bulk head or diaphragm shall be tested before its each use by a responsible person to ensure that such bulk head or diaphragm is in proper working order; |
| b | Such responsible person shall keep the record of each test and such record shall be produced for inspection. |
| c | The bulk head or diaphragm shall be made of sound material of adequate strength, which shall be able to withstand the maximum pressure on which they are subjected to at any time of their use; |
| d | A bulkhead anchorage and air lick shall be tested at its work place at an excavation or tunneling work immediately after their installation at such place. |
| **11.46** | **DIAPHRAGM:** |
| | All diaphragms, which are in the form of horizontal decks across a shaft used at excavation or tunneling work, shall be securely anchored |
| **11.47** | **PORTABLE ELECTRICAL HAND TOOLS:** |
| | All portable electrical hand tools and inspection lamps used underground or in a confined space shall be operated at a voltage not exceeding 24 V. |
| **11.48** | **CIRCUIT BREAKER** |
| a | Adequate numbers of differential ground fault circuit breakers shall be installed for every electrical distribution system and its sub-systems used at an excavation or tunneling; |
| b | Work and the sensitivity of each of circuit breaker shall be adjusted in accordance with the requirement set out in accordance with the approved standards; |
| c | No semi-enclosed fuse unit shall be used in underground place. |
| **11.49** | **TRANSFORMER:** |
| | The contractor shall ensure no transformer is used in any section of a tunnel under compressed air unless such transformer is of the dry type and conforms to the approved standards. |
| **11.50** | **LIVE WIRES:** |
| | There shall be no exposed live wire in working areas at an excavation or tunneling work which are accessible to building workers other than those authorized to work on such live lines. |
| **11.51** | **WELDING SETS:** |
| | All welding sets used in a tunnel shall be of adequate capacity and of suitable type, duly approved. |

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| **11.52** | **QUALITY AND QUANTITY** |
| a | Every working chamber at an excavation or tunneling work where compressed air is used, the supply of such air shall be maintained at not less than 0.3 m3 per minute per person working therein; |
| b | A reserve supply of compressed air shall be made available at all times for man-locks and medical locks used at a tunneling work; |
| c | The air supplied in a compressed air environment at a tunneling work shall be, as far as practicable, free from contaminants, namely, dust, fumes and other toxic substances. |
| **11.53** | **WORKING TEMPERATURE:** |
| | The temperature in any working chamber at an excavation or tunneling work where building workers are employed shall not exceed 290 c and the arrangement shall be maintained for kipping records in which the temperatures measured by dry bulb and wet bulb inside such working chamber once in every hour and for producing such records for inspection on demand. |
| **11.54** | **MAN-LOCKS AND WORKING IN COMPRESSED AIR ENVIRONMENT** |
| a | Man-locks used at a tunneling work shall be of adequate strength, made of sound material and designed to withstand any pressure, internal or external, to which it may be subjected in the normal use or in an emergency; |
| b | Doors of man-locks at an excavation or tunneling work shall be made of steel and used at a tunneling work for keeping the work airtight and devices shall be provided for sealing the doors when such locks are under pressure. The anchorage of a man-lock used at tunneling work shall have adequate strength to withstand the pressure exerted by air on the man-lock. There shall be adequate room available for the workers for working in the man-locks; |
| c | Where work is carried out in any compressed air tunnel, a Man-lock in accordance with the approved standards shall be used; |
| d | Where a man-lock is used, safety Instructions in Hindi and in local language understood by majority of building workers employed there, shall be displaced at conspicuous places; |
| e | Except in an emergency, compression and de-compression operations shall be carried out in a man-lock and in an emergency any material-lock may be used; |
| f | A record of compression and de-compression shall be kept in writing and produced for inspection on demand; |
| g | Material lock shall be used with the permission of the Engineer in-charge where it is impracticable to install both the man-lock and the material-lock at; |
| h | The man-lock at tunneling work shall not be used for any purpose |
| i | other than compression or de-compression of building workers; |
| j | No de-canting of building workers at tunneling work shall be carried |
| k | out without prior approval of the Engineer in-charge except in an emergency; |
| l | In case a building worker collapses or is taken ill during his de-compression in a man-lock, the lock attendant of such man-lock shall raise the pressure to a level equal to the maximum pressure which that building worker was exposed to in the working chamber prior to such de-compression and such lock attendant shall immediately report the matter relating to such collapse to the medical lock attendant and medical officer on duty; |

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| m | A building worker who had previously received training with a trained building worker to work in a compressed air environment at tunneling work shall be employed to work independently in such a compressed air environment; |
| n | A building worker who had undergone three de-compressions from a pressure exceeding one bar in a period of eight hours at tunneling work shall not be allowed to enter a compressed air environment except for the purpose of carrying out rescue work; |
| o | A building worker employed in a compressed air environment for a period of eight hours in a day at tunneling work shall not be employed again in such environment unless he has spent not less than twelve consecutive hours of rest at atmospheric pressure; |
| p | No building worker shall be engaged in a compressed air environment at a pressure, which exceeds three bars at a tunneling work unless prior permission, in writing, has been obtained from the Engineer in-charge; |
| q | No building worker shall be employed in a compressed air environment for more than fourteen consecutive days in a month; |
| r | A register of employment of all building workers in compressed air environment shall be maintained; |
| s | An identification badge shall be supplied to a building worker employed in compressed air environment; |
| t | The badge of a building worker shall contain particulars of his name, location of the medical-lock allotted to him for work, the telephone number of the Construction Medical Officer concerned for his treatment and the instructions in case of his illness of unknown and doubtful causes; |
| u | Record of all identification badges supplied to building shall be kept in a register; |
| v | Every building worker whose name appears in the register shall wear the badge supplied to him at all times during his duty hours; |
| w | Suitable warning signs shall be displayed in the compressed air for the prohibition of the following, namely: |
| w-i | Use of alcoholic drinks; |
| w-ii | Use and carrying of lighters, matches or other sources of ignition; |
| w-iii | Smoking; and |
| w-iv | No entry to person who has consumed alcoholic drink |
| **11.55** | **SAFETY INSTRUCTION:** |
| | All building workers employed in compressed air environment at tunneling work shall follow the instructions issued for their safety in the course of such employment. |
| **11.56** | **MEDICAL-LOCK** |
| a | A suitably constructed medical lock shall be maintained at tunneling work where building workers are employed in a working chamber at a pressure exceeding one bar; |
| b | Where more than one hundred building workers are employed in a compressed air working environment exceeding one bar at tunneling work, one medical-lock is provided for every one hundred building workers or part thereof and such medical lock shall be situated as near as possible to the main-lock used at such tunneling work. |

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| **12** | **SAFETY IN PILING WORK** |
| **12.1** | **GENERAL PROVISIONS** |
| a | All pile driving equipment shall be of good design and sound construction, taking into account the ergonomic principles and properly maintained; |
| b | A pile driver shall be firmly supported on a heavy timber sill, concrete bed or other secured foundation; |
| c | In case a pile driver is required to be erected in dangerous proximity to an electrical conductor, all necessary precautions shall be taken to ensure safety; |
| d | The hoses of steam and air hammer shall be securely lashed to such hammer so as to prevent them from whipping in case of connection or break; |
| e | Adequate precaution shall be taken to prevent the pile driver from over turning and hammer from missing the pile; |
| f | A responsible person for inspecting pile-driving equipment shall inspect such equipment before taking it into use and takes all appropriate measures as required for the safety of building workers before commencing piling work by such equipment; |
| g | Where there is any question of stability of a structure for its adjoining areas to be piled, such structure shall be supported, where necessary, by underpinning, sheet pilling, shoring, and bracing or by other means to ensure safety and stability of such structure and to prevent injury to any person. |
| **12.2** | **PROTECTION OF OPERATOR:** |
| | The operator of every pile driving equipment shall be protected from falling objects, steam, cinders or water by substantially covering or otherwise or by other means. |
| **12.3** | **INSTRUCTION TO AND SUPERVISION OF BUILDING WORKERS WORKING ON PILE-DRIVING EQUIPMENT:** |
| | Every building worker working on a pile driving equipment shall be given instructions regarding safe work procedure to be followed in piling operation and shall be supervised by a responsible person throughout such work. |
| **12.4** | **ENTRY OF UNAUTHORIZED PERSON:** |
| | The contractor shall ensure at a construction site of a buildings or other construction work that all piling areas where pile-driving equipment is in use are effectively cordoned off to prevent entry of unauthorized persons. |
| **12.5** | **INSPECTION AND MAINTENANCE OF PILE DRIVING EQUIPMENT** |
| a | Pile-driving equipment shall not be taken into use until it has been inspected by a responsible person and found to be safe for such use; |
| b | A responsible person for such inspection at suitable intervals to ensure safety to the building worker working on such equipment shall inspect pile driving equipment in use; |
| c | All pile lines and pulley blocks shall be inspected by a responsible person before the beginning of each shift of piling operations. |
| **12.6** | **OPERATION OF PILE-DRIVING EQUIPMENT** |
| a | Only experienced and trained building worker shall operate pile driving so as to avoid any probable danger from such operation; |

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| b | Pile-driving operations shall be governed generally prevalent and accepted signals so as to prevent any probable danger from such operations; |
| c | Every building worker employed in pile driving operation or in the vicinity of such pile driving operation shall wear ear protection and safety helmet or hardhat and safety shoes; |
| d | Piles shall be prepared at a distance, at least equal to twice the length of the longest pile, from the place of pile-driving operations; |
| e | When a pile driver is not in use, the hammer of such pile driver shall be blocked at the bottom of the heads of such pile driver. |
| **12.7** | **WORKING PLATFORM ON PILING FRAMES:** |
| | Where a structural tower supports the lead of a pile driver, leads at which it is necessary for the building workers to work and such platforms except on the hammer of such pile driver or lead sides of such platform and where such platforms cannot be provided with such railing and toe boards, a safety belt shall be provided to each such building worker. |
| **12.8** | **PILE TESTING** |
| a | The testing of pile shall be conducted under the supervision of a responsible person for such testing; |
| b | All practicable measures like displaying of waning notices, barricading the area and other similar measures shall be taken to protect the area where the pile testing is carried out; |
| c | Entry to a pile testing area shall be prohibited to general public to ensure safety. |
| **12.9** | **PILING, SHORING AND BRACING** |
| a | Planks used for sheet piling in excavation or tunneling work shall be of sound material with adequate strength; |
| b | Shores and braces used in excavation or tunneling work shall be of adequate dimensions and so placed as to be effective for their intended purposes; |
| c | Earth supported shores or braces used in excavation or tunneling work shall bear against a footing of sufficient area and stability to prevent the shifting of such shores or braces. |

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| **13** | **SAFETY IN THE ERECTION, USE AND DISMANTLING OF SCAFFOLDS** |
| **13.1** | **SCAFFOLD CONSTRUCTION** |
| a | Every scaffold and every component thereof shall be of adequate construction, made of sound material and free from defects and safe for the purposes for which it is intended for use; |
| b | In case bamboo is used for scaffolding, such bamboo shall be of suitable quality, good condition, free from protruding knots and stripped off to avoid any injury to building workers during handling such bamboo; |
| c | All metal scaffolds used in building or other construction work shall conform to the approved standards; |
| **13.2** | **SUPERVISION BY A RESPONSIBLE PERSON**: No scaffold shall be erected, added, altered or dismantled except under the supervision of a responsible person. |
| **13.3** | **Maintenance** |
| a | The scaffold used in building or other construction work shall be maintained in good repairs and the measures taken against its accidental displacement or any other hazard; |
| b | No scaffold or part thereof shall be partly dismantled and allowed to remain in such a condition unless – |
| b-i | The stability or safety of the remaining portion of such scaffold has been ensured by a responsible person for the safety of such scaffolds; |
| b-ii | In case the remaining part of such scaffold cannot be used by the building workers, necessary warning notice written in Hindi and in a language understood by the majority of the building workers that such scaffold is unfit for use, shall be displayed at the place where such scaffold is erected. |
| **13.4** | **STANDARDS, LEDGERS, PUTLOGS** |
| a | Standards of a scaffold shall be plumb, where practicable, fixed sufficiently close together to secure the stability of such scaffold having regard to all the possible working situations and conditions for the intended use of such scaffold, spaced, as close as practicable, to ensure safety and stability of such scaffold; |
| b | Adequate measures are taken to, prevent displacement of a standard of a scaffold either by providing sole plate or a base plate, as necessary; |
| c | Ledgers of metal scaffold are placed at vertical intervals with due regard to safety and stability of such scaffold; |
| d | Bamboo ledgers are kept as nearly as possible and are placed and fastened to the standards of a scaffold with due regard to the stability of such scaffold. |
| **13.5** | **WORKING PLATFORM** |
| a | Working platform shall be provided around the face or edge of a building adjoining at every upper most permanent floor of such building under construction and at any level where construction work of such building is carried out; |
| b | A platform shall be designed to suit the number of building workers to be employed on each bay of a scaffold work on such platform and the materials or articles and tools to be carried with them in such bay; |

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| c | The safe working load and the number of building workers to be employed in each bay of a scaffold shall be displayed for the information of all the building workers employed at such construction site. |
| **13.6** | **BOARD, PLANK AND DECKING** |
| a | Board, plank and decking used in the construction of a working platform shall be of uniform size and strength and shall be capable of supporting the load and number of building workers keeping in view the safety of such building workers; |
| b | Metal decking, which forms part of a working platform, shall be provided with non-skid surface; |
| c | No board or plank which forms the working platform shall be projected beyond its end support unless it is effectively prevented from tripping or lifting and board, plank or decking shall be fastened and secured; |
| d | At any one time, not more than two working platforms per bay, shall be used to support building workers or materials or articles at such bay; |
| e | Adequate measures shall be taken to prevent injury which may be caused by falling material and objects by using safety nets or other suitable means; |
| f | Concrete, other debris or materials shall not be allowed to accumulate at any platform on a scaffold; |
| g | Where a work is to be done at the end of a wall, working platform at such workplace shall be faced or, wherever practicable, at least 0.6 m beyond the end of such wall. |
| **13.7** | **REPAIR OF DAMAGED SCAFFOLD** |
| a | No building worker shall be permitted to work on a scaffold that has been damaged or wakened unless adequate safety measures have been taken to ensure the safety of such building worker; |
| b | Necessary warning signs shall be displayed at such places where repairs of scaffold are undertaken. |
| **13.8** | **OPENING** |
| a | There shall be no opening in any working platform except for allowing access to such working platform; |
| b | Wherever opening on a platform is unavoidable, necessary measures for protection against failing of objects or building workers from such platform shall be taken by providing suitable safety nets, belts or any other similar means; |
| c | Access from one working platform to another platform on a scaffold, if required, shall be provided with suitable and safe ladder for the use of building workers working on such platforms; |
| d | Every opening or shaft in the floor shall be provided with suitable means to protect the fall of a person or material by providing suitable fencing or railing of height not less than 900 mm. |
| **13.9** | **GUARDRAILS:** Every side of a working platform from which a person is liable to fall shall be provided with suitable and safe guardrails and toe board of adequate strength to prevent fall of any building worker, material or tools from such platform. |
| **13.10** | **SCAFFOLD USED BY BUILDING WORKERS OF DIFFERENT EMPLOYERS** |
| a | Where a scaffold or a part of a scaffold is used, which has previously been used by another employer for his building workers, such scaffold or part thereof shall be used only after its inspection and examination by a responsible person for ensuring that such scaffold or part thereof is safe and fit for such use; |

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| b | If any rectification, alteration or modification in a scaffold or part thereof, needed to suit its use, shall be made in consultation with the responsible person. |
| **13.11** | **PROTECTION AGAINST ELECTRIC POWER LINE:** |
| | The contractor shall ensure that all necessary and practical measures for protection are taken to prevent any building worker, working on a scaffold, from coming into contact with the electric wires or dangerous equipment. |
| **13.12** | **SCREENING NET AND WIRE NETS:** |
| | Where a scaffold is erected in an area where the construction activities may pose hazards to pedestrians or vehicular traffic nearby from the falling of objects, wire nets or screening nets shall be used to envelope such scaffold. |
| **13.13** | **TOWER SCAFFOLD** |
| a | The height of every tower scaffold used in building or other construction work shall not be more than eight times the lesser to the base dimension of such scaffold; |
| b | A tower scaffold shall be lashed to a building or a fixed structure before being used by the building workers; |
| c | Any tower scaffold which can be moved or catered shall be – |
| c-i | Constructed with due regard to the stability and, if necessary, adequately weighted at the base; |
| c-ii | Used only on plain and even surface; and |
| c-iii | Has casters provided with positive locking devices to hold such scaffold in position; |
| d | No building worker shall remain on board scaffold or leave behind tools and material when it is being shifted from one position to another position. |
| **13.14** | **GEAR FOR SUSPENSION OF SCAFFOLD** |
| a | Chains, ropes or lifting gears used for suspension of a scaffold shall be of adequate strength, made of sound material and suitable for the purpose of their use and maintained in good repairs; |
| b | Chains, wires, ropes or metal tubes used for the suspension of a scaffold shall be: |
| b-i | Properly and securely fastened to every anchorage point and to the scaffold ledgers of other main supporting members used for the support of such scaffold; and |
| b-ii | So positioned as to ensure stability of the scaffold. |
| **13.15** | **TRESTLE SCAFFOLD AND CANTILEVER SCAFFOLD** |
| a | No trestle scaffold shall be constructed with more than three tiers or if its working platform is more than 4.5 m above the ground or floor or other surface upon which such scaffold is erected; |
| b | Trestle scaffold shall be designed by professional engineer and shall have the approval of the Engineer in-charge before being taken into use. |
| c | No trestle scaffold shall be erected on a suspended scaffold; |
| d | No cantilever or jib scaffold shall be used unless it is adequately supported, fixed and anchored on opposite side of its support and have out triggers of adequate length and, where necessary sufficiently, supported and braced to ensure safety and stability of such scaffold; |

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| e | No working platform resting on bearers let into a wall at one end and without other support shall be used unless such bearers are of adequate strength, braced through the wall and securely fastened on the other side. |
| **13.16** | **SCAFFOLD SUPPORTED BY BUILDING** |
| a | No part of a building shall be used as support or part of a scaffold unless such part of the building is made of sufficient strength and made of sound material to afford safe support; |
| b | Overhanging eaves gutters shall not be used for supporting scaffold; |
| c | Suspended scaffold shall be made of in accordance with the approved standards before being used by the building workers. |
| **13.17** | **USE OF WINCHES AND CLIMBERS FOR SUSPENDED SCAFFOLD** |
| a | No scaffold shall be raised or lowered by winches or climbers unless such scaffold is made of sound material, adequate strength and has been tested and certified safe for use of winches or climber by a competent person before being taken into use; |
| b | All suspended scaffolds counter-balanced by counter weights shall be of approved types before being taken into use for building or other construction work; |
| c | The working platform of a suspended scaffold shall be securely fastened to the building or structure as to be safe and to prevent such platform from swing; |
| d | The safe working load that a suspended scaffold can carry, shall be displayed where such scaffold is being used |
| **13.18** | **SAFETY DEVICES FOR SUSPENDED SCAFFOLD** |
| a | Every suspended scaffold, raised or lowered by the winches or climbers, shall be provided at each of its suspension point with a safety rope with automatic safety device mounted on each of such rope so that such safety rope with such automatic safety device support the platform of such |
| b | scaffold in the event of failure of the primary suspension wire ropes, winches, climbers or any part of the mechanism used for raising or lowering such suspended scaffold; |
| b-i | Provided that the clause (a) shall not apply - |
| | Where the platform of such scaffold is supported at two independent suspension wire rope at or near each end of such platform so that in the event of failure of one of such suspension wire rope, the other wire rope is capable of sustaining the weights of such platform and its load and prevent it from tilting; or |
| b-ii | Where a system is incorporated which operates automatically to support the platform of such scaffold and its load in the event of failure of the primary suspension wire rope of such scaffold. |

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| **14.0** | **SAFETY IN THE ERECTION OF STRUCTURAL FRAME & FORMWORK** |
| **14.1** | **GENERAL PROVISION** |
| a | The trained building worker under the direct supervision of a person, responsible for structural frame and formwork, shall be employed for erection of such structural frame or formwork, dismantling of building and structure and performance of and engineering work formwork, false work and shoring work; |
| b | Adequate measures shall be taken to guard against hazards arising from any temporary state of weakness or unsuitability of a structure. |
| **14.2** | **FORMWORK, FALSE WORK AND SHORING** |
| a | Formwork and false work shall be so designed, constructed and maintained that such formwork and false work are able to support the load that may be imposed on them; |
| b | Such formwork shall be so erected that working platform, means of access, bracings, means of handling and stabilizing could easily be fixed with such formwork. |
| **14.3** | **ERECTION OR DISMANTLING OF STEEL AND PREFABRICATED** |
| a | Erection or dismantling of any pre-fabricated structure shall be made safe against danger by using appropriate means such as ladders, gangways or fixed platforms, buckets, boatswains chair or other appropriate means suspended from lifting appliances, safety harness, life lines, catch nets or catch platforms, power-operated mobile working platforms etc.; |
| b | The work of erection or dismantling of buildings or structures or formwork or false work or shoring or any other civil engineering work shall be carried out by trained building workers under the supervision of a person responsible for such work; |
| c | Steel or prefabricated structures shall be so designed and made that such structures can be safely transported or erected; and weight of each unit of such structures shall be clearly marked on such unit; |
| d | The design of each such part shall maintain stability of each part of the structures referred to in clauses above when erected, and to prevent danger, the design shall explicitly take into - |
| d-i | The relevant conditions and methods of attachment in the operations of stripping, transport, storing and temporary support during erection of such parts; |
| d-ii | Safeguards, such as provision of railings with working platforms, and for mounting such railings and platforms easily on the structural steel or prefabricated parts; |
| e | The hooks and softer devices built in or provided on the structural steel or prefabricate parts that are required for lifting and transporting such parts shall be so shaped, dimensioned and positioned to withstand the stresses to which such hooks or other devices are subjected; |
| f | Prefabricated parts made of concrete shall not stripped or erected before such concrete has set and hardened sufficiently to the extent provided for in the plans, and such parts are examined by the responsible person for any sign of damage before their use; |
| g | Store-places shall be so constructed that – |
| g-i | There shall be no risk of structural steel of prefabricated parts falling or overturning; |
| g-ii | Storage conditions shall generally ensure stability and avoid damage having regard to the method of storage and atmospheric conditions; and |
| g-iii | Racks shall be set on firm ground and designed so that units cannot move accidentally in such store-places; |

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| h | Structural steel or pre-fabricated parts shall not be subjected to stresses prejudicial to their stability while they are stored or transported or raised or set down; |
| i | Tongs, clamps and other appliances for lifting structural steel and prefabricated part shall be: |
| i-i | In such shape and dimensions as to ensure a secure grip without damaging and marked with the maximum permissible load in the most unfavorable lifting conditions; and |
| i-ii | Structural steel or pre-fabricated parts shall be lifted by such methods and appliances that prevent them from spinning accidentally; |
| j | Structural steel or pre-fabricated parts shall be provided with railings and working platforms before raising such parts to prevent any danger of falling of building workers, materials or articles at the time of any work with such parts; |
| k | All reasonably practical measures shall be taken to avoid injury to building workers, building structure or equipment while structural steel or pre-fabricated parts are handled or stored or transported or raised or lowered; |
| l | Structures shall not be worked on during violent storms or high winds or any other such hazardous situation; |
| m | The risk of falling to which building workers, moving on high or sloping girders, may be exposed is limited by all means of adequate collective protection or by the use of a safety harness which shall be well secured to a sufficiently strong supports; |
| n | Structural steel parts, which are to be erected at a great height, shall, as far as practicable, be assembled on the ground; |
| o | When structural steel or pre-fabricated parts are being erected, a sufficiently extended area underneath the workplace shall be barricaded or guarded; |
| p | Steel trusses, which are being erected, shall be adequately shored, braced or guyed until they are permanently secured in position; |
| q | Structural members shall not be forced into place by the hoisting machine while any building worker is in such a position that he is likely to be injured by such operation. |
| **14.4** | **FORMWORK** |
| a | All formwork shall be properly designed keeping in view the safety of building workers, buildings or structures; |
| b | A responsible person for structural frame and formwork shall – |
| b-i | Inspect and examine the material, timber, structural steel and scaffolding for its strength and suitability before being taken into use; |
| b-ii | Lay-down procedures to cover all stages of such structural frame and formwork; |
| b-iii | Supervise such structural frame and formwork; |
| b-iv | Take all necessary steps or measure to correct any situation with a view to prevent accident or dangerous occurrence during performances of such structural frame and formwork. |
| **14.5** | **DE-SHORING** |
| a | When shoring is removed, sufficient props shall be left in place of such shoring to prevent any possible hazard; and |
| b | De-shoring shall be adequately braced and tied together with support to prevent any hazard. |

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| **15.0** | **SAFETY IN CONCRETE WORK** |
| **15.1** | **GENERAL PROVISIONS REGARDING USE OF CONCRETE** |
| a | All construction with the use of concrete or reinforced concrete shall be based on plans including specification of steel and concrete and other material to be used in such construction |
| a-i | Giving technical details regarding methods for safe placing and handing of such materials and indicating the type, quality and arrangement of each part of a structure of such construction; and |
| a-ii | Explaining the sequence of steps to be taken for completion of such construction; |
| b | Formwork and shores used for concrete work shall be structurally safe and properly braced or tied together so as to maintain position and shape of formwork or shores; |
| c | Formwork structure used shall have sufficient catwalks and other secure access for inspection of such structure if such structure is in two or more tiers; |
| d | No machinery or any object should fall below by using wire nets, screen nets etc. |
| **15.2** | **PREPARATION AND POURING OF CONCRETE AND ERECTION OF CONCRETE STRUCTURE** |
| a | A building worker handling cement or concrete shall – |
| a-i | Wear close-fitting clothing, gloves, helmet or hardhat, safety goggles, proper footwear and respirator or mask to protect himself from danger in such handling; |
| a-ii | Keep as much of his body covered as is required to protect himself from danger in such handling; |
| a-iii | Take all necessary precautions to keep cement and concrete away from his skin in such handling; |
| b | Lime pits shall be fenced or enclosed and filled and emptied by such devices, which do not require workers to go into the pit; |
| c | Moving parts of the elevators, hoists screens bunkers, chutes, grouting equipment used for concrete work and of other equipment used for storing, transport and other handling ingredients of concrete shall be securely fenced to avoid contact of building workers with such moving parts; |
| d | Screw conveyors used for cement, lime and other dusty materials shall be completely enclosed. |
| **15.3** | **BUCKETS** |
| a | Concrete buckets used with cranes or aerial cableways shall be free from projections from which accumulations of concrete could fall; |
| b | Movements of concrete buckets shall be governed by signals necessary to avoid any danger by such movements. |
| **15.4** | **PIPES AND PUMPS** |
| a | A scaffolding carrying a pipe for pumped concrete shall be strong enough to support such pipe at a time when such pipe is filled with concrete or water or any other liquid and carry the combined load of the all the building workers who may be on such scaffold at such time, safely; |
| b | Every pipe for carrying pumped concrete shall be – |
| b-i | Securely anchored at its end point and at each curve on it; |

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| b-ii | Provided near the top of such pipe with an air release valve; |
| b-iii | Securely attached to a pump nozzle by a bolted collar or other adequate means; |
| c | The operation of concrete pumps shall be governed by standard signals; |
| d | Building workers employed around a concrete pump shall wear safety goggles; |
| **15.5** | **MIXING AND POURING OF CONCRETE** |
| a | The concrete mixture shall not contain any material, which may unduly affect the setting of such concrete, weaken such concrete or corrode steel used with such concrete; |
| b | When dry ingredients of concrete are being mixed in confined spaces such as silos – |
| b-i | The dust shall be exhausted at the time of such mixing and |
| b-ii | In case the dust the dust cannot be exhausted, as specified, the workers shall wear respirators at the time of such mixing; |
| c | When concrete is being tipped from buckets, building workers shall be kept out of the range of any kickbacks of such buckets; |
| d | Loads shall not be dumped or placed on settling concrete. |
| **15.6** | **CONCRETE PANELS AND SLABS** |
| a | All parts of a concrete panel or concrete slab shall be hoisted uniformly; |
| b | Concrete panels shall be adequately braced in their final positions and such bracings shall remain in such positions until such panels are adequately supported by other parts of the construction for which such panels are used; |
| c | Temporary bracings of concreter panels shall be securely fastened to prevent any part of such panels from falling when such panels are being moved. |
| **15.7** | **STRESSED AND TENSIONED ELEMENTS** |
| a | Building workers shall not stand directly over jacking equipment while stressing of concrete girders and beams is being done; |
| b | A pre – stressed concrete unit shall not be handled except at points on such unit and by the devices specified for such work by the manufacture of such devices; |
| c | During transport, pre-stressed concrete girders or concrete beams shall be kept upright by bracing or other effective means; |
| d | Anchor fittings for pre-tensioned strands of pre-stressed concrete girders of concert beams are kept in a safe condition in accordance with the instruction of manufacturer of such anchor fittings; |
| e | Building workers shall not stand behind jacks or in line with tensioning elements and jacking equipment during tensioning operations of pre-stressed concrete girders of concrete beams; |
| f | Building workers do not cut wires of pre – stressed concrete girders or concrete beams under tension before such concrete used of such girder or beams is sufficiently hardened. |
| **15.8** | **VIBRATORS** |
| a | A building worker, who is in good physical condition, shall operate vibrators used in concreting work; |

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| b | All practical measures shall be taken to reduce the amount of vibration transmitted to the operators working in concreting work and |
| c | When electric vibrators are used in concreting work |
| c-i | Such vibrators shall be earthed; |
| c-ii | The leads of such vibrators shall be heavily insulated; and |
| c-iii | The current shall be switched off when such vibrators are not in use. |
| **15.9** | **INSPECTION AND SUPERVISION** |
| a | A person responsible for a concreting work shall supervise the erection of the formwork, shores, braces and other supports used for such concreting work, make a thorough inspection of every formwork to ensure that such formwork is safe, regularly inspect the formwork, shores, braces, re-shores and other supports during the placing of concrete, keep all records of inspections referred to above at the workplace relating to such inspection and produce them for inspection upon the demand. |
| b | Any unsafe condition, which is discovered during the inspections, shall be remedied immediately. |
| **15.10** | **BEAMS, FLOORS AND ROOFS** |
| a | Horizontal and diagonal bracings shall be provided in both longitudinal and transverse direction as may be necessary to provide structural stability to formwork used in concreting work and shores used in such concreting work shall be properly seated on top and bottom and secured in their places; |
| b | Where shores used in concreting work rest upon the ground, base plates shall be provided for keeping such shores firm and in level; |
| c | Where the floor to ceiling height of a concreting work exceeds 9 m or where the formwork deck used in such concreting work is supported by shores constructed in two or more tiers, or where the dead, live and impact loads on the formwork used in such concreting work exceed 700 kilogram per m2, the structure of such formwork shall be designed by a professional engineer in the relevant field and the specifications and drawings of such formwork kept at such construction site and produced on demand. |
| d | Where a professional engineer designs the structure of the formwork used in concreting work, such engineer shall be responsible for the supervision of construction and the stability of such structure. |
| **15.11** | **STRIPPING** |
| a | Stripping of formwork used in concreting work shall not commence until the concrete on such formwork is fully set, examined and certified to this effect by the responsible person and record of such examination and certification is maintained; |
| b | Stripped forms in concreting work shall be removed or stock piled promptly after stripping from all areas in which building workers are required to work or pass; |
| c | Protruding nail, wire ties and other formwork accessories not required for subsequent concreting work shall be pulled, cut or otherwise made safe. |
| **15.12** | **RE-SHORING** |

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| a | Re-shoring used in concreting work shall be provided to a slab or beam for its safe support after its stripping or where such slab or beam is subjected to superimposed loads due to construction above such slab or beam; |
| b | The provisions applicable to shoring in a concreting work shall also be applicable to reshoring in such work or pass. |

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| **16.0** | **SAFETY IN CONSTRUCTION, REPAIR & MAINTENANCE OF STEEP ROOFS** |
| **16.1** | **WORK ON STEEP ROOFS:** |
| | All practicable measures shall be provided to protect the building workers against sliding when carrying outwork on steep roofs. |
| **16.2** | **CONSTRUCTION AND INSTALLATION OF ROOFING BRACKETS** |
| a | Roofing brackets shall be constructed to fit the pitch of steep roof and such brackets shall be used to provide level working platform; |
| b | Roofing bracket shall be secured in its place by nailing pointed metal projections attached to the underside of such bracket and securely driven into a steep roof on which it is used or secured by a rope passed over the ridgepole and tie of such roof. |
| **16.3** | **CRAWLING BOARDS** |
| a | All crawling boards used for work on steep roofs shall be of adequate strength, made of sound material and of the type approved for the purpose of their use; |
| b | Crawling boards shall be kept in good repairs and inspected by a responsible person before being taken into use; |
| c | Crawling boards shall be secured to a steep roof on which it is used by ridge hooks or other effective means; |
| d | A firmly fastened lifeline of adequate strength shall be strung beside each crawling board throughout its length while using such crawling boards. |

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| **17.0** | **SAFETY IN CATCHES PLATFORMS, HOARDINGS & CHUTES** |
| **17.1** | **CATCH PLATFORM** |
| a | Catch platform shall not be used for storage of material or as a working platform; |
| b | Catch platform shall at least be of 2 m wide and inclined so that the position of outer edge of such platform is 1500 mm higher than the inner edge; |
| c | The open end of catch platform shall be properly fenced to the height not less than 1 m. |
| **17.2** | **HOARDINGS:** |
| | Hoardings shall be constructed when the Registering Authority / Assistant Labour Commissioner considers it necessary for protection of building workers and directs such employer to construct such hoardings. |
| **17.3** | **CHUTES, ITS CONSTRUCTION AND USE** |
| a | Wooden or metal chutes which are at an angle of more than 450 to the horizontal and used for the removal of materials shall be closed on all sides except at their openings used for receiving or discharging of materials or articles; |
| b | All openings of chutes except their top openings shall be closed when not in use; |
| c | Every chute – |
| c-i | Shall be constructed of sound material, adequate strength and suitable for the purpose it is intended for use; |
| c-ii | Exceeding 12 m in height shall be constructed in accordance with the design and drawings of professional engineer for such; |
| c-iii | A suitable warning notice shall be displayed at conspicuous locations, written in Hindi and in a local language, at the discharge end of every chute; |
| c-iv | Shall be cleared when debris has accumulated to a height, which can pose danger to building worker, but such clearance shall be done in no case less frequently than once a day. |

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| **18.0** | **SAFETY IN WORK ON OR ADJACENT TO WATER** |
| **18.1** | **TRANSPORT OF WORKERS BY WATER** |
| a | When any building worker has to proceed to or from any workplace by water for purposes of carrying on a building or other construction work, proper measures shall be taken to provide for his safe transportation and vessels used for such purpose shall be in charge of a responsible person, properly equipped for safe navigation and maintained in good condition; |
| b | Maximum number of persons which can be safely carried in a vessel shall be marked plainly and conspicuously on such vessel and such number shall not be exceeded during use of such vessel for carrying persons; |
| c | Adequate protecting shall be provided to the building workers in such vessel from inclement weather; |
| d | Such vessel shall be manned by adequate and experienced crew; |
| e | In case the bulwarks of such vessel are lower than 60 cm from the level of the deck of such vessel, the open edge of such bulwarks shall be fitted with suitable fencing to a height of at least 1 m above such deck and the post and stanchions and similar parts used in such fencing shall not be spaced more than 2 m; |
| f | The number of life buoys on deck of such vessel shall at least be equal to the number of crew members of such vessel and shall not be less than two; |
| g | All life buoys on deck of such vessel shall be kept in good state of maintenance and so placed that if such vessel sinks then they will remain afloat and one of such buoys shall be within the immediate reach of the Steersman of such vessel and another is situated after part of such vessel; and |
| h | The position of the steersman of the vessel shall be such that he has a reasonably free view of all sides. |
| **18.2** | **PREVENTION FROM DROWNING** |
| a | Where, on or adjacent to the workplace of any contraction site, there is water into which a building worker employed for work on such site, in the course of his employment, may fall and has the risk of drowning, suitable rescue equipment shall be provided and kept in an efficient state of ready use and measures shall be taken to arrange for the prompt rescue of such building worker from the danger of drowning and where there is a special risk of such fall from the edge of adjacent land or from a structure adjacent to or above the water, or from floating stage on such water, secure fencing shall be provided near the edge of such land, structure or floating stage, as the case may be, to prevent such fall, and such fencing may be removed or allowed to remain unerected for the time and to the extent necessary for the access of building workers to such work or the movement of material for such work; |
| b | For handling rescue equipment, at least two persons knowing diving should be available at such sites. |

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| **19.0** | **SAFETY IN COFFERDAMS & CAISSONS** |
| **19.1** | **EVERY COFFERDAM AND CAISSON SHALL BE** |
| a | Of good construction, sound material and of adequate strength, provided with adequate means for workers to reach safely at the top of such cofferdam or caisson in the event of an in rush of water and safe means of access to every place where workers shall be employed; |
| b | Work relating to construction, positioning, modification, dismantling of cofferdams or caissons shall be carried out under the supervision of a responsible person and inspected by the responsible person at the specified intervals; |
| c | A worker shall be allowed to work in a cofferdam or caisson after such cofferdam or caisson has been inspected and found safe by responsible person within such preceding period as approved and a record of such inspection maintained. |
| **19.2** | **WORK IN COMPRESSED AIR IN A COFFERDAM OR CAISSON SHALL BE** |
| a | Carried out in accordance with the procedure laid down; |
| b | Carried out by such building workers who have completed eighteen years of age and are medically examined and found fit for the work; |
| c | Carried out under the supervision of a responsible person; |
| d | If the work in cofferdam or caisson is carried out in shifts, a record of the time spent by each worker in each such shift for carrying out the wok shall be maintained in a register with particulars or time taken for the compression of such building worker, if any; |
| e | At every work site or project in a cofferdam or caisson, where workers are employed to work in compressed air environment, a construction medical officer assisted by a nurse or trained first-aid attendant, shall be available at all times and there shall be one standby reserve compressor to meet the emergency. |
| **19.3** | **PRESSURE PLANT AND EQUIPMENT** |
| a | Pressure plant and equipment for which it is used shall be – |
| a-i | Properly maintained in good repairs and working condition and fitted with a suitable safety valve or other effective device to provide maximum safe discharge pressure from being exceeded at any time; a suitable pressure gauge with a dial range not less than 1.5 time and not exceeding twice the maximum working pressure, easily visible and designed to show at all times, the internal pressure in kilogram per square centimeter and marked with the maximum safe working pressure, a suitable stop valve or valves by which the pressure plant or the system of the pressure plant may be isolated from the source supply of pressure or otherwise; |
| a-ii | Every pressure plant or equipment shall be thoroughly examined by the competent person, externally, once in every period of six months; internally, once in every period of twelve months; and by hydraulic test, once in a period of four years. |

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| **20** | **SAFETY IN DEMOLITION WORK** |
| **20.1** | **PREPARATION** |
| a | All glass or similar material or article in exterior openings shall be removed before commencing any demolition work and all water, steam, electric, gas and other similar supply lines put off and suitably capped and the concerned department of the appropriate authority informed and permission obtained wherever required before commencing; |
| b | Wherever it is necessary to maintain water, gas or electric line or power during such demolition, such line shall be so located or protected with substantial coverings so as to protect it from damage and to afford safety to the building workers and the general public. |
| **20.2** | **PROTECTION OF ADJACENT STRUCTURES** |
| **20.2.1** | **Examination of walls etc. of adjacent structures –** |
| a | During demolition process, the contractor shall examine the walls of all structures adjacent to the structure to be demolished to determine the thickness, method of support to such adjacent structures and; |
| b | In case, such employer has reason to believe that any of such adjacent structure is unsafe or may become unsafe during such demolition process, he shall not perform demolition activity unless stability to such unsafe adjacent structu4e from collapsing has been taken. All roads and open spaces adjacent to the site of demolition work shall be closed or suitably protected by bracketing. |
| **20.3** | **DEMOLITION OF WALLS, PARTITIONS, ETC.** |
| a | Any demolition of walls or partitions shall be proceeded in a systematic manner as per the standard safe operating practices approved and all work above each tier of any floor beams shall be completed before the safety of the supports of such beam is impaired; |
| b | Masonry shall be neither loosened nor permitted to fall in such masses or volume or weight as to endanger the structural stability of any floor or structural supports; |
| c | No wall chimney or other structure or part of a structure shall be left unguarded in such a condition that it may fall, collapse or weaken due to wind pressure or vibration; |
| d | In the case of demolition of exterior walls by hand, safe footing shall be provided for the workers employed in, such walls or partitions, which are to be demolished by hand shall be not left standing more than one store high above the uppermost floor on which persons are working. |
| **20.4** | **METHOD OF OPERATION:**<br>The contractor shall ensure that debris, bricks and other materials or articles are removed by means of chutes, buckets or hoists and through openings in the floors. |
| **20.5** | **ACCESS TO FLOOR** |
| a | Safe access to and egress from every building shall be provided at all times in the course of demolition by means of entrances hallways, stairways or ladder runs which shall be so protected as to safeguard the workers using such means from falling material or articles; |
| b | Demolition of structural steel etc. shall be demolished column by column and tier by tier and every structural member, which is being demolished, shall not be under any stress, and such structural member shall be suitably lashed to prevent it from any uncontrolled swinging, dropping or falling or falling; |

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| c | Large structural members shall not be thrown or dropped from the building, but carefully lowered by adopting suitable safe method; |
| d | Where a lifting appliance like a derrick is used for demolition, the floor on which such lifting appliance rests shall be completely planked over or supported and such floor shall be of adequate strength to sustain bearing load for such lifting appliance and its operation. |
| **20.6** | **STORAGE OF MATERIAL OR ARTICLE** |
| a | No materials or articles shall be not stored or kept on platform, floor or stairways of a building being demolished, provided that this clause shall not apply to the floor of a building when such floor is of such strength as to support safely the load to be superimposed by storing such material or articles; |
| b | No access to any stairway or passageway shall be affected or blocked by storing any material or article; |
| c | Suitable barricades shall be provided so as to prevent materials or articles from sliding or rebounding into any space used by the workers. |
| **20.7** | **FLOOR OPENINGS:** |
| | Every opening used for the removal of debris from every floor which is not closed to access, except the top or working floor, shall be provided with an enclosure from such floor to its ceiling, or such opening is so barricaded that no building worker shall access to within a horizontal distance of 6.0 m from such opening through which debris is being dropped. |
| **20.8** | **INSPECTION:** |
| | A person responsible for demolition work shall make continuous inspections during demolition process so as to detect any hazard resulting from weakened or deteriorated floors or walls or loosened materials or articles, and that no building worker shall be permitted to work where such hazard exist unless remedial measured like shoring or bracing shall be taken to prevent such hazards. |
| **20.9** | **WARNING SIGNS, BARRICADES, ETC.** |
| a | Barricades and warning sign shall be erected along every side throughout the length and breadth of a building or other construction work to be demolished to prevent unauthorized persons from entering into the during demolition operations; |
| b | During the demolition of an exterior masonry wall or a roof from a point more than 12 m above the adjoining ground level of such wall or roof, if persons below such wall or roof are exposed to falling objects, suitable and safe catch platform shall be provided and maintained at a level not more than 6 m below the working level except where an exterior built-up scaffold is provided for safe and adequate protection of such persons; |
| c | Suitable and standard warning signs shall be displayed or erected at conspicuous places or position at the workplace; |
| **20.10** | **MECHANICAL METHOD OF DEMOLITION** |
| a | The following requirements shall be fulfilled in case the mechanical method of demolition like use of swinging weight, clamshell bucket, power shovel, bulldozer or other similar mechanical methods are used for the purpose of demolition namely – |
| a-i | The building or structure or structure or remaining portion thereof shall be not more than 12 m in height; |

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| a-ii | Where a swinging weight is used for demolition, a zone of such demolition having a radius of at least 1.5 times the height of the structure of portion thereof being demolished shall be maintained around the points of impact of such swinging weight; |
| a-iii | Where a clamshell bucket is being used for demolition, a zone of demolition shall be maintained within eight meters of the liner of travel of such bucket; |
| a-iv | Where other mechanical methods are being used to affect total or partial collapse of a building or other construction work, there shall be maintained, in the area into which the affected portion of such building or other construction work may fall, a zone of demolition at least 1.5 times the height of such affected portion thereof; and |
| a-v | No person other than building workers or other persons essential to the operation of demolition work shall be permitted to enter a zone of demolition, which shall be provided with substantial barricades. |

<table>
<tr><td>21.0</td><td>FIRE EXTINGUISHERS & OTHER APPLIANCES OF FIRE FIGHTING</td></tr>
<tr><td>21.1</td><td>FIRE EXTINGUISHERS & OTHER MEANS OF PREVENTION AND PROTECTION</td></tr>
<tr><td>a</td><td>Every contractor shall have a fire protection and prevention plan developed and implemented keeping in view the following:</td></tr>
<tr><td>a-i</td><td>The specific work practices requiring fire control measures;</td></tr>
<tr><td>a-ii</td><td>Response measures to be taken in case of fire;</td></tr>
<tr><td>a-iii</td><td>Equipment required;</td></tr>
<tr><td>a-iv</td><td>Personnel requirements and responsibilities;</td></tr>
<tr><td>a-v</td><td>Schedules of daily and weekly inspection;</td></tr>
<tr><td>a-vi</td><td>Open flames and fires are prohibited in all underground construction;</td></tr>
<tr><td>a-vii</td><td>Readily visible signs to be posted in the fire prone/inflammable/explosive areas prohibiting smoking use of open flames and other hot work.</td></tr>
<tr><td>a-viii</td><td>A system of Permit-to-Work.</td></tr>
<tr><td>b</td><td>For the protection of the workers from the outbreak of fire, the contractor shall Provide, maintain and regularly inspect the Fire extinguishing equipment, which shall be sufficiently provided to extinguish any probable fire;
<table>
<tr><td colspan="4">Suitability of portable fire extinguishers</td></tr>
<tr><td rowspan="2">Class of fire</td><td colspan="3">Type of extinguisher</td></tr>
<tr><td>Water</td><td>DCP</td><td>CO2</td></tr>
<tr><td>A</td><td>Yes</td><td>Yes</td><td>Yes</td></tr>
<tr><td>B</td><td>No</td><td>Yes</td><td>Yes</td></tr>
<tr><td>C</td><td>No</td><td>Yes</td><td>Yes</td></tr>
<tr><td>D</td><td>No</td><td>Yes</td><td>Yes</td></tr>
<tr><td>Electrical</td><td>No</td><td>Yes</td><td>Yes</td></tr>
</table></td></tr>
<tr><td>c</td><td>Ensure availability of an adequate supply of water at ample pressure;</td></tr>
<tr><td>d</td><td>Make available</td></tr>
<tr><td>d-i</td><td>Adequate number of trained persons required to operate the fire extinguishing equipment;</td></tr>
<tr><td>d-ii</td><td>Properly maintain Fire extinguishing equipment and inspect them at regular intervals of not less than once in a year by the responsible person and a record of such inspections maintained;</td></tr>
<tr><td>e</td><td>Portable fire extinguishers provided in the operator’s cabin of earthmoving machinery, material handling systems, construction equipment etc. shall be regularly inspected, maintained and replenished/refilled;</td></tr>
<tr><td>f</td><td>The operators and the helpers of such equipment shall be trained in the methods operating the equipment and fighting the fire effectively;</td></tr>
</table>

| | |
|---|---|
| g | All combustion engine power equipment shall be so located that the exhausts are well away from combustible material; |
| h | No smoking shall be allowed at or in the vicinity of operations, which constitute fire hazards and shall be conspicuously posted with No smoking or open flame signs; |
| i | In the flammable environment as described in IS: 9570, the electrical fittings and equipment shall be of flame proof type conforming to IS: 2206 & IS; 2148; |
| j | Arrangements shall be made to contain sparks generated during welding, cutting or other operations and spark shall not be allowed to fall down on combustible material kept below; All means of exit shall be kept free of obstruction at all times; |
| k | Appropriate type of fire extinguishers according to IS: 5698 shall be kept in fully charged condition at the places which have potential risk of fire; |
| l | The contractor shall educate his or his sub-contractors' men working in the vicinity of fire risk, on how to operate these equipment and know in particular circumstances which type of extinguishers is to be used; |
| m | The contractor shall take full responsibility for the upkeep and replenishment/refilling of the fixed and portable fire extinguishers. |

# ANNEXURE

# ANNEXURE - 1

**List of Safety Equipment's & safety Personal Protective Equipment's, the list of minimum suggestive Safety Equipment's & Safety Personal Protective Equipment's to be deployed necessarily by the bidder is furnished below. However, the actual deployment at site shall not be limited to these and additional equipment's if required shall be mobilized by the contractor. Safety Gadgets, Equipment and Measurement Devices to be ensured in total throughout the duration of the project.**

| Sl. No. | Minimum Suggested List of Safety Equipment's and Safety Personal Protective Equipment's | Minimum Quantity |
|---|---|---|
| 1 | **Safety Net (Conforming IS 11057:1984)**<br>Safety Net (Net Size: 10m x 5m, Mesh Size: 25 mm, Mesh Rope: 2mm double cord, Border/Tie Cord: 12mm diameter polypropylene rope (tested as per IS: 5175). Two metres length shall be provided at all four corners. | 240 Nos. |
| 2 | **Fall Arrester 'Rope grab fall arrester' & anchorage line.**<br><br>Anchorage Line: 14mm- 16 mm diameter, three strand twisted Polyamide rope.<br><br>Rope Grab fall arrester: Openable & Guided type Fall Arrestor (on flexible line) conforming EN 353-2 & works on 14-16 mm diameter polyamide rope.<br>material: Nickel Chrome plated Steel<br><br>Connector: Karbiner conforming to EN 362 (Minimum Strength 22 KN),<br>material: Steel | 200 nos. of Rope Grab Fall arrester'<br>and Karbiner each.<br><br>90 nos. anchorage line, 30 metre long<br>each,<br><br>30 nos. anchorage line, 40 metre long each |
| 3 | **Horizontal life line**<br><br>Stainless Steel Wire rope of 8mm diameter. Minimum six nos. of steel U-bolt clips are required for clamping each wire rope to a rigid support (03 nos. of U-bolt clips at each end). | 40 nos. of wire rope, each 40 metre long<br><br>90 nos. of wire rope, each 25 metre long. |
| 4 | **Ladders on column**<br>The minimum design live load on metallic ladder shall be a single concentrated load of 100 kilo grams. All rungs shall have a minimum diameter of 1.90 centimetres, and minimum clear length of rungs shall be 40.6 centimetres. The distance between rungs shall not exceed 30.5<br>centimetres. Each ladder shall have maximum height of 9.0 metre. The ladder shall have proper fastenings for attaching it to a column using positive means such as bolt, weld or other type of fasteners. | cumulative length of ladders<br>is 1200 metres |
| 5 | **Safety PPEs (Industrial Safety helmet & Industrial Safety Shoes)**<br>Industrial Safety Helmet (IS:2925-1984 marked).<br>Industrial Safety/Electrical Shoes (IS:15298-2002 marked).<br>Full body Safety Harness (conforming IS:3521) | <br>1575 nos.<br>1575 nos.<br>395 nos. |
| **Note** | Above mention quantity is for whole project, however separate annexure issued to all contractor at the time of execution of work by Safety officer BHEL with approval of construction manager. PPEs Quantity annexure issued by site are final and agency must fulfill the same during exaction of work | |

**ANNEXURE – 1 Cont.**

**List of Safety Equipment's & safety Personal Protective Equipment's mention in this table are, the list of minimum suggestive Safety Equipment's & Safety Personal Protective Equipment's. However, all the Safety Equipment's & Safety Personal Protective Equipment's to be deployed necessarily by the Contractor wherever required or as per instruction from BHEL HSE officer/ construction manager.**

**The actual deployment at site shall not be limited to these and additional equipment's if required shall be mobilized by the contractor. Safety Gadgets, Equipment and Measurement Devices to be ensured in total throughout the duration of the project.**

| | **Safety Gadgets & Equipment** | | |
|---|---|---|---|
| | **Name** | **Quantity** | **Unit** |
| **1** | Lifelines-steel wire rope min 8mm insulated (Length-100mtr) | | |
| **2** | Retractable fall arrestors | | |
| **3** | Safety nets (10m X 5m) | | |
| **4** | Sky climbers | | |
| **5** | Fire blanket (5mX 5m) | | |
| **6** | Honey Bee Removal Suit & Kit | | |
| **7** | Flashback arrestors | | |
| **8** | Barricading Tape (100mX 100 nos ) | | |
| **9** | Binoculars | | |
| **10** | Walkie-Talkies | | |
| **11** | LOTO kit | | |
| **12** | 24-Volt light | | |
| **13** | Sand Buckets | | |
| **14** | Hard barricading | | |
| **15** | ELCB for welding machine & winches | | |
| **16** | Fire extinguishers | | |
| **17** | First aid box covering medicines as per BOCW | | |
| **18** | Temporary platform material (grating) | | |
| **19** | Small size u clamps to tie life lines | | |
| **20** | Vertical lifeline ( 16mm polyamide rope with fire resistant ) | | |
| **21** | Rescue harness | | |
| **22** | Mini fogging machine | | |
| **23** | Gas Welding Igniter | | |
| **24** | Toe boards (height-150mm) | | |
| **25** | Portable Aluminum ladder (Length- 3mtrX400mm) | | |
| **26** | Eye/ Hand wash station | | |
| **27** | Whistle | | |
| **28** | Sintex plastic water tank-1000L | | |
| **29** | Earth pits each electrical per panel & connected load | | |
| **30** | Electrical shed covered for keeping welding machine and electrical panels | | |
| **31** | Earth flat (Aluminum) (50mmX 400 m) for earthling | | |
| **32** | Gas cylinder trolley for gas cutting sets. | | |
| **33** | Sheds for segregating filled and unfilled gas cylinders | | |
| **34** | 100 W LED & its fixture/cable | | |
| **35** | 250 W LED & its fixture/cable | | |
| **36** | Painting safety kit | | |
| **37** | Double lanyard full body harness with shock absorber | | |

| | | | |
|---|---|---|---|
| **38** | Multi-purpose Ladder | | |
| **39** | Urinal provision | | |
| **40** | As per requirement | | |
| **41** | Tool carrying bags | | |
| **42** | Bigger sized Bins for floor for scrap collection | | |
| **43** | Ladder clamps for beam type of columns | | |
| **44** | Ladder clamps for box type of columns (with stoppers where inclined or vertical boxes) | | |
| **45** | Helmet torches | | |
| **46** | Torches with good capacity | | |
| **47** | Mobile Tower ladder with platform provision for hopper cavity 350x350 | | |
| **48** | Laser Distance meter | | |
| **49** | Man Cage for standard wt and with standard wire ropes | | |
| **50** | Temporary Ladders 3 meters | | |
| **51** | Exhaust fans | | |
| | | | |
| | **Measurement Instruments (All measuring instrument must be calibrated)** | | |
| | **Name** | **Quantity** | **Unit** |
| **1** | ELCB/RCCB Tester | | |
| **2** | Multi meter (Light cables) | | |
| **3** | Electric Tester (to checked low voltage up to 415 V) | | |
| **4** | Earth Resistance Meter | | |
| **5** | Lux Meter | | |
| **6** | Anemometer | | |
| **7** | Breath Analyzer (Alcohol) | | |
| **8** | Multi-gas dozi-meter | | |
| **9** | Gas leakage detector / alarm | | |
| **10** | Gas monitor (confined space) | | |
| **11** | Radiation meter & Badges | | |
| **12** | Blood Pressure Monitor | | |
| **13** | Fire detectors | | |
| **14** | Sound level meter | | |
| **15** | SCBA (Self-contained breathing apparatus) | | |
| **16** | Siren | | |
| **17** | Public address system | | |
| **18** | Emergency lamp – (rechargeable) | | |
| **19** | Oxygen Meter (while working in confined space etc) | | |

# ANNEXURE 2

| **Details & Contents of First Aid Box as per Contract Labor (Regulation & Abolition Act), Central Rules, 1971** | |
|---|---|
| (1) | The first-aid box shall be distinctively marked with a Red Cross on a white background and shall contain the following items, namely |
| (A) | For establishments in which the number of contract labor employed does not exceed fifty, each first aid box shall contain the following equipment |
| (i) | 6 small sterilized dressings |
| (ii) | 3 medium size sterilized dressings |
| (iii) | 3 large size sterilized dressings |
| (iv) | 6 pieces of sterilized eye pads in separate sealed packets. |
| (v) | 6 roller bandages 10 cm wide. |
| (vi) | 6 roller bandages 5 cm wide. |
| (vii) | One tourniquet |
| (viii) | A supply of suitable splints |
| (ix) | Three packets of safety pins. |
| (x) | Kidney tray. |
| (xi) | 3 large sterilized burn dressings. |
| (xii) | 1 (30ml) bottle containing a two percent alcoholic solution of iodine |
| (xiii) | 1 (30 ml) bottle containing Sal volatile having the dose and mode of administration indicated on the label |
| (xiv) | 1 snake bite lancet |
| (xv) | 1 (30gms) bottle of potassium permanganate crystals. |
| (xvi) | 1 pair scissors |
| (xvii) | 1 copy of the First-Aid leaflet issued by the Director General, Factory Advice Service and Labor Institutes, Government of India. |
| (xviii) | A bottle containing 100 tablets (each of 5 grains) of aspirin |
| (xix) | Ointment for burns |
| (xx) | A bottle of suitable surgical anti-septic solution |

| **(B)** | **For establishment in which the number of contract labor exceeds fifty each first-aid box shall contain the following equipment:** |
|---|---|
| (i) | 12 small sterilized dressings |
| (ii) | 6 medium size sterilized dressings |
| (iii) | 6 large size sterilized dressings. |
| (iv) | 6 large size sterilized burn dressings |
| (v) | 6 (15 grams) packets sterilized cotton wool |
| (vi) | 12 pieces of sterilized eye pads in separate sealed packets. |
| (vii) | 12 roller bandages 10 cm wide. |
| (viii) | 12 roller bandages 5 cm wide. |
| (ix) | One tourniquet. |
| (x) | A supply of suitable splints. |
| (xi) | Three packets of safety pins. |
| (xii) | Kidney tray. |
| (xiii) | Sufficient number of eye washes bottles filled with distilled water or suitable liquid clearly indicated by a distinctive sign which shall be visible at all times. |
| (xiv) | 4 per cent Xylocaine eye drops, and boric acid eye drops and soda by carbonate eye drops. |
| (xv) | 1 (60ml) bottle containing a two percent alcoholic solution of iodine |
| (xvi) | One (two hundred ml) bottle of mercurochrome (2 per cent) solution in water. |
| (xvii) | 1 (120ml) bottle containing Sal volatile having the dose and mode of administration |

| | |
|---|---|
| | indicated on the label. |
| (xviii) | 1 roll of adhesive plaster (6 cmX1 meter) |
| (xix) | 2 rolls of adhesive plaster (2 cmX1 meter) |
| (xx) | A snake bite lancet. |
| (xxi) | 1 (30 grams) bottle of potassium permanganate crystals. |
| (xxii) | 1 pair scissors |
| (xxiii) | 1 copy of the First-Aid leaflet issued by the Director-General, Factory Advice service and labor Institutes, Government of India. |
| (xxiv) | a bottle containing 100 tablets (each of 5 grains) of aspirin |
| (xxv) | Ointment for burns |
| (xxvi) | A bottle of a suitable surgical anti septic solution. |
| (2) | Adequate arrangement shall be made for immediate recoupment of the equipment when necessary. |

# ANNEXURE 3

**List of HSE Procedures**

| S No | Procedure No. | Procedure Name |
|---|---|---|
| 1 | HSEP:01 | HSE Procedure for Register of OHS Hazards & Risks |
| 2 | HSEP:02 | HSE Procedure for Register of Environmental Aspects & Impacts |
| 3 | HSEP:03 | HSE Procedure for Register of Regulations |
| 4 | HSEP:04 | HSE Procedure for Training & Awareness |
| 5 | HSEP:05 | HSE Procedure for Control of Documents |
| 6 | HSEP:06 | HSE Procedure for Emergency Preparedness & Response |
| 7 | HSEP:07 | HSE Procedure for HSE Performance Measurement, Monitoring & Review |
| 8 | HSEP:08 | HSE Procedure for Incident Investigation, Reporting & Corrective Action |
| 9 | HSEP:09 | HSE Procedure for Non-conformity Handling & Corrective Action |
| 10 | HSEP:10 | HSE Procedure for Control of Records |
| 11 | HSEP:11 | HSE Procedure for Internal Audit |
| 12 | HSEP:12 | HSE Procedure for Permit to Work |
| 13 | HSEP:15 | HSE Procedure for Operational Control |

## ANNEXURE 4

| Sl. No | Type of Fire Risk (Class of Fire) | Extinguishing Medium & Relevant INDIAN STANDARD | Scale of Equipment (Minimum recommended) |
|---|---|---|---|
| **1.** | **CLASS 'A'** Fires involving ordinary combustible materials like wood, paper, textiles, rubber etc. (Ordinary hazard or low fire load) | WATER Soda acid type, water type (gas pressure) and water type (constant air pressure) IS: 934 -1976; IS: 940 - 1976; IS: 6234 -1971 | For every 600 square meter floor area or part, one 9-litre capacity. Minimum 4 numbers per floor or room; should not be required to travel more than 15 meter to reach any extinguisher. |
| **2.** | **CLASS 'A'** (Extra hazard &high fire load) | -do | -do – (Also, consult local fire authority). |
| **3.** | **CLASS 'A'** (Special hazards) | -do | -do – Extra provision For every 100 square meter floor area or part, one 4.5 Kg. CO2; minimum 2 numbers per room; should not be required to travel more than 10 meter to reach any extinguisher. |
| **4.** | **CLASS 'B'** (Fires in flammable liquids like oils, solvents, petroleum, products, varnishes, paints, etc. where blanketing effect is essential) (Storage and handling in small quantities) | FOAM / CARBON DIOXIDE / DRY CHEMICAL POWDER IS: 933 -1976; IS: 2878 1976; IS: 2171 1976; IS: 4308 - 1982 | For every 50 square meter floor area or part, 2 numbers 9 -liters foam or 5 kg dry powder; should not be required to travel more than 10 m in the area of storage to reach any extinguisher. |
| **5.** | **CLASS 'B'** (Bulk storage other than in tank form)) | -do - | -do- (but minimum 3 numbers per room) |
| **6.** | **CLASS 'C'** (Fires involving gaseous substances under pressure where it is necessary to dilute the burning gas at a very fast rate with an inert gas or powder) (storage and handling of gas cylinders) | CARBON DIOXIDE / DRY CHEM. POWDER. The best way to extinguish such fire is by stopping the flow of fuel gas to the fire. Container is kept cool with water spray. IS: 2878 - 1976; IS: 2171 -1976; IS: 4308 -1982 | For every 100 square meter floor area or part; 2 numbers, 10 kg powder extinguisher or 6 kg C02; minimum 3 nos. per room; should not be required to travel more than 10 meter to reach any extinguisher. |
| **7.** | **CLASS'D'** Fires involving | SPECIAL DAY POWDER IS: 2171 -1976 IS: 4861 - | For every 50 square meter floor area or part, 2 nos. 5 |

| | | | |
|---|---|---|---|
| | metals like magnesium, aluminum, zinc, potassium etc. where the burning metal is reactive to water and which require special extinguishing media or technique | 1968 | kg special dry powder; minimum 3 nos. per room; should not be required to travel more than 10 meter to reach any extinguisher. |
| **8.** | **MIXED OCCUPANCY** (electrical); Generators; Transformers; etc. | CARBON DIOXIDE DRY POWDER, IS: 2878 1976; IS: 2171 -1976 | For every 100 square meter floor area or part one 10 kg C02. Minimum 2 numbers for every location should not be required to travel more than 10 meter to reach an extinguisher. |

**Note**: Due to peculiarities of the power plant construction sites, there would be locations in the construction areas of Boiler, Turbine, Generator, Transformer, etc. where different types of fire risk (classes of fire) may co-exist. Special care shall be taken while selecting and installing portable fire extinguishers for such locations so that all types of fire risk that may co-exist, are adequately covered. Similar special care shall be taken for storage areas.

# ANNEXURE 5

**HSE Requirements for Adverse Weather & Climate Conditions, Epidemics/ Pandemics**

| | |
|---|---|
| **1.** | **Summer** |
| **a** | **<u>The Working Time and Lunch Hour will be as per instruction of Statutory Authorities (no work between 11am to 3:30pm).</u>** However, in case temp comes down due to rain/cloudy weather work will continue as per normal routine. |
| **b** | During long lunch break, worker will be allowed to go back home for rest. Those who will like to stay back will avail at the facility of rest shed or other designed area. |
| **c** | They will be allowed to take small break during work as per their need. |
| **d** | Water sprinkling will be done on roads to reduce **dust** concentration. |
| **e** | Workers will be provided with adequate cool drinking water and Butter milk/Lemon water etc. |
| **f** | Adequate ORS stock will be made available at the work location in the First-Aid Box for use as needed and at First-aid Center for emergency need. |
| **g** | Fire prevention shall be on high alert, with removal of dry grass and bushes, etc, inside and outside the surrounding work areas. No smoking, and control of open flame/sparks shall be maintained and monitored. |
| **h** | Worker will be informed about the Do's and Don'ts to be followed during summer in the Pre Job Brief. |
| | |
| **1.1** | **Dos & Don'ts** |
| **a** | Drink plenty of cool water and other non-alcoholic fluid and keep body well hydrated. |
| **b** | Eat salt in food to replenish loss of salt through sweating. |
| **c** | Avoid over physical exercise. |
| **d** | Have adequate sleep at night. |
| **e** | Eat light and less spicy food |
| **f** | Avoid eating food which was cooked long time ago. |
| **g** | Nobody should use small water bodies such as pits, running rain water through crevices etc. for drinking and cleaning purpose as it may be unhygienic. |
| | |
| **1.2** | **Emergency Handling** |
| In case of emergency due to heat disorder: | |
| **a** | Rescue the victim from workplace and place under shed. |
| **b** | If to be rescued from height, use stoke basket or rescue kit. |
| **c** | Inform Ambulance immediately. |
| **d** | If nearby any air conditioned room/shed is available, place him inside the room/shed. |
| **e** | Administer First aid by trained First aider for Heat Disorder |
| **f** | If conscious, give him ORS solution to drink. |
| **g** | If required send the victim hospital immediately. |
| | |
| **2.** | **Monsoon** |
| This is the procedure to be followed during monsoon period in the entire project with respect: | |
| **a** | To give clear guidance as to other action that must be implemented |
| **b** | To inform employees what to do in an Emergency Scenario |
| **c** | To establish an emergency response and communication procedure |
| | |
| **2.1** | **During monsoon the following will be implemented:** |
| **a** | Do not allow any loose material (e.g. GI sheet, Ply board, empty cement bag, aluminum foil, foam sheets etc.) on roof sheds or top of structures. |
| **b** | Avoid joints on power cables which need to be laid over-head or under-ground, better not to have any joint at all. In case joints become essential, such cables must be housed rigidly |

| | |
|---|---|
| | and insulation must be provided as per approved standard. The joint shall be suitable for outdoor use. |
| **c** | Maintain smooth flow on open drains. i.e. no obstruction or blockade shall be made on storm water drains. If required, make temporary drains. |
| **d** | Arrange back-filling of excavated pits on war-footing basis. |
| **e** | Arrange bringing down booms of all cranes, hydra machines during stormy weather (wind speed 40-50 kmph) |
| **f** | Confirm that all gantry cranes are effectively choked to prevent rolling and toppling. |
| **g** | Do not forget to deep ready a dew battery operated lights at site-offices during rainy season. |
| **h** | Do not go alone nor permit anyone to stay at tower-tops, roof-tops, high structures or on electrical poles during the course of stormy weather or heavy rain. |
| **i** | Avoid using wet damp clothes. |
| **j** | Barricade excavated zone filled with water. |
| **k** | Engage diesel operated water pump to dewater work area. For electrically operated water pump, the starter shall be protected from rain water. All rotating parts shall be guarded. Ensure availability of sufficient water pumps. |
| **l** | Spread sand/dry soil over slippery area. |
| **m** | Avoid movement of vehicles as minimum as possible. |
| **n** | Avoid self-medication – consult doctors/physicians if feeling sneezy or cold. |
| **o** | All electrical connections / loads have to be routed through ELCB/RCCB (residual current circuit breaker) whose rating should be 30mA. ECLB/RCCB operational checks need to be done monthly during monsoon season. |
| **p** | Provide lightening arrestors at the top of Boiler 3 and boiler 4 and rest sheds which are not covered by existing lightening arrestor of other installation. |
| **q** | All electrical distribution board shall be properly covered at top and sides to protect from rain water. Extension boards shall be protected from rain water. |
| **r** | Do not permit any one to ride up or come down scaffolds frame work during heavy wind or rain. |
| **s** | Provide “anchor” of adequate strength to scaffolds and other high-rise structures. |
| **t** | All rest sheds and GI sheds will be anchored into the round and wall and roof panels will be secured with J hook to prevent shed from blowing over or parts/pieces becoming airborne. Proper earthing per IS standard is also to be installed. |
| **u** | Ensure proper “earthing” for each and every electrical appliance. |
| | |
| **2.2** | **Health and hygiene** |
| Monsoon reduces the immunity of our body and makes us vulnerable to many diseases which are commonly associated with this season. It is time for us to keep our body challenging against disease by boosting our immunity and taking safety measures against these diseases. | |
| The diseases associated with monsoon are Malaria, Jaundice, Gastro-intestinal infections, like typhoid, cholera etc. apart from these viral infections like cold and cough also make their presence felt. Majority of above said diseases are on account of: | |
| **A** | Puddle of water formed due to rain become breeding grounds for mosquitoes which spread disease like, malaria and dengue fever. As a precautionary measure against mosquito-bite disease one can use mosquito net around the end which is better choice to mosquito repellants like mats and coils. |
| **B** | Pollution of drinking water during monsoon is very common. It is very necessary to drink clean and pure water when water-borne monsoon diseases like diarrhea and gastro-intestinal infections threaten us. |

| | |
|---|---|
| **C** | Walking in dirty water during rainy season leads of numerous fungal infection which affect toes and nails. Diabetic patients have to take a special care about their feet. Keeping feet always dry and clean is very necessary. Avoid walking in dirty water. Keep shoes socks and raincoats dry and clean. |
| | |
| **2.3** | **Workmen will be made aware of following Do's and Don'ts:** |
| **a** | Do not sleep in daytime. |
| **b** | Avoid over physical exertion. |
| **c** | During lightning and thunder storm, do not take shelter under tree. Take shelter inside rest shed or store room. |
| **d** | 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. |
| **e** | 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 exits. |
| **f** | 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. |
| **g** | It will constitute a standard practice to switch off portable tools while shifting from one place to another or while leaving them behind unattended; |
| **h** | The contractor shall ensure that a system is in place to always keep tools well maintained. |
| **i** | Wash vegetables with clean water and steam them well to kill germs. |
| **j** | Avoid eating un-cooked foods and salads should be washed properly before consumption. |
| **k** | Drink plenty of water and keep body well-hydrated. |
| **l** | Always keep the surrounding area dry and clean. Don't allow to get water accumulated around. |
| **m** | Keep body warm as viruses attack immediately when body temperature goes down. |
| **n** | Do not enter air conditioned room with wet hair and damp cloths. |
| **o** | Dry your feet and webs with soft dry cloth whenever they are wet. |
| **p** | Eat light and less spicy food. |
| **q** | Avoid eating food which was cooked long time ago. |
| **r** | Eat salt in food to replenish loss of salt through sweating. |
| | |
| **3** | **Emergency Weather Conditions** |
| **Cyclone/Severe thunder storm** | |
| In the event of Cyclone/Severe thunder storm, alert will be issued y BHEL site manager based on notification received by Govt. authorities/Metrological departments or Customer. | |
| **I.** | **The actions required during cyclone/rough weather:** |
| **a** | Check and advice contractors to cleanup work area. Pick up all loose and unused material of respective supervisor's area. |
| **b** | Tie to secure all gas cylinders to avoid displacement and unsafe conditions which could be due to wind pressure. |
| **c** | Secure portable electricity generating sets and other equipment, pumps, hoses etc. |
| **d** | Make preparation for removal of water logging. |
| **e** | Take review of work activity and make preparation for removal of equipment and material from vulnerable areas. |
| **f** | Isolate/turn off all electrical power form the main panel/switches. Secure and anchor panels properly. |
| **g** | Recheck anchorage/tie of all temporary structures/sheds, tall objects, cranes, rigs, scaffolds etc. to avoid toppling due to wind force. |
| **h** | Cranes boom shall be secured, either locked or lowered the booms as reasonably and practicably possible and rigs to safe position for the safety point of view. |
| **i** | Group up all trash barrels, wooden pallets, forms; wooden decks etc. and anchor properly. |

| | |
|---|---|
| **j** | Welding machines, air compressors and such equipment are to be grouped together and secured to the stable objects. Welding leads, electrical cables, hoses are to be rolled up and secured properly. |
| **k** | Set on site vehicles on high ground in the site area with brakes set firmly. |
| **l** | Anchor all tanks, vessels, gas cylinders that may be moved by high wind and water. |
| **m** | Evacuate job site. |
| | |
| **ii** | **Personnel Evacuation:** |
| **a** | Personnel Evacuation will be required if predicted wind speed and storm surge heights are beyond acceptable limits as per the instructions from Govt. Authorities/ Metrological departments or Customer. |
| **b** | Once the warning is received for personnel evacuation, an emergency response team shall be formed. The team will work with local authorities and other agencies formed/deployed to evacuate and transport all personnel involved in the project to the cyclone shelter. |
| **c** | Cyclone may be followed by the calm “EYE”, be aware of it. If the wind suddenly drops, don’t assume the cyclone is over. Violent wind may resume from the opposite side direction. Wait for the official “All clear Signal”. |
| **d** | After the cyclone, do not go outside until officially communicated about safe situation outside. Use recommended routes for returning. Do not panic or rush while returning |
| **e** | Checking of gas leaks and wellbeing of electrical appliances is essential before leaving the site. |
| | |
| **D** | **Preparedness for Other Adverse Climates and Weather Conditions** |
| Preventive steps for ensuring health and safety of workers in all possible adverse weather and climatic conditions to be ensured as per requirement | |
| | |
| **E** | **Preparedness for Epidemics & Pandemics** |
| All necessary precautions and actions as per guidelines of Govt, authorities and regulatory bodies and BHEL procedures, shall be ensured so as to ensure health, safety and prevention of infection during any epidemic/ pandemic/ medical emergency. | |

# ANNEXURE 6

## Indicative List of Indian Standard Codes for Safety

| S No | CODE NAME | TITLE |
|---|---|---|
| | **PERSONAL PROTECTIVE EQUIPMENT** | |
| (1) | IS : 818-1968 (Reaffirmed 2003) | Code of Practice for safety and health requirements in Electric and Gas Welding and Cutting operations. |
| (2) | IS: 1179-1967 (Reaffirmed 2003) | Specification for Equipment for Eye & Face protection during welding. |
| (3) | IS : 1989 (Part 2):1986 (Reaffirmed 1997) | Specification for Leather Safety Boots & Shoes |
| (4) | IS:4770 : 1991 (Reaffirmed 2006) | Rubber Gloves – Electricals purposes-Specification |
| (5) | IS:8519 – 1977 (Reaffirmed 1983) | Guide for Selection of Industrial Safety Equipment for Body Protection. |
| (6) | IS:8520 – 1977 (Reaffirmed 2002) | Guide for Selection of Industrial Safety Equipment for Eye, Face and Ear Protection. |
| (7) | IS: 8807-1978 | Code of practice for maintenance and care of industrial safety equipment eye and face protection |
| (8) | IS: 1224-1985 | Safety shoes |
| (9) | IS: 8940-1978 | Code of practice for maintenance and care of industrial safety equipment eye and face protection |
| (10) | IS: 8990-1978 | Code of practice for maintenance and care of industrial safety clothing |
| (11) | IS: 10667-1983 | Guide for selection of industrial safety for protection of foot and leg |
| (12) | IS: 816-1969 | Code of practice for safety and health requirements in electric and gas welding and cutting operations |
| (13) | IS: 7194-1994 | Assessment of noise exposure during work for hearing conservation purposes |
| (14) | IS:2925 – 1984 (Reaffirmed 2010) | Specification for Industrial Safety Helmets |
| (15) | IS:3521 : 1999 (Reaffirmed 2002) | Industrial Safety Belts & Harnesses-Specification |
| (16) | IS:14166:1994 (Reaffirmed 2002) | Respiratory Protective Devices-Full Face Masks Specification |
| (17) | IS:14746 : 1999 (Reaffirmed 2003) | Respiratory Protective Devices-Half Masks and Quarter Masks - Specification |
| | **CIVIL ENGINEERING OR CONSTRUCTION WORK** | |
| (18) | IS: 2750- 1967(Part II) | Steel scaffolds |
| (19) | IS: 875-1987 | Structural safety of building: loading standards |
| (20) | IS: 4014-1967 | Code of practice for steel tubular scaffolding |
| (21) | IS:3646(Part II) – 1966 (Reaffirmed 2003) | Code of Practice for Interior Illumination |
| (22) | IS:3696 (Part I) – 1987 (Reaffirmed 2002) | Safety Code for Scaffolds and Ladders |
| (23) | IS: 4138-1977 | Safety code for working in compressed air |

| | | |
|---|---|---|
| (24) | IS: 7293-1974 | Safety code for working with construction machinery |
| (25) | IS: 9944-1992 | Recommendations on safe working load for natural and man-made rope slings |
| (26) | IS: 3696(Part 2) : 1991 (Reaffirmed 2002 ) | Scaffolds and Ladders-Code of Safety |
| (27) | IS:3786 – 1983 (Reaffirmed 2002) | Method for Computation of Frequency and Severity Rates for Industrial Injuries and Classification of Industrial Incidents |
| (28) | IS:4912 : 1978 (Reaffirmed 2002) | Safety Requirements for Floor and Wall Openings, Railings and Toe Boards |
| (29) | IS: 5983 – 1980 (Reaffirmed 2002) | Specification for Eye-Protectors |
| (30) | IS:6519 – 1971 (Reaffirmed 1997) | Code of Practice for Selection, Care and Repair of Safety Footwear |
| (31) | IS:9167:1979 | Specification for Ear-Protectors |
| (32) | IS:6994(Part I)-1973 (Re affirmed 1996) | Specification for Industrial Safety Gloves Leather and Cotton Gloves |
| (33) | IS 11006 : 2011 | Flash Back(Flame Arrestor) Specification |
| (34) | IS:9473:2002 | Respiratory Protective Devices-Filtering Half Masks to protect Against Particles-Specification. |
| (35) | IS:9944:1992 (Reaffirmed 2003) | Natural and Man-made Fiber Rope Slings-Recommendations On Safe working loads. |
| (36) | IS:11057 – 1884 (Reaffirmed 2001) | Specification for Industrial Safety Nets |
| (37) | IS:12254:1993 (Reaffirmed 2002) | Polyvinyl Chloride (PVC) Industrial Boots-Specification |
| (38) | BS:1129 | Portable timber ladders, steps, Trestles & lightweight staging |
| (39) | BS:1139 | Metal scaffolds |
| (40) | BS:5973 | Code of practice for access & working scaffolds |
| (41) | BS:5974 | Code of practice for temporary installed scaffolds and access equipment |
| (42) | BS:5975 | Code of practice for false work |
| **FIRE PROTECTION** | | |
| (43) | IS: 2190-1992 | Code of practice for selection, installation and maintenance of portable first-aid fire extinguishers |
| (44) | IS: 5896 | Code of practice for selection, operation and maintenance of fire-fighting appliances |
| (45) | IS: 8433-1984 | Code of practice for dissolved acetylene cylinders |
| (46) | IS : 15397 :2003 (Reaffirmed 2008) | Portable Extinguisher MechanicaL Foam Type(Stored Pressure)-Specification |
| **ELECTRICAL** | | |
| (47) | IS: 3043-1987 | Code of practice for earthing |
| (48) | IS: 5424-1969 | Rubber mats for electrical purposes |
| (49) | IS: 3646 (Part II) | Artificial lightings |
| (50) | IS: 2148 & IS: 2206 | Flame proof electrical fittings Machinery |
| **MACHINERY** | | |
| (51) | IS:13367(Part 1):1992 (Reaffirmed 20030 | Safe Use of Cranes-Code of Practice |
| (52) | IS: 1860-1980 | Code of practice for installation, operation and maintenance of electric passenger and goods lifts |
| (53) | IS: 1991-1987 | Safety requirements for the use, care and protection of |

| | | |
|---|---|---|
| | | abrasive grinding wheels |
| (54) | IS: 5903-1970 | Safety devices for gas cylinders |
| (55) | IS: 8216-1976 | Guide for inspection of lift wire ropes |
| (56) | IS: 8964-978 | Recommendations for safety conditions for woodworking machines |
| (57) | IS: 9474-1980 | Principles of mechanical guarding of machinery |
| (58) | IS: 11461- 1985 | Code of practice for compressors safety |
| (59) | IS: 19011:2002 | Guidelines for Quality and/or Environmental Management Systems Auditing |

**CODES & STANDARDS**

In addition to the codes and standards specifically mentioned in the relevant technical specifications for the equipment / plant / system, all equipment parts, systems and works covered under this specification shall comply with all currently applicable statutory regulations and safety codes of the Republic of India as well as of the locality where they will be installed, including the following:

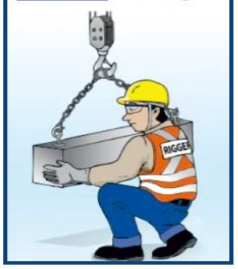
| | |
|---|---|
| A | Indian Electricity Act |
| B | Indian Electricity Rules |
| C | Indian Explosives Act |
| D | Indian Factories Act and State Factories Act |
| E | Indian Boiler Regulations (IBR) |
| F | Regulations of the Central Pollution Control Board, India |
| G | Regulations of the Ministry of Environment & Forest (MoEF), Government of India |
| H | Pollution Control Regulations of Department of Environment, Government of India |
| I | State Pollution Control Board. |
| J | Rules for Electrical installation by Tariff Advisory Committee (TAC). |
| K | Building and other construction workers (Regulation of Employment and Conditions of services) Act, 1996 |
| L | Building and other construction workers (Regulation of Employment and Conditions of services) Central Rules, 1998 |
| M | Explosive Rules, 1983 |
| N | Petroleum Act, 1984 |
| O | Petroleum Rules, 1976 |
| P | Gas Cylinder Rules, 1981 |
| Q | Static and Mobile Pressure Vessels (Unified) Rules, 1981 |
| R | Workmen's Compensation Act, 1923 |
| S | Workmen's Compensation Rules, 1924 |
| T | Any other statutory codes / standards / regulations, as may be applicable. |

# ANNEXURE-7

RIGGER HANDBOOK

बी एच ई एल BHEL

## रिगर हैंडबुक




## एक रिगर क्या है?

- भारोत्तोलन गियर के चयन या निरीक्षण सहित, किसी भार को सुरक्षित रूप से उठाने के लिए तकनीकों का उपयोग करने वाले व्यक्ती को रिगर कहते है।

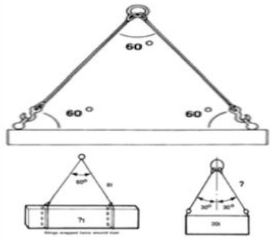
## एक योग्य रिगर को पता होना चाहिए कि कैसे...

- विभिन्न प्रकार की रस्सियों, स्लिंग्स, जंजीरों और सहायक उपकरणों का उपयोग करें।
- उठाने के लिए उपयोग की जाने वाली किसी भी रस्सी, स्लिंग या चेन के सुरक्षित कार्य भार (एसडब्ल्यूएल) की गणना करें।
- भार उठाने के लिए भार का आकलन करें।
- उपयुक्त सुरक्षित स्लिंगिंग तकनीकों का चयन करें और उनका उपयोग करें।
- विभिन्न भारों और आकारों के सुरक्षित रूप से स्लिंग लोड का चयन करें ।
- जब लोड (सामान) ऑपरेटर की दृष्टि से बाहर होता है तो क्रेन या होइस्ट ऑपरेटर को लोड की गति में निर्देशित करें ।
- भार को निर्देशित करने के लिए हाथों और सीटी से संकेत दें।
- संभाले जाने वाले कुछ भारों का भार-वितरण डॉकिट पर मुद्रित किया जा सकता है या किस प्रकार से भार पर अंकित किया जा सकता है।

## फ्लैट वेबिंग और राउंड सिंथेटिक स्लिंग्स (Flat webbing and round synthetic slings)

फ्लैट वेबिंग और राउंड सिंथेटिक स्लिंग्स को SWL के साथ लेबल किया जाता है। अगर लेबल गायब है तो भार न उठाएं। मूल्यांकन और पुनः लेबलिंग के लिए निर्माता को स्लिंग लौटाएं। सिंथेटिक स्लिंग्स रंग कोडित होते हैं।

लोड या डिलीवरी डॉक पर अंकित भार से सावधान रहें। उदाहरण के लिए इमारती लकड़ी, गीली होने पर 50 प्रतिशत भारी हो सकती है। फाउंड्री में, जब बड़े ढलाई को एक सांचे से उठाया जाता है, तो रेत द्वारा निर्मित चूषण (Suction) वजन में काफी वृद्धि कर सकता है। पाइप और टैंक अक्सर तरल पदार्थ, कीचड़ या अन्य सामग्री द्वारा भारित होते हैं।



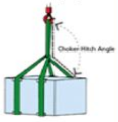

## स्लिंग के विभिन्न प्रकार

प्रत्यक्ष (direct) लोड स्लिंग

2 पैर कि स्लिंग

चोकर हित्व गोलाकार भार

चोकर हित्व (वर्ग) भार




## सामान्य नियम (Thumb Rule)

स्लिंग का सेफ वर्किंग लोड (एसडब्ल्यूएल) अधिकतम भार है जिसे स्लिंग सामग्री के एसडब्ल्यूएल, रीविंग व्यवस्था और स्लिंग टर्मिनेशन की विधि पर विचार करने के बाद उठाया जा सकता है।

अ) लचीला इस्पात तार रस्सी (FSWR) स्लिंग के लिए SWL नीचे दिये गये सुत्र द्वारा दिया जाता है :-

सूत्र: SWL (kg) = $D^2$(mm) x 8

D(mm) = $\sqrt{SWL(kg) / 8}$

जहा, SWL= सुरक्षित कार्य भार और D= रस्सी व्यास

ब) श्रृंखला (Chain) का SWL ग्रेड (G) द्वारा नीचे दिये गये सुत्र द्वारा दिया जाता है :-

सूत्र: SWL (किलो) = $D^2$ (मिमी) x G x 0.4

जहा(i.e.), ग्रेड (G) 80 श्रृंखला, 0.4 का उपयोग करें।

**WORKING LOAD LIMIT (W.L.L.) IN TONNES UNDER GENERAL CONDITIONS OF USE**

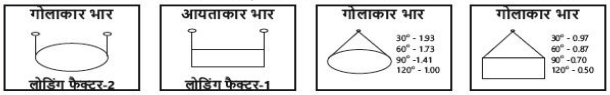
| | | Single Leg Slings | | | | Slings of 2, 3 or 4 Leg Slings | | | 2 Leg Slings Max 90° 90° Max | |
|---|---|---|---|---|---|---|---|---|---|---|
| Chain Size (mm) | Grade | Straight Sling | Adjustable sling* | Reeved Sling | Basket Sling Max 60° | Straight sling -60 degree | Straight sling - 90 degree | Straight sling -60 degree | Reeved Sling 60 degree | Basket Sling Max 60 degree |
| 6 | 80 | 1.1 | 1.1 | 0.8 | 1.5 | 1.9 | 1.6 | 1.1 | 1.5 | 2.5 |
| 8 | 80 | 2.0 | 2.0 | 1.5 | 2.6 | 3.5 | 2.8 | 2.0 | 2.6 | 4.5 |
| 10 | 80 | 3.2 | 3.2 | 2.4 | 4.1 | 5.5 | 4.5 | 3.2 | 4.1 | 7.2 |
| 13 | 80 | 5.3 | 5.3 | 4.0 | 6.9 | 9.2 | 7.5 | 5.3 | 6.9 | 11.9 |
| 16 | 80 | 8.0 | 8.0 | 6.0 | 10.4 | 13.8 | 11.3 | 8.0 | 10.4 | 18.0 |
| 20 | 80 | 12.5 | 12.5 | 9.4 | 16.3 | 21.6 | 17.6 | 12.5 | 16.3 | 28.1 |
| 22 | 80 | 15.0 | 15.0 | 11.3 | 19.5 | 26.0 | 21.2 | 15.0 | 19.5 | 33.8 |
| 26 | 80 | 21.2 | 21.2 | 15.9 | 27.6 | 36.7 | 29.9 | 21.2 | 27.6 | 47.7 |
| 32 | 80 | 31.5 | 31.5 | 23.6 | 41.0 | 54.5 | 44.4 | 31.5 | 41.0 | 70.9 |
| 6 | 100 | 1.4 | 1.4 | 0.8 | 1.8 | 2.4 | 2.0 | 1.4 | 1.8 | 3.2 |
| 8 | 100 | 2.5 | 2.5 | 1.4 | 3.3 | 4.3 | 3.5 | 2.5 | 3.3 | 5.6 |
| 10 | 100 | 4.0 | 4.0 | 2.3 | 5.2 | 6.9 | 5.6 | 4.0 | 5.2 | 9.0 |
| 13 | 100 | 6.7 | 6.7 | 3.8 | 8.7 | 11.6 | 9.4 | 6.7 | 8.7 | 15.1 |
| 16 | 100 | 10.0 | 10.0 | 5.6 | 13.0 | 17.3 | 14.1 | 10.0 | 13.0 | 22.5 |
| 20 | 100 | 16.0 | 16.0 | 9.0 | 20.8 | 27.7 | 22.6 | 16.0 | 20.8 | 36.0 |
| 22 | 100 | 19.0 | 19.0 | 10.7 | 24.7 | 32.9 | 26.8 | 19.0 | 24.7 | 42.8 |
| 26 | 100 | 26.5 | 26.5 | 14.9 | 34.5 | 45.8 | 37.4 | 26.5 | 34.5 | 59.6 |
| 32 | 100 | 40.0 | 40.0 | 22.5 | 52.0 | 69.2 | 56.4 | 40.0 | 52.0 | 90.0 |
| 8 | 120 | 3.0 | 3.0 | 2.3 | 3.9 | 5.2 | 4.2 | 3.0 | 3.9 | 6.8 |
| 10 | 120 | 5.0 | 5.0 | 4.0 | 6.5 | 8.8 | 7.0 | 5.0 | 6.5 | 11.3 |
| 13 | 120 | 8.0 | 8.0 | 6.3 | 10.4 | 13.8 | 11.3 | 8.0 | 10.4 | 18.0 |

*On adjustable slings, some grab shortening hooks may derate the W.L.L. by 25%. Advice should be sought from the mfg.
नोट – उपर दिये गये सभी कारक मानक के अनुसार है और यह वास्तविक परिस्थिति के अनुसार बदल सकते है ।

चित्र :- उपयोग की सामान्य परिस्थितियों में टन (1000 किलो) में कार्य भार सीमा

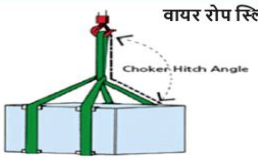
## सिंगल स्लिंग

### बास्केट हित्व - सिंगल स्लिंग वट्किल लेग्स - पैरों के बीच के कोण को शमिल करें

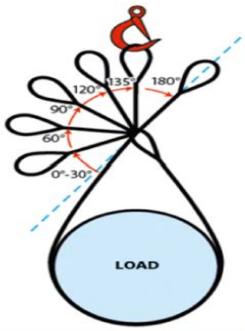



### अंतहीन स्लिंग

## वायर रोप स्लिंग चोकर हित्व के साथ




| चोकर हित्व कोन न्युनीकरण चार्ट | |
|---|---|
| चोकर हित्व (कोन) | सीमित कारक |
| 120-180 | 1.00 |
| 105-120 | 0.82 |
| 90-105 | 0.71 |
| 60-90 | 0.58 |
| 0-60 | 0.50 |



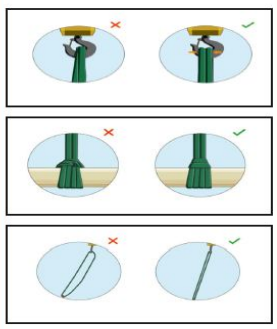

## रिगर के हाथो के संकेत

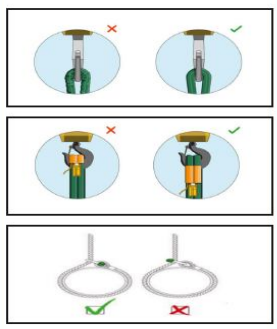
क्रेन की गतिविधियों को निर्देशित करते समय एक रिगर को क्रेन ड्राइवरों को स्पष्ट मौखिक संकेत देना चाहिए। रिगर स्पष्ट रूप से बोलें और क्रेन के उस हिस्से का नाम बताएं जिसे पहले ले जाना है - फिर चलने / घुमने की दिशा।

| MOTION | HAND SIGNAL | WHISTLE, BELL OR BUZZER SIGNAL |
|---|---|---|
| Hoisting raise | | 2 short •• |
| Luffing boom up | | 3 short ••• |
| Slewing right | | 1 long, 2 short —•• |
| Jib-trolley out; telescoping boom extend | | 1 long, 3 short —••• |
| Travel and traverse | | Not applicable |

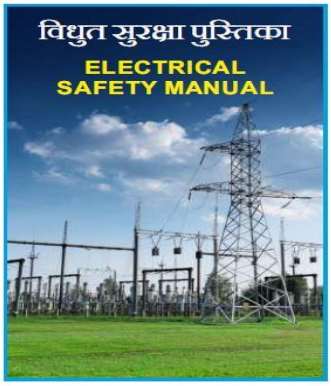
| MOTION | HAND SIGNAL | WHISTLE, BELL OR BUZZER SIGNAL |
|---|---|---|
| Hoisting lower | | 1 long — |
| Luffing boom down | | 4 short •••• |
| Slewing left | | 1 long, 1 short —• |
| Jib-trolley in; telescoping boom retract | | 1 long, 4 short —•••• |
| Stop | | 1 short • |

## क्या करें और क्या न करें





# ANNEXURE 8




## बिजली क्या है :

बिजली एक किस्म की उर्जा है, जो कि संवाहक (कंडक्टर ) में धनात्मक व ऋणात्मक बिन्दुओं से इलेक्ट्रानों के अंतरण से उत्पन्न होती है। बिजली के आवेश के दोलन को विद्युत धारा कहा जाता है, जिसकी तीव्रता सामान्यतः एम्पीयर में मापी जाती है। विद्युत धारा या तो डिरेक्ट धारा (Direct Current) होती है या फिर प्रत्यावर्ती धारा (Alternate Current) वोल्टेज विद्युतीय शक्ति ( विभव शक्ति प्रति युनिट चार्ज ) होती है, जिसके कारण सर्किट में धारा प्रवाहित होती है। इसे प्रति कुलंब जुल्स (वोल्ट्स ) में मापा जाता है।

## बिजली के खतरे :-

१ ) **बिजली का झटका** एक खतरनाक स्थिती होती है, जिसमें बिजली की नंगी तारों / पुर्जों के सम्पर्क से, उर्जा का संभावित उत्सर्जन होता है।

२ ) **शॉट सर्किट** बिजली के किसी सर्किट के अलग-अलग वोल्टेज के दो बिंदुओं के बीच असामान्य संपर्क के कारण होता है।

३ ) **ज्वलन (फ्लैश)** का खतरा एक ऐसी स्थिती होती है, जो विद्युत चाप ( आर्क ) के कारण उर्जा के उत्सर्जन से उत्पन्न होती है।

४ ) **ओवरलोड** एक ऐसी स्थिति होती है, जिसमें बिजली की तार या सर्किट पर उसकी क्षमता से ज्यादा एम्पीयर लोड डाला जाता है।

५ ) **अधिक वोल्टता** तब होती है, जब किसी सर्किट या उसके पुर्जे में वोल्टता, उसकी अधिकतम डिझाइन सीमा को लांघ लेती है।

६ ) **ऊपरी लाईन के खतरे** से तात्पर्य है जमीन से ऊपर खुली हवा में लटकती बिजली की ट्रान्समिशन लाइन।

## बिजली के झटके (शॉक) को रोकने के लिए सावधानियां :

१) **इन्सुलेशन निरीक्षण** :- बिजली के उपकरण, झटके (शॉक) से बचाने के लिए इंसुलेटेड बनाते हैं। कमजोर इन्सुलेशन से झटके (शॉक) को रोकने के लिए, रोजमर्रा के उपयोग में बिजली के तार और कनेक्शन का ठीक से निरीक्षण करें। सुनिश्चित करें कि प्रत्येक विद्युत कनेक्शन में सॉकेट प्रदान किया गया है।

२) **केवल एमसीबी/ईएलसीबी/ आरसीसीबी का उपयोग करें** :- बिजली के झटके से संबंधित चोटों को कम करने के लिए यह सुनिश्चित करें कि एमसीबी/ईएलसीबी/ आरसीसीबी का मुख्य जंक्शन बॉक्स में उपयोग किया जाता है और ओएमएच्य विद्युत मानक के अनुसार आवश्यक है कि, उपभोक्ता आउटलेट के लिए या तो ग्राउंड फॉल्ट सर्किट इंटरप्टर्स (जीएफसीआई) प्रदान करें या एक सुनिश्चित उपकरण ग्राउंडिंग कंडक्टर उपलब्ध कराए।

३) **व्यक्तिगत सुरक्षा उपकरण (पीपीई)** :- इस उपकरण में रबर इन्सुलेटिंग दस्ताने, आस्तीन, चटाई, कंबल, लाइन नली, और गैर-प्रवाहकीय कठोर टोपी ( कैप ) शामिल हैं। उचित पीपीई को पहनने के अलावा कर्मचारियों को , पीपेई उपयोग करने से पहले उसकी बारिकी से जांच करें । यदि उपकरण सेवा योग्य नहीं है तो, उसे त्यान दें या उसकी मरम्मत करें।

४) **ताला और टैग** :- बिजली के झटके को कम करने के लिए, तालाबंदी और टैग आउट उपकरण का उपयोग सबसे प्रभावी तरीकों में से एक है। रखरखाव करते समय आकस्मिक ऊर्जा को रोकने के लिए , तालाबंदी/टैग आउट का उपयोग करने के लिए कर्मचारियों को शक्ति के स्रोत पर या तो एक टैग या ताला लगाना होगा।

५) **पावर लाइन सुरक्षा** :- बिजली की लाइनें सबसे बड़ा विद्युत पावर संकुलित करती हैं, इसलिए एहतियात अतिरिक्त सुरक्षा लेना महत्वपूर्ण है। सिर के ऊपर बिजली लाइनों के पास काम करते समय यह सुनिश्चित करने की आवश्यकता है कि वे केवल लकड़ी या फाइबरग्लास सीढ़ी का उपयोग करें। खुताई करने से पहले, स्थानीय उपयोगिता कंपनी से दबी हुई बिजली लाइनों के संपर्क को रोकने के लिए जानकारी ले कर सुनिश्चित करें।

## घरेलु उपयोग – क्या करें

- मानक/ आईएसाई/ चिन्हित उपकरण और सामान का उपयोग करें।
- रेफ्रिजरेटर, वाशिंग मशीन, ओवन, मिक्सर वगैरह को बिजली से कनेक्ट करने के लिये हमेशा उपयुक्त रूप से अर्थिंग की हुई तीन पिनों वाली प्लग का उपयोग करें।
- मानव संरक्षण हेतु बिजली के सर्किट में ३०mA संवेदनशीलता वाला आरसीसीबी (रेसिड्युल करंट सर्किट ब्रेकर) लगाएं।
- उपयोग में न होने पर बिजली की आपुर्ति बंद कर दें।
- बिजली की तारों को गर्म / गीले उपकरणों से दुर रखें।
- स्विचबोर्ड ऐसी जगह लगाये जहा आसानी से पहुंचा जा सके।
- उपकरणों को साफ और धुल से मुक्त रखें।
- बिजली से चलनेवाले औजार प्रचालित करते समय रबर के सोल वाले जुते पहनें।
- साफ करने से पहले , हमेशा बिजली की वस्तुओं के प्लग निकाल दें।

- यह सुनिश्चित करें कि सभी किस्म की तारों को पेशेवर लाइसेंसधारी विद्युतकर्मी ही स्थापित एवं / या सर्विस / मरम्मत करे।
- सर्किट ब्रेकर और फ्युज उपलब्ध करांए, जिनसे शॉट सर्किट / ओवरलोडिंग होने पर मुख्य पैनल से सर्किट अपने-आप बंद हो जाएगा और कोई दुर्घटना नहीं होगी।

## घरेलु उपयोग – क्या न करें

- गीले हाथों से बिजली के उपकरण प्रचालित न करें।
- कई उपकरणों से जोडकर तारों को ओवरलोड न करें।
- फ्युज की जगह तार न लगाएं।
- बिजली चालु होने पर फ्युज्ड बल्ब / सीएफएल न बदलें।
- नंगी तारें डालकर , बिजली आपुर्ती की निकासी न करें।
- प्लग को सॉकेट से निकालने के लिए तार को न खींचें।
- तारों को बीच से न जोडें और अगर जोडना ही पडे तो उनपर आवरण लगाएं।
- तारों को कालीन वगैरह के नीचे न डालें।
- बिजली की नंगी तारों को सॉकेट में प्लग के बगैर न डालें।
- बिजली की तारों को कभी न मोडें और न ही मरोडें या फिर उपकरणों को तार के सहारे न उठाएं।

## औद्योगिक उपयोग – क्या करें

- सभी स्विचों / स्विचबोर्डों की पहचान निश्चित करें और उनपर निशान लगाएं।
- सभी स्विचों / स्विचबोर्डों / पैनलों को पहुंचने योग्य स्थानों पर लगाएं।
- बिजली के पैनलों के सामने रबर / आवरण मैट का उपयोग करें।
- काम करते समय, हमेशा आईएसआई निशान वाले मानक वैयक्तिक संरक्षण उपकरणों (पीपीई) का उपयोग करें।
- पृथकरण हेतु और बिजली की प्रणाली पर काम करने के लिये कार्य अनुमति / लोटो (LOTO) प्रणाली अपनाएं।
- मानक / आईएसआई निशान वाली सामग्री / वस्तुओं का उपयोग करें।
- बिजली के सभी उपकरणों / मशीनों की दोहरी अर्थिंग करना सुनिश्चित करें।
- कार्यस्थल पर अग्नीशमन यंत्रों /रेत की बाल्टीयों का उपलब्ध होना सुनिश्चित करें।
- जहां कहीं जरुरत हो, खतरे के बोर्ड और अन्य चेतावनी संकेतों का उपयोग करें।
- बिजली के उपकरणों एवं तारों के कटने-फटने या आवरण क्षतीग्रस्त होने की जांच जरुर करें।
- जब तक साबित न हो जाए , तब तक हरेक सर्किट को बिजलीयुक्त मानें।
- ज्वलन संरक्षण वाले उपयुक्त रुप से निर्मित उपकरण का उपयोग करें। संरक्षण हेतु, आर्क रोधी कपडों और पीपीई का इस्तेमाल करें।
- सुनिश्चित करें के काम शुरु करने से पहले ठेकेदारों और श्रमिकों ने काम को समझ लिया है।
- बिजली प्रणाली पर काम करने के लिए लिखित प्रक्रिया विकसित करें।
- जहां तक संभव हो, बिजली की ऊपरी तारों को हटा दें, आवरणयुक्त करें या उर्जारहित प्रणाली पर काम करने से पहले, गैर-संपर्क किस्म के वोल्टेज संयुक्तक द्वारा वोल्टेज की गैर-मौजुदगी की जांच करें।
- अनायास सम्पर्क से बचने के लिए, बिजली की तारों को आवरणयुक्त या रबरयुक्त बनाए।
- उपकरण के सिरे पर निशान की जांच द्वारा या संबंधित व्यक्ति से संपर्क करके सर्विस के वोल्टेज का पता लगाए।
- अगर सामग्री को बिजली की तारों के नीचे रखना पडे, तो श्रमिकों को खतरे की जानकारी देने हेतु, चेतावनी पताकाएं और संकेत लटकाएं तथा सामान रखने से पहले लिखित प्रक्रियाएं हासिल करें।
- कार्य के अनुकुल, मल्टिमीटर्स / मापन यंत्रों का चयन करें।

## औद्योगिक उपयोग – क्या न करें

- अस्थायी कनेक्शन न लगाएं।
- विशेषकर सुवाह्य उपकरणों हेतु प्रयुक्त तारों को बीच से न जोडें।
- स्विच / पैनल आवरणों को खुला न छोडें।
- सर्किट के विद्युत – प्रवाहित पुर्जे खुले न छोडें।

# ANNEXURE 9

# HSE INSPECTION FORMATS

| | POWER SECTOR | FORMAT NO: **HSEP:14-F01**<br>REV NO.: 01<br>PAGE NO. 01 OF 1 |
|---|---|---|
| | Inspection of First Aid Box | |

| | |
|---|---|
| **Name of Site** | |
| **Name of Sub-Contractor** | |
| **Inspected by** | |
| **Date & Time of Inspection** | |

**Number of employees on the site: -_____ Number of Workers on the site: - _____**

| S. No. | Item | No. Available | Remarks |
|---|---|---|---|
| 1 | No. of small sterilized dressings | | |
| 2 | No of medium sized sterilized dressings | | |
| 3 | No of large sized sterilized dressings. | | |
| 4 | No. of large sized sterilized burn dressings | | |
| 5 | No of (15 grams) packets sterilized cotton wool | | |
| 6 | No of pieces of sterilized eye pads in separate sealed packets. | | |
| 7 | No of roller bandages 10 cm wide. | | |
| 8 | No of roller bandages 5 cm wide. | | |
| 9 | Whether tourniquet available | | |
| 10 | Whether supply of suitable splints available. | | |
| 11 | No of packets of safety pins. | | |
| 12 | Whether kidney tray available | | |
| 13 | Whether sufficient number of eye wash bottles, filled with distilled water or suitable liquid, clearly indicated by a distinctive sign which shall be visible at all times, available. | | |
| 14 | Whether 4%-xylocaine eye drops, and boric acid eye drops and soda bicarbonate eye drops available. | | |
| 15 | Whether (60ml) bottle containing a two percent alcoholic solution of iodine available | | |
| 16 | Whether (two hundred ml) bottle of mercurochrome (2 per cent) solution in water available. | | |
| 17 | Whether 120ml bottle containing Sal volatile having the dose and mode of administration indicated on the label, | | |
| 18 | Whether roll of adhesive plaster (6 cm X 1 meter) available | | |
| 19 | No of rolls of adhesive plaster (2 cmX1meter) | | |
| 20 | Whether snake bite lancet available. | | |
| 21 | Whether (30 grams) bottle of potassium permanganatecrystals available. | | |
| 22 | Whether a pair scissors available | | |
| 23 | Whether copy of the First-Aid leaflet issued by the Director-General, Factory Advice service and labor Institutes, Government of India available. | | |
| 24 | Whether bottle containing 100 tablets(each of 5 grains) of aspirin available | | |
| 25 | Whether Ointment for burns available | | |
| 26 | Whether bottle of a suitable surgical anti-septic solution available | | |
| 27 | Whether List of Contents pasted on First Aid Box along with respective expiry dates | | |

**Signature of Inspecting Official** **Date:**

**Signature of Contractor Site I/C** **Date:**

| | | |
|---|---|---|
| | **POWER SECTOR** | FORMAT NO: **HSEP:14-F02**<br>REV NO.: 01<br>PAGE NO. 01 OF 2 |
| | Health Check-Up | |

| | |
|---|---|
| **Name of Site** | |
| **Name of Sub-Contractor** | |
| **Name of Employee** | |
| **Age** | |

| | |
|---|---|
| History Of Past Illness | H/O Epilepsy: |
| | H/O Drug Allergy: |
| | H/O Diabetics/ Hypertension: |
| | H/O Unconsciousness: |
| Personal History | |

| **EXAMINATION** | **OBSERVATION** | |
|---|---|---|
| **General Physical Examination** | | |
| Height | | |
| Weight | | |
| BMI | | |
| Built And nourishment | | |
| Pallor | | |
| Temperature | | |
| Chest Expansion | Inspiration | Expansion |
| | | |
| Lymph Node Enlargement | | |
| Upper Limbs Strength & Function | | |
| Lower Limbs Strength & function | | |
| Spine Adequately flexible for the job concerned (Yes/No) | | |
| Mental alertness and stability with good eye, hand and foot co-ordination. | | |
| **Ear, Nose, Throat** | | |
| Ear / Hearing | | |
| Nose | | |
| Throat | | |
| **Vision** | | |
| Left Eye | Right Eye | |
| | | |

| **EXAMINATION** | **OBSERVATION** | |
|---|---|---|
| **Cardiovascular System Examination** | | |
| Inspection | | |
| Palpation | Pulse | BP |
| Auscultation (Heart Sounds) | | |

| **Respiratory System** | | |
|---|---|---|
| Inspection | Respiratory Rate | |
| Palpation: | | |
| Percussion | | |
| Auscultation<br>(Breath Sounds) | | |
| **Examination of Abdomen** | | |
| Inspection | | |
| Palpation | | |
| Auscultation<br>(Bowel Sounds) | | |
| **Any Other** | | |
| **Clinical Impression** | | |

**Signature of the Examining doctor** **Date:**

| | POWER SECTOR | FORMAT NO: **HSEP:14-F03**<br>REV NO.: 01<br>PAGE NO. 01 OF 1 |
|---|---|---|
| | HSE Induction Training | |

| | |
|---|---|
| **Name of Site** | |
| **Name of Sub-Contractor** | |
| **Date** | |
| **Name of Training Coordinator** | |

| Sl. No. | Name | Designation | Organization | Signature |
|---|---|---|---|---|
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**Signature of Training Coordinator** **Date:**

| | POWER SECTOR | FORMAT NO: **HSEP:14-F04**<br>REV NO.: 00<br>PAGE NO. 01 OF 01 |
|---|---|---|
| | Toolbox Talk | |

| | |
|---|---|
| **Name of Site** | |
| **Sub-Contractors Name** | |
| **Date** | |

| **Topic** | **Name of person delivered Tool Box Talk** | **No. of Participants attended** | **Remarks** |
|---|---|---|---|
| | | | |
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| | | | |

**Signature of Site I/C of Contractor** **Date:**

| **Name of Contractor:** | **Report Month & Date:** |
|---|---|
| | |

**A. Accidents/Incidents Details: -**

| **a** | **Lost time in Accidents** | **No. of incidents** | **Man Hours Lost** | **No. of People Involved** | **No. of persons reported to Govt.** | | |
|---|---|---|---|---|---|---|---|
| | For the Month | | | | | | |
| | Cumulative | | | | | | |
| **b** | **Minor Injuries** | | | | | | |
| | For the Month | | | | | | |
| | Cumulative | | | | | | |
| **c** | **Fires** | **No. of Near-Misses** | **No. of First- Aid cases** | **No. of persons injured** | **No. of equipment damaged** | **No. of Fire reported Outside** | |
| | For the Month | | | | | | |
| | Cumulative | | | | | | |
| **d** | **Other mishaps not covered in a, b, c.** | **No. of Near-Misses** | **No. of First- Aid cases** | **No. of persons injured** | **No. of equipment damaged** | **Total near misses and First-Aid** | |
| | For the Month | | | | | | |
| | Cumulative | | | | | | |

**B. Data for Man-hours worked:**

| **Details** | **Value** | **Remarks if any** |
|---|---|---|
| **No. of people** | | |
| **Man Hours worked** | | |
| **O.T. Hours** | | |
| **Total Man Hours** | | |
| **Grand Total of man hours worked during the month(A+B)** | | |
| **Cumulative man-hours(from_____to_____):<br>( Since commencing of operations)** | | |

**C. Status of Deployment of Work force, Safety Officers/Supervisors & Construction Medical Officer(s) &Electricians:**

| **Description** | **Names** | **Qualification & Experience** |
|---|---|---|
| **Safety Officers** | | |
| **Safety Supervisors** | | |
| **First aider staff detail** | | |
| **Electricians** | | |
| **Scaffolding Inspectors** | | |
| **T&P Inspectors** | | |

**Signature of Contractor Site In-charge** **Signature of Contractor HSE Officer**

**D. Lifting Tools, Tackles, Equipment and Pressure Vessels:**

| Item | Nos. Deployed | Nos. Tested by competent person | Serial Number and Test validity (one per line) |
|---|---|---|---|
| Winches | | | |
| Chain Blocks | | | |
| Wire Rope Slings | | | |
| Man Cages | | | |
| D-Shackles | | | |
| Air Compressors | | | |
| Crawler Cranes | | | |
| Mobile Cranes | | | |
| Hydra Cranes | | | |
| Others | | | |

**E. Reverse Horns in Construction Vehicles:**

| Item | Serial numbers, last testing dates and status of reverse horns (OK/ No OK) – one per line |
|---|---|
| **Transit Mixers** | |
| **Hydra Cranes** | |
| **Dumpers/Trippers** | |
| **Backhoes** | |
| **Other Vehicles** | |

**F. ELCBs:**

| Serial numbers, locations, last testing dates, status (OK/ Not OK) – one per line |
|---|
| |

**G. Electrical Earthing:**

| Serial numbers, locations and locations of electrical earth points – one per line |
|---|
| |

**H. Fire Extinguishers:**

Name & designation of person responsible for maintenance of Extinguishers at different locations :( Individual Contractor's Safety Officers).

**FIRE EXITINGUISHERS AT ERECTION SITE:**

| Type | Serial numbers, sizes, Locations, last testing dates and status (OK/ Not OK) (one per line) |
|---|---|
| FOAM TYPE | |
| SODA TYPE | |
| DRY TYPE (DCP) | |
| C02 TYPE | |

**Signature of Contractor Site In-charge** **Signature of Contractor HSE Officer**

**FIRE EXTINGUISHERS AT SITE OFFICES & STORES:**

| Type | Serial numbers, sizes, Locations, last testing dates and status (OK/ Not OK) (one per line) |
|---|---|
| FOAM TYPE | |
| SODA TYPE | |
| DRY TYPE (DCP) | |
| C02 TYPE | |

**I. Implementation of checklist, Work Permits:**

| Item | Numbers During the Month | Major Deviations |
|---|---|---|
| | | |
| | | |
| | | |
| **Note:-** Please attach photocopies of all filled Checklists & Work permits for that month. | | |

**J. Personal Protective Equipment Issued (Extend table for each Contractor):**

| Item | Issued this Month | Nos. Issued up to the Month | Percentage of usage at Site (as per physical verification) |
|---|---|---|---|
| **Name of Contractor:** | | | |
| Safety Helmet | | | |
| Safety Shoes | | | |
| Full Body Harness | | | |
| Fall Arrestor | | | |
| Safety Nets | | | |
| Other PPEs. | | | |

**K. Safety Observations by Contractor Executives- Observations package wise:**

| No. of Observations received in the month | No of points complied | Cumulative no. of non-complied points |
|---|---|---|
| | | |

**L. Training programs on safety during the month:**

**1. Refresher/ On the Job Trainings Conducted: -**

| Topic | Date Of Programme | No. Of Participants | Level Of Participants |
|---|---|---|---|
| | | | |

**2. Tool-Box talks/ Pep-talks on Safety:**

| Date | Tool Box Talk - No of Participants | Topic | Remarks |
|---|---|---|---|
| | | | |
| | | | |
| | | | |
| | | | |

**Signature of Contractor Site In-charge** **Signature of Contractor HSE Officer**

**3. Induction Trainings:**

| Date | Safety Induction No. of Participants | Topic | Remarks |
|---|---|---|---|
| | | | |
| | | | |
| | | | |
| | | | |

**M. Progress of Management Programmes at Site**

| SL | Description Of MPs | Annual Plan | Achievement In This Month | Cumulative Achievement |
|---|---|---|---|---|
| **A. Environment Improvement Programme** | | | | |
| 1 | Plantation of Trees | | | |
| 2 | Installation of Scrap Bins | | | |
| 3 | Chemical Storage & Handling System | | | |
| **B. Improvement of Working Environment** | | | | |
| 4 | Increasing LTI free days | | | |
| 5 | Air Quality Monitoring | | | |
| 6 | Water Quality Monitoring | | | |
| 7 | Illumination level Monitoring | | | |

**N. HR Information:**

| Designation | Total No. Inducted | Total no. of Induction Balance | Total no. of Gate Pass Issued | Total no. of Gate Pass Balance | Total no. of Gate Pass Cancelled | Medical Check-up Completed | Medical Check-up Balance |
|---|---|---|---|---|---|---|---|
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |

**O. Rewards on Account of Good Safety Performance**

| Serial Number | Reward Issued to | Details of Reward Issued (Amount etc.) | Brief Reason |
|---|---|---|---|
| | | | |
| **Note:** Photos of Reward Functions to be attached | | | |

**P. Other Safety initiatives / Safety Activities conducted (with photos, if any):**

**Signature of Contractor Site In-charge**

**Date:**

**Signature of Contractor HSE Officer**

**Date:**

| | POWER SECTOR | FORMAT NO: **HSEP:14-F06**<br>REV NO.: 00<br>PAGE NO. 01 OF 01 |
|---|---|---|
| | Personal Protective Equipment | |

| | |
|---|---|
| **Name of Site** | |
| **Name of Sub-Contractor** | |
| **Date & Time of Inspection** | |

| **Item** | **Issued this Month** | **Nos. Issued up to the Month** | **Percentage of usage at site** |
|---|---|---|---|
| **Safety Helmet** | | | |
| **Safety Shoes** | | | |
| **Full Body Harness** | | | |
| **Fall Arrestor** | | | |
| **Safety Nets** | | | |
| **Other PPEs.** | | | |
| | | | |
| | | | |
| | | | |

**Signature of Inspecting Official:** **Date:**

**Signature of Site I/C of Contractor:** **Date:**

| | POWER SECTOR | FORMAT NO: **HSEP:14-F07**<br>REV NO.: 00<br>PAGE NO. 01 OF 1 |
|---|---|---|
| | Inspection Of T&Ps | |

| | |
|---|---|
| **Name of Site** | |
| **Name of Sub-Contractor** | |
| **Date & Time of Inspection** | |

| **Sl.No.** | **Description** | | **Remarks** |
|---|---|---|---|
| 1.0 | Name of equipment | | |
| 2.0 | Basic Information of equipment | | |
| 2.1 | Specification | | |
| 2.2 | Sr. No. of equipment | | |
| 2.3 | Make | | |
| 2.4 | Year of manufacture | | |
| 3.0 | Major repairs / overhauls(Furnish details of work carried out) | | Date(s) of major repair/overhaul |
| 3.1 | | | |
| 3.2 | | | |
| 3.3 | Repairs carried out at site | | |
| | | | |
| 4.0 | Any performance test conducted | Yes/No | |
| 5.0 | Document Submitted | Yes/No | |
| 6.0 | Manufacturer's test / guarantee certificate | Available/ Not available | |
| 7.0 | Performance test | Done/ Not Done | |
| 8.0 | Acceptance Norms | | |
| 9.0 | Committee Observations | | |
| 10.0 | Date of next review (if accepted) | | |

| | |
|---|---|
| **Signature-Contractor HSE Officer** | **Signature-Contractor Site In-charge** |

| | POWER SECTOR | FORMAT NO: **HSEP:14-F08**<br>REV NO.: 01<br>PAGE NO. 01 OF 1 |
|---|---|---|
| | Status Of T&Ps | |

| | |
|---|---|
| **Name of Site** | |
| **Name of Sub-Contractor** | |
| **Date & Time of Inspection** | |

| Item | Nos. Deployed | Identification Numbers (1 on each line) | Whether Tested by competent person | Validity of Test Certificates | Whether internal testing using Color Coding or similar system done |
|---|---|---|---|---|---|
| **Winches** | | | | | |
| **Chain Blocks** | | | | | |
| **Wire Rope Slings** | | | | | |
| **Man Cages** | | | | | |
| **D-Shackles** | | | | | |
| **Air Compressors** | | | | | |
| **Crawler Cranes** | | | | | |
| **Mobile Cranes** | | | | | |
| **Hydra Cranes** | | | | | |
| **Others** | | | | | |

**Signature of Inspecting Official** **Date**

**Signature of Site I/C of Contractor** **Date**

| | POWER SECTOR | FORMAT NO: **HSEP:14-F09A**<br>REV NO.: 00<br>PAGE NO. 01 OF 01 |
|---|---|---|
| | Inspection Of Cranes | |

| | |
|---|---|
| **Name of Site** | |
| **Name of Sub-Contractor** | |
| **Inspected by** | |
| **Date & Time of Inspection** | |

**Crane Reg. No (Make/Model)** _____

**Name of Driver/Operator** _____

| Sl.no. | Description | Observation | Measures |
|---|---|---|---|
| 1 | Valid Driving license | | |
| 2 | Hook & Hook Latch | | |
| 3 | Over Hoist limit switch | | |
| 4 | Boom limit switch | | |
| 5 | Boom Angle Indicator | | |
| 6 | Boom limit cutoff switch | | |
| 7 | Condition of Boom | | |
| 8 | Condition of ropes | | |
| 9 | Number of load lines | | |
| 10 | Size and condition of the slings | | |
| 11 | Stability of the cranes | | |
| 12 | Soil Condition | | |
| 13 | Swing Break And Lock | | |
| 14 | Proper Break And Lock | | |
| 15 | Hoist Break And Lock | | |
| 16 | Boom Break And Lock | | |
| 17 | Main Clutch | | |
| 18 | Leakage in Hydraulic Cylinders | | |
| 19 | Out riggers filly extendable | | |
| 20 | Tyre pressure | | |
| 21 | Condition of Battery And Lamps | | |
| 22 | Guards of moving and rotating parts | | |
| 23 | Load chart provided | | |
| 24 | Number and position of pedant ropes | | |
| 25 | Reverse Horn | | |
| 26 | Load Test Details | | |
| 27 | Operator's fitness | | |
| 28 | Pollution under control certificate | | |
| 29 | Fire extinguisher of appropriate type. | | |
| 30 | Training of the operator | | |

**Signature of Site I/C of Contractor:** **Date:**

| | POWER SECTOR | FORMAT NO: **HSEP:14-F09B**<br>REV NO.: 00<br>PAGE NO. 01 OF 1 |
|---|---|---|
| | Inspection Of Winches | |

| | |
|---|---|
| **Name of Site** | |
| **Name of Sub-Contractor** | |
| **Inspected by** | |
| **Date & Time of Inspection** | |

**Winch Reg. No. (Make/Model)** _____

**Name of Operator** _____

| Sl.No. | Description | YES | NO | NA | Remarks |
|---|---|---|---|---|---|
| 1 | Has the copy of Third Party Inspection certificate been provided in winch machine shed? | | | | |
| 2 | Is winch machine operator experienced enough to operate the winch machine? | | | | |
| 3 | Is the winch machine operated by someone other than the winch machine operator? | | | | |
| 4 | Is there guard provided in all moving parts like wheel and motor's shaft? | | | | |
| 5 | Will it protect against unforeseen operational contingencies? | | | | |
| 6 | Are brakes, clutch and locking arrangement working properly? | | | | |
| 7 | Has it been ensured that the guard does not constitute a hazard by itself? | | | | |
| 8 | Are the cranks and the connecting rods protected by guardrails? | | | | |
| 9 | Is there provision for fully covered shed with wooden plank roof? | | | | |
| 10 | Is wire rope free from any kind of damage or wear and tear? | | | | |
| 11 | Is split pin provided for the protection of clutch and brake locking arrangement? | | | | |
| 12 | Is pulley inspected by competent person and certified before use? | | | | |
| 13 | Is pulley free from any wear and tear visually? | | | | |
| 14 | Is winch rope barricaded with clipsheet for the protection of rope and person? | | | | |
| 15 | Is the wire rope lubricated by cardium oil? | | | | |
| 16 | Is there any friction in wire rope which may damage the wire rope rather than the rolling parts? | | | | |
| 17 | Is there any oil leakage in the hydraulic system of the winch machine? | | | | |
| 18 | Has it been ensured that the guard will not cause discomfort or inconvenience to operator? | | | | |

| | | | | | |
|---|---|---|---|---|---|
| **Total NO** | | **Total NA** | | **% Compliance** | |

**Signature of Inspecting Official:** **Date:**

**Signature of Site I/C of Contractor:** **Date:**

| | | |
|---|---|---|
| | **POWER SECTOR**<br>Inspection of Height Working | FORMAT NO: **HSEP:14-F10**<br>REV NO.: 01<br>PAGE NO. 01 OF 2 |

| | |
|---|---|
| **Name of Site** | |
| **Name of Sub-Contractor** | |
| **Area/ Location** | |
| **Inspected by** | |
| **Date & Time of Inspection** | |

| Sl. No. | Descriptions | Observation (OK/ Not OK) | Remarks |
|---|---|---|---|
| | **A. Working Platforms** | | |
| 1 | Adequate illumination has been ensured. | | |
| 2 | Work area inspected prior to the start of the work. | | |
| 3 | Is the work area barricaded to prevent fall and platforms are of adequate strength (bamboo, jute / plastic ropes not to be used). | | |
| 4 | The temporary work platforms & structures for height work including those used in Boiler structures, water walls, ESP, Powerhouse are fully barricaded with railings (as per **IS 3696**) | | |
| 5 | Fabricated makeshift arrangements are checked for quality and type of material welding, anchoring etc. | | |
| 6 | Are floor gaps, permanently covered and barricaded | | |
| 7 | Area below the work place barricaded, particularly below hot work. | | |
| 8 | All work platforms ensured to be of adequate strength and ergonomically suitable. | | |
| 9 | Work at more than one elevation at the same segment is restricted. | | |
| 10 | In case work platform is hanging/ non-rigid, lifeline connected to independent & rigid structure | | |
| 11. | Scaffolds are certified by certified scaffolding inspector and provided with green tag | | |
| | **B. PPE And Safety Devices** | | |
| 1 | Use of safety helmet, safety belts ensured for all workers | | |
| 2 | Anchoring points provided at all places of work. | | |
| 3 | Common lifeline provided wherever linear movement at height is required. | | |
| 4 | Lifeline is installed on rigid & independent structure | | |
| 5 | Safety nets are use wherever required. | | |
| 6 | Proper fall arrest system is deployed at critical workplaces. | | |
| 7 | Crawler boards/Safety system for works on fragile roof are used. | | |
| 8 | Minimum three lines of fall protection eg. Safe platform, Safety nets and double lanyard Safety harness with lifelines provided | | |
| | **C. Training, Awareness/ Medical** | | |
| 1 | All the workers have been explained safe work method? | | |
| 2 | All height workers have undergone vertigo test and height specific training | | |
| 3 | Workers provided with bags /box to carry bolts, nuts and hand tools | | |
| 4 | Arrangement for fastening hand tools made. | | |
| 5 | An established communication system has been established and explained to the workers. | | |

| | | | |
|---|---|---|---|
| **D. Access/Egress** | | | |
| 1 | Walkways provided with handrail, mid-rail and toe guard? | | |
| 2 | All checkered plates, gratings properly welded/ bolted? | | |
| 3 | Are ladders inspected and they are in good condition? | | |
| 4 | Are ladders spliced? | | |
| 5 | Are ladders properly secured to prevent slipping, sliding or falling? | | |
| 6 | Do side rails extend 36” above top landing? | | |
| 7 | Are built up ladders constructed of sound materials? | | |
| 8 | Are rugs and cleats not over 12” on center? | | |
| 9 | Metal ladders not used around electrical hazards. | | |
| 10 | Proper maintenance and storage. | | |
| 11 | Ladders placed at right slope. | | |
| 12 | Ladders / staircases welded/ bolted properly. | | |
| 13 | Any obstruction in the stairs. | | |
| 14 | Are landing provided with handrails, knee rails, toe-boards etc.? | | |
| 15 | Whether ramp is provided with proper slope. | | |
| 16 | Proper hand rails / guards provided in ramps. | | |
| **E. Housekeeping** | | | |
| 1 | Walkways, aisles & all overhead workplaces cleared of loose material. | | |
| 2 | Flammable materials, if any, are cleared. | | |
| 3 | All the de shuttering materials are removed after de-shuttering is done. | | |
| 4 | Platforms and walkways free from oil/grease or other slippery material. | | |
| 5 | Collected scrap are brought down or lowered down and not dropped from height. | | |
| **F. Other Observations** | | | |

**Signature of Inspecting Official** **Date:**

**Signature of Site I/C of Contractor:** **Date:**

| | POWER SECTOR | FORMAT NO: **HSEP:14-F11**<br>REV NO.: 00<br>PAGE NO. 01 OF 1 |
|---|---|---|
| | Inspection of Welding and Gas Cutting | |

| | |
|---|---|
| **Name of Site** | |
| **Name of Sub-Contractor** | |
| **Area/ Location** | |
| **Inspected by** | |
| **Date & Time of Inspection** | |

| **Electric Welding** | | | | |
|---|---|---|---|---|
| **S No** | **Description** | **Yes** | **No** | **Remarks** |
| 1 | Is electric connection given through 30 mA ELCB/RCCB to welding m/c? | | | |
| 2 | Is electric cable fitted properly injunction box on m/c? | | | |
| 3 | Is electrical cable free from joints? | | | |
| 4 | Are the joints attached firmly &insulated with tape? | | | |
| 5 | Is double earthing given to body of m/c? | | | |
| 6 | Is the physical condition of the m/c good? | | | |
| 7 | Is ON/OFF switch connected to the m/c working and in good condition? | | | |
| 8 | Are indication lamps on m/c working? | | | |
| 9 | Is the electrode holder in good condition? | | | |
| 10 | Are the cables of the welding m/c lugged & tight properly? | | | |
| 11 | Are return lead connected properly (Rod, Angle, Channels not to be used) | | | |
| | Total No of NO | | | |
| | Total No of YES | | | |
| | **% Compliance** | | | |

| **Gas Welding & Cutting** | | | | |
|---|---|---|---|---|
| **S No** | **Description** | **Yes** | **No** | **Remarks** |
| 1 | Are Cylinders kept on trolleys? | | | |
| 2 | Physical condition of Gas cylinders good? | | | |
| 3 | Is there Oil/Grease on valve of the cylinder? | | | |
| 4 | Are pressure regulators and gauges in good condition? | | | |
| 5 | Condition of hose pipe OK? | | | |
| 6 | Are hose pipe clamped with hose clip? | | | |
| 7 | Is flash back arrestor & NRV fitted on both torch & cylinder ends | | | |
| 8 | Is nozzle of the torch cleaned? | | | |
| 9 | Are cylinders protected from falling weld splatters? | | | |
| 10 | Are Fire blankets used to prevent weld splatters falling on the ground? | | | |
| | Total Number of NO | | | |
| | Total No of YES | | | |
| | **% Compliance** | | | |

**Signature of Inspecting Official** **Date:**

**Signature of Site I/C of Contractor:** **Date:**

| | | |
|---|---|---|
| बीएचईएल BHEL | **POWER SECTOR**<br>**Inspection Of Electrical Installation** | FORMAT NO: **HSEP:14-F12**<br>REV NO.: 00<br>PAGE NO. 01 OF 1 |

| | |
|---|---|
| **Name of Site** | |
| **Name of Sub-Contractor** | |
| **Area/ Location** | |
| **Inspected by** | |
| **Date & Time of Inspection** | |

| S No | Description | Yes/ No | Remarks |
|---|---|---|---|
| **A** | **Cables** | | |
| 1 | Whether the condition of cable is checked? | | |
| 2 | Are cables received from other sites checked for insulation resistance before putting them into use? | | |
| 3 | Are all main cables taken either underground /overhead? | | |
| 4 | Are welding cables routed properly above the ground? | | |
| 5 | Are welding and electrical cables overlapping? | | |
| 6 | Is any improper joining of cables/wires prevailing at site? | | |
| **B** | **DBs/SDBs** | | |
| 1. | Is earth conductor continued up to DB / SDB? | | |
| 2. | Whether DBs and extension boards are protected from rain / water? | | |
| 3. | Is there any overloading of DBs / SDBs? | | |
| 4. | Are correct / proper fuses & CBs provided at mainboards and sub-boards? | | |
| 5. | Is energized wiring in junction boxes, CB panels &similar places covered all times? | | |
| **C** | **ELCB** | | |
| 1. | Whether the connections are routed through ELCB/ RCCB? | | |
| 2. | Is ELCB sensitivity maintained at 30 mA? | | |
| 3. | Are the ELCB numbered and tested periodically & test results recorded in a logbook countersigned by a competent person? | | |
| **D** | **Grounding** | | |
| 1. | Is natural earthing ensured at the source of power (main DB at Generator or Transformer)? | | |
| 2. | Whether the continuity and tightness of the earth conductor are checked? | | |
| 3. | Mention the gauge of the earth conductor used at the site. | | |
| 4. | Mention the value of Earth Resistance. | | |
| **E** | **Electrically operated Machines or Accessories** | | |
| 1. | Whether the plug top is provided everywhere. | | |
| 2. | Are all metal parts of electrical equipment and light fittings / accessories grounded? | | |
| 3. | Is there any shed or cover for welding machines? | | |
| 4. | Are halogen lamps fixed at proper places? | | |
| 5. | Are portable power tools maintained as per norms? | | |
| 6. | Any other observations: | | |

**Signature of Inspecting Official** **Date:**

**Signature of Site I/C of Contractor:** **Date:**

| | | |
|---|---|---|
| | **POWER SECTOR**<br>**Inspection of Elevator** | FORMAT NO: **HSEP:14-F13**<br>REV NO.: 00<br>PAGE NO. 01 OF 1 |

| | |
|---|---|
| **Name of Site** | |
| **Name of Sub-Contractor** | |
| **Area/ Location** | |
| **Inspected by** | |
| **Date & Time of Inspection** | |

| Sr. No. | Description | | Remarks |
|---|---|---|---|
| 1.0 | Name of equipment | | |
| 2.0 | Basic Information of equipment | | |
| 2.1 | Specification | | |
| 2.2 | Sr. No. of equipment | | |
| 2.3 | Make | | |
| 2.4 | Year of manufacture | | |
| 3.0 | Major repairs/overhauls(Furnish details of work carried out) | | Date(s) of major repair/overhaul |
| 3.1 | | | |
| 3.2 | | | |
| 3.3 | Repairs carried out at site | | |
| | | | |
| 4.0 | Any performance test conducted | Yes/No | |
| 5.0 | Document Submitted | Yes/No | |
| 6.0 | Manufacturer's test / guarantee certificate | Available/ Not available | |
| 7.0 | Performance test | Done/ Not Done | |
| 8.0 | Acceptance Norms | | |
| 9.0 | Committee Observations | | |
| 10.0 | Date of next review (if accepted) | | |

**Signature of Inspecting Official** **Date:**

**Signature of Site I/C of Contractor:** **Date:**

| | | |
|---|---|---|
| | **POWER SECTOR**<br>**Inspection of Excavation** | FORMAT NO: **HSEP:14-F13E**<br>REV NO.: 00<br>PAGE NO. 01 OF 1 |

| | |
|---|---|
| **Name of Site** | |
| **Name of Sub-Contractor** | |
| **Area/ Location** | |
| **Inspected by** | |
| **Date & Time of Inspection** | |

| Sl.no | Description | Yes | No | Remarks |
|---|---|---|---|---|
| 1 | Precautions taken for Underground Electrical Cable | | | |
| 2 | Precautions taken for Under / Above ground sewer/ Drinking Water Line | | | |
| 3 | Precautions taken for Underground Telecommunication Line | | | |
| 4 | Precautions taken for Underground Product/Utility Line | | | |
| 5 | Precautions taken for Underground Fire Water Line | | | |
| 6 | Shoring / Shuttering / Sheet piling done to prevent collapse of excavation walls. Strength of Excavation wall ensured at all times | | | |
| 7 | Slope Cutting / Angle Maintained | | | |
| 8 | Hard Barricading & Edge Protection provided | | | |
| 9 | Separate Safe Access for Man and Vehicle | | | |
| 10 | Lighting arrangement | | | |
| 11 | Banksman Provided | | | |
| 12 | Required basic PPEs provided | | | |
| 13 | Excavated soil / Construction Material / equipment kept away from the edge. | | | |
| 14 | First aid in attendance. | | | |
| 15 | Other: | | | |
| | | | | |
| | Total No of YES | | | |

**Signature of Inspecting Official** **Date:**

**Signature of Site I/C of Contractor:** **Date:**

| | POWER SECTOR | FORMAT NO: **HSEP:14-F14** |
|---|---|---|
| | **HSE Penalty Format** | REV NO.: 01<br>PAGE NO. 01 OF 1 |

**Sub: MEMO for Penalty for non-compliances in Safety**

Following lapse (tick marked) was observed and penalty (in Rs.) is imposed as stated at the bottom of this memo. It is requested that such occurrences be please avoided in future.

| S No | Nature of Non - Compliance | Penalty | Remarks |
|---|---|---|---|
| 1. | Not wearing safety helmet/ safety shoes/ safety gloves as per requirement; Not using grinding goggles while doing grinding operations; Wearing of helmets without chin straps | 250 | Per Person/ day |
| 2. | Not wearing safety belt while working at height (> 1.8 meters)or not anchoring to lifeline connected to independent/ rigid structure | 1000 | Per Person/ day |
| 3. | Improper earthing of welding & Other electrical Machines; Unsafe electrical practice like not installing ELCB/ RCCB | 2000 | Per Machine per incidence |
| 4. | Electrical plug not used for connection/ hand Machines; Not using 24 V supply for lighting in confined spaces | 200 | Per connection per incidence |
| 5. | Using damaged slings or not slinging properly; using lifting equipment , T&Ps without using valid test certificates | 1000 | Per event Per T&P |
| 6. | Using frayed/ broken welding cables | 500 | Per machine per week |
| 7. | Non removal of scrap from platforms | 1000 | Per Event Per location |
| 8. | Lifting cylinders without cage or rolling of cylinders; Gas cutting without flash back arrestor; Not keeping gas cylinders vertically | 300 | Per Event |
| 9. | Not having valid driving license for the type of vehicle/ T&P | 5000 | Per driver per incidence |
| 10. | Not providing proper hard barricades for excavation, dismantling , floor and wall openings, not providing safe access/ platform for work & area; Not using temporary platform during work at height; Gas cutting at height without fire blanket/ sheet below | 5000 | Per Event. |
| 11. | Two wheeler entry in construction area without authorization | 1000 | Per vehicle |
| 12. | Using Hydraulic Mobile Cranes for material movement at site in unsafe manner (without Flag man – guide rope and two helpers etc.) | 5000 | Per case |
| 13. | Vehicles, Hydraulic Mobile Cranes, Cranes, Dumpers and Earth Movers, Excavators etc. not having automatic back horns linked to gear; Lifting hooks without latches | 2000 | Per Equipment |
| 14. | Improper/ unacceptable level of hygiene in canteen as per BOCW | 1000 | Per event |
| 15. | Working without requisite Permit/ Clearance | 5000 | Per Event |
| 16. | Failure to attend BHEL HSE meeting or to conduct safety walks by agency site head | 1000 | Per case |
| 17. | Removal of grills, safety nets, safety facilities etc. without permit/ authorization | 5000 | Per case |
| 18. | Any other unsafe acts or conditions not covered from sl. No. 1 to 17 of this table. | 1000 | Per case |
| 19. | Major Accident – Victim not reporting for work within 48 hours – resulting in partial loss in earning capacity & termination / demotion in employment | 400000 | Per victim **#** |
| 20. | Fatal Accident/Accidents Resulting in total Loss in Earning Capacity # | 1000000 | Per victim **#** |

1. For repeated violation by the same person, the penalty would be double of the previous penalty. Date of "Repeated violation" will be counted from subsequent days.
2. Penalty amount not limited to above mention table, incase customer penalties more than above mention penalty or any other penalty imposed by customer, then same penalty will be deducted from Contractor RA Bill.
3. **#:** or as deducted by customer, whichever is higher. For repeated fatal incident in the same Unit incremental penalty to be imposed. The Contractor will pay 2 times the penalty compared to previously paid in case there are repeated cases of fatal incidents under the same Contractor for the same package in the same unit.

**Details (if any) related to non- compliance (Name of persons, Nature of deficiency, etc.)**

**Penalty imposed:** **1.** Rate as per above chart_____

2. No. of Persons/ machine/ event/ labor Total Penalty= 1. X 2. =

**Witnessed by:** (Sub- Contractor representative) (BHEL representative)

Signature _____ _____

Name _____ _____

**Distribution**: 1 Copy: to Sub- contractor Site In-charge, 1 Copy to Site Construction Manager (BHEL)

| | | |
|---|---|---|
| बीएचईएल BHEL | **POWER SECTOR- HQ**<br>**Incident Report**<br>To be submitted within 24 hours of time of incident<br>(Immediate information through message to be sent) | FORMAT NO: **HSEP:14-F15**<br>REV NO.: 00<br>PAGE NO. 01 OF 01 |

**Type of incident: Fatal/Major/ Minor/Fire/Property Damage/Near-miss**

| | | | | | |
|---|---|---|---|---|---|
| 1 | NAME OF SITE | | 3 | ACTIVITY AREA | |
| 2 | SCOPE OF WORK | | 4 | NAME OF CONTRACTOR | |
| | | | 5 | NAME & DESIGNATION OF BHEL ACTIVITY I/C | |
| 6 | DATE & TIME OF ACCIDENT | | 7 | DATE RESUMED | |
| 8 | NO. OF WORK-DAYS LOST BY VICTIM (If duty not resumed, give estimated figure) | | | | |
| 9 | NO. OF MANHOURS LOST BY OTHERS | | | | |
| 10 | PERSONAL DETAILS OF INJURED AND / OR DETAILS OF MATERIALS / EQUIPMENT / PROPERTY DAMAGED | | | | |

| | | | | | |
|---|---|---|---|---|---|
| NAME | | | | NAME OF MATERIAL / EQUIPMENT / PROPERTY | |
| PERIOD OF EMPLOYMENT | | | | | |
| AGE | YRS | SEX | MALE/ FEMALE | ESTIMATED COST | ACTUAL COST |
| MARITAL STATUS | | SINGLE / MARRIED | | | |
| OCCUPATION | | | | NATURE OF DAMAGE | |
| PART OF BODY INJURED | | | | | |
| NATURE OF INJURY | | | | | |
| AGENCY ( OBJECT / EQUIPMENT / SUBSTANCE ) MOST RESPONSIBLE FOR CAUSING ACCIDENT / INJURY / DAMAGE | | | | | |
| 12 | PERSON (NAME & DESIGNATION) WITH MOST CONTROL OVER AGENCY (OBJECT / EQUIPMENT / SUBSTANCE ) CAUSING ACCIDENT INJURY / DAMAGE | | | | |
| 13 | DESCRIBE CLEARLY HOW THE ACCIDENT OCCURRED (USE ADDITIONAL SHEET, IF REQUIRED | | | | |
| | | | | | |
| ANALYSIS | | | | | |
| 14 | WHAT ACTS AND / OR CONDITIONS CONTRIBUTED MOST DIRECTLY TO THIS ACCIDENT | | | | |
| 15 | WHAT ARE THE BASIC REASON FOR THE EXISTENCE OF THESE ACTS AND / OR CONDITION? | | | | |
| 16 | WHAT CORRECTIVE ACTIONS HAVE BEEN TAKEN TO PREVENT ACCIDENT RECURRENCE? | | | | |
| | DATE : | | | SIGNATURE OF SITE HSE COORDINATOR | |
| 17 | COMMENTS OF HEAD / SOX | | | | |
| | DATE: | | | SIGNATURE OF HEAD/SOX | |

| | | |
|---|---|---|
| | **POWER SECTOR**<br>**Format for Inspection of Labor Colony** | FORMAT NO: **HSEP:14-F16**<br>REV NO.: 00<br>PAGE NO. 01 OF 1 |

| | |
|---|---|
| **Name of Site** | |
| **Name of Sub-Contractor** | |
| **Area/ Location** | |
| **Inspected by** | |
| **Date & Time of Inspection** | |

| S. No | Particulars | No | Yes | Comments |
|---|---|---|---|---|
| 1 | Sufficient living space ensured for each occupant with Kitchen area | | | |
| 2 | Area cleanliness ensured through regular cleaning | | | |
| 3 | Toilet facility sufficient for all occupants available, in order with adequate lighting, cleaned regularly and in hygienic condition | | | |
| 4 | Washing facilities available with adequate water supply | | | |
| 5 | Availability of sufficient drinking water in protected tanks with weekly tank cleaning and source tested annually as per IS10500 ensured | | | |
| 6 | Adequate drainage to remove waste and rain water, no flooding | | | |
| 7 | "Unsafe for Drinking" posted near accessible non-potable water and sources; posted in language of occupants or universal symbol | | | |
| 8 | Prevention of mosquitoes, flies, and rodents in immediate housing area through insecticide sprays if required | | | |
| 9 | Electricity provided& electrical connections safety ensured | | | |
| 10 | Fans, Coolers / Quilts, Heaters provided as required to cater to weather conditions along with adequate electricity supply | | | |
| 11 | Houses Walls and roof tight and solid; floors rigid and durable, with smooth, cleanable finish in good repair | | | |
| 12 | Availability of nominal rate ration / common use items shop within / nearby the colony | | | |
| 13 | Emergency medical plan developed:<br>(A) Potential injuries determined<br>(B) Local EMS response determined<br>(C) Qualified first-aid person on site, if required | | | |
| 14 | Emergency plans posted where employees gather | | | |
| 15 | Transportation to nearest suitable facility | | | |
| **Any other checks:** | | | | |
| | | | | |
| **Remarks:** | | **Name & Sign. Of Contractor HSE Officer** | | |

| | | |
|---|---|---|
| | **POWER SECTOR**<br>Format for Maintaining Records of E-waste Handled / Generated | FORMAT NO: **HSEP:14-F17**<br>REV NO.: 00<br>PAGE NO. 01 OF 1 |

**(Generated Quantity in Metric Tons (MT) per year)**

| | | |
|---|---|---|
| **Site** | | |
| **Contractor** | | |
| **Date** | | |
| Types & Quantity of e-waste handled/generated** | Category | Quantity |
| | Item Description | |
| Types & Quantity of e-waste stored | Category | Quantity |
| | Item Description | |
| Types & Quantity of e-waste sent to collection center authorized by producer/dismantler/recycler/refurbisher or authorized dismantler/ recycler or refurbisher ** | Category | Quantity |
| | Item Description | |
| Types & Quantity of e-waste transported* | Category | Quantity |
| | Item Description | |
| Name, address and contact details of the destination | | |
| Types & Quantity of e-waste refurbished* | Category | Quantity |
| | Item Description | |
| Name, address and contact details of the destination of refurbished materials | | |
| Types & Quantity of e-waste dismantled* | Category | Quantity |
| Name, address and contact details of the destination | Item Description | |
| Types & Quantity of e-waste recycled* | Category | Quantity |
| Types & Quantity of materials recovered | Item Description | |
| | Quantity | |
| Name, address and contact details of the destination | | |
| Types & Quantity of e-waste sent to recyclers by dismantlers | Category | Quantity |
| | Item Description | |
| Name, address and contact details of the destination | | |
| Types and Quantity of other waste sent to respective recyclers by dismantlers / recyclers of e-waste | Category | Quantity |
| Name, address and contact details of the destination | Item Description | |
| Types and Quantity of e-waste treated & disposed | Category | Quantity |
| | Item Description | |
| Name, address and contact details of the destination | | |

**Signature of Contractor Site In-charge:** **Date**

| | | |
|---|---|---|
| | **POWER SECTOR**<br>Format for Maintaining Records of Hazardous Waste at the Facility | FORMAT NO: **HSEP:14-F18**<br>REV NO.: 00<br>PAGE NO. 01 OF 1 |

1. Name of Site:
2. Name of the Contractor:
3. Date:
4. Description of hazardous waste:

| Physical form with description | Chemical form | Total volume and weight (in kg.) |
|---|---|---|
| | | |

5. Description of storage and treatment of hazardous waste:

| Date | Method of storage of hazardous wastes | Date | lethod of treatment of hazardous wastes |
|---|---|---|---|
| | | | |

6. Details of transportation of hazardous waste:

| Name & address of consignee of package | Mode of packing/of the waste for transportation | Mode of transportation to site of disposal | Date of transportation |
|---|---|---|---|
| | | | |

7. Details of disposal of hazardous waste:

| Date of disposal | Concentration of hazardous material in the final waste form | Site of disposal (identify the location on the relevant layout drawing for reference) | Method of disposal | Persons involved in disposal |
|---|---|---|---|---|
| | | | | |

8. Data of environmental surveillance:

| Date of measurement | Analysis of ground water | | | Analysis of soil samples | | | Analysis of air sampling | | | Analysis of any other samples (give details) |
|---|---|---|---|---|---|---|---|---|---|---|
| | Location of sampling | Depth of sampling | Data | Location of sampling | Depth of sampling | Data | Location of sampling | Data | | |
| | | | | | | | | | | |

9. Details of the hazardous wastes reused and recycled:

| Date | Total quantity of hazardous waste generated | Details of hazardous waste minimization activity | Material received | Final quantity of waste generated | Net reduction in waste generation quantity and percentage |
|---|---|---|---|---|---|
| | | | | | |

**Signature of Contractor Site In-charge:** **Date:**

| | | |
|---|---|---|
| बी एच ई एल BHEL | **POWER SECTOR**<br>**Inspection of Illumination** | FORMAT NO: **HSEP:14-F19**<br>REV NO.: 00<br>PAGE NO. 01 OF |

| | |
|---|---|
| **Name of Site** | |
| **Name of Sub-Contractor** | |
| **Area/ Location** | |
| **Inspected by** | |
| **Date & Time of Inspection** | |

| S. No | Date/ Time | Area | Reqd Lux Value | Actual Lux Value | HSE Agency Sign | HSE BHEL Sign | Remarks |
|---|---|---|---|---|---|---|---|
| 1 | | | | | | | |
| 2 | | | | | | | |
| 3 | | | | | | | |
| 4 | | | | | | | |
| 5 | | | | | | | |
| 6 | | | | | | | |
| 7 | | | | | | | |
| 8 | | | | | | | |
| 9 | | | | | | | |
| 10 | | | | | | | |
| 11 | | | | | | | |
| 12 | | | | | | | |

**Signature of Inspecting Official** **Date:**

**Signature of Site I/C of Contractor:** **Date:**

| | | |
|---|---|---|
| | **POWER SECTOR**<br>**Format for Monthly HSE Planning & Review** | FORMAT NO: **HSEP:14-F30**<br>REV NO.: 00<br>PAGE NO. 01 OF 3 |

| **Note: This is a template and can be modified in consultation with BHEL** | | | |
|---|---|---|---|
| **Name of the Site** | | **Name of the Contractor** | |
| **Scope of Work** | | **Date** | |
| **PART- A: PLAN OF HSE ACTIVITIES FOR THE MONTH OF……** | | | **PART-B: REVIEW ON ……** |
| **SN.** | **Description of HSE Activity & Formats** | **Plan & Targets for the month** | **Review** |
| 1 | Availability of First Aid Box at Required Places and Inspection thereof as per Format: F01 | Areas<br>1. …<br>… | |
| 2 | Health check-up as per Format: F02 | Health check-up for<br>Nos<br>1. New inductees<br>2. Drivers & Operators<br>3. Workers in following high risk areas:<br>a. … | |
| 3 | Induction training of newly joined workers as per Format: F03 | Minimum No. of workers: | |
| 4 | Toolbox talks (TBT) conducted before start of work as per Format: F04 | Locations of TBTs & No. of workers<br>**1.** … | |
| 5 | PPE usage and issue as per Format: F06 | | |
| 6 | Inspection of T&Ps as per Format: F07 | List of T&Ps to be inspected<br>1. | |
| 7 | Identification & Inspection Status of T&Ps as per Format: F08 | | |
| 8 | Inspection of Cranes & Winches as per Format: F09 (A & B) | List of Cranes & Winches & Nos.<br>1. … | |
| 9 | Inspection of Height Working as per Format: F10 | Areas:<br>1. … | |
| 10 | Inspection of Welding & Gas Cutting operations as per Format: F11 | Areas:<br>1. … | |
| 11 | Inspection of Electrical Installations as per Format: F12 | Locations:<br>1. … | |
| 12 | Inspection of Elevators (as applicable) as per Format: F13 | Locations:<br>1. … | |
| 13 | Inspection of Excavation as per Format: F13E | **Locations:**<br>**1. …** | |

| SN. | Description of HSE Activity & Formats | Plan & Targets for the month | Review |
|---|---|---|---|
| 14 | Job Safety Analysis | **Activities:**<br>**1. ...** | |
| 15 | Regular Job Specific Training (Re-training) for workers involved in hazardous activities | Topics/ Hazards & No. of workers<br>**1.** ... | |
| 16 | Mass housekeeping (HK) drive in work areas | Areas<br>**1.** ... | |
| 17 | Vertigo Test of Height workers | Minimum No. of workers: | |
| 18 | Deployment of qualified HSE Officers as per contract | Location(s) & Nos.<br>**1.** ... | |
| 19 | Deployment of qualified HSE Stewards as per contract | Location(s) & Nos.<br>**1.** ... | |
| 20 | Deployment of Safety tools & Equipment (Safety Nets, Lifelines, Fall arrestors, Man-cages, flashback arrestors, scaffolding etc.) | Tool/ Equipment & Location<br>**1.** ... | |
| 21 | Safety Walks by site in charge of agency (4 -Weekly once) | Dates: | |
| 22 | Safety walks by departmental head (8-Weekly twice) | Dates: | |
| 23 | Availability/ deployment of Safety posters/ placards/ signage at strategic locations | Locations: Nos.<br>**1.** ... | |
| 24 | Provision of clean drinking water sources for workers | Locations: Nos.<br>**1.** ... | |
| 25 | Provision of toilets for workers (separate for male & female workers) | Locations: Nos.<br>**1.** ... | |
| 26 | Rest sheds for workers during lunchtime, rain, dust storm etc. | Locations: Nos.<br>**1.** ... | |
| 27 | Availability of following in Labor colony | **1. Clean drinking water**<br>**2. Toilets**<br>**3. Cleanliness & Hygiene**<br>**4. Grass cutting,**<br>**5. Fogging**<br>**6. Electrical Inspection ...** | |

| SN. | Description of HSE Activity & Formats | Plan & Targets for the month | Review |
|---|---|---|---|
| 28 | Availability of dust/ waste bins at various locations | Locations:<br>**1.** ... | |
| 29 | Availability of First Aider in each shift | Details of first aider | |
| 30 | Emergency vehicle/ Ambulance as required (Centrally arrange by BHEL) in each shift | 1. | |
| 31 | Deployment/ Availability of tested Fire Extinguishers | Locations & Nos.<br>**1.** ... | |
| 32 | Tree plantation | Locations & Nos.<br>**1.** ... | |
| 33 | Waste disposal & Scrap Bins | Locations<br>**1.** ... | |
| 34 | Illumination checks | Locations<br>**1.** ... | |
| 35 | Safety award function:<br>1. Display of good practices<br>Award presentation | Minimum 1 per month | |
| **36** | **Submission of Daily Reports as per Format No.F31A** | **Daily Reports (Night & Day Shifts)** | |

| **PLAN** | | **REVIEW** | |
|---|---|---|---|
| **Agency**<br>Name:<br><br>Sign:<br><br>Date: | **BHEL**<br>Name:<br><br>Sign:<br><br>Date: | **Agency**<br>Name:<br><br>Sign:<br><br>Date: | **BHEL**<br>Name:<br><br>Sign:<br><br>Date: |

| | | |
|---|---|---|
| | **POWER SECTOR**<br>**Format for Daily HSE Reporting** | FORMAT NO: **HSEP:14-F31 B**<br>REV NO.: 00<br>PAGE NO. 01 OF 1 |

**Note: Following format to be submitted (preferably) in excel/ soft copy by BHEL daily at the end of each shift. Any photographs/ records to be attached**

| | | |
|---|---|---|
| | **Daily HSE Report (BHEL)**<br>**Health, Safety & Environment**<br>**Power Sector Headquarters** | **Format No. HSEP13:F31B**<br>**Rev. 00** |

| | | | | | |
|---|---|---|---|---|---|
| **Day** | | **Month** | | **Year** | |
| **Project** | | | | **Agency** | |

**Important:**

**1. N-Night Shift**

**2. Photographs of inspection of height work, hazardous activities, T&Ps, Toolbox Talks, Training, Reward Function, Housekeeping/ Plantation drives etc. to be attached**

**4. Report to be compiled daily at day end and submitted to BHEL**

**5. Format to be preferably used in soft copy only and submitted by e-mail**

| General Info | | | Manpower Details | | | | | Safety Statistics | | | | | | | | | | | Incident Statistics | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Shift | Submitted By | Work Area(s) | Staff | Man-Power | Safety Officers | Safety Stewards | Tool Box Inspected | Induction Training Inspected | Vertigo Test Inspected | On-the-Job Training Given/ Inspected | Work Permits Issued | Job Safety Analyses Approved | Height Work Inspection Conducted (Areas) | Other Hazardous Activities Inspection (Areas) | T&P Inspection (Names & Nos. Inspected) | Safety Walk (Designation, Areas) | HSE Meeting | Safety Reward (Details) | Housekeeping/ Dust Suppression/ Tree Plantation Activities (Locations/ Details) | Lost time Accident | Restricted Work Case | Medical Treatment Case | First Aid Case | Near miss | Property Damage/ Fire | Any other remains /input |
| **DAY** | | | | | | | | | | | | | | | | | | | | | | | | | |
| **Night** | | | | | | | | | | | | | | | | | | | | | | | | | |

| | | |
|---|---|---|
| बी एच ई एल BHEL | **POWER SECTOR**<br>**Format for Daily HSE Reporting** | FORMAT NO: **HSEP:14-F31 A**<br>REV NO.: 00<br>PAGE NO. 01 OF 1 |

**Note: Following format to be submitted (preferably) in excel/ soft copy by Contractor daily at the end of each shift. Any photographs/ records to be attached**

| | | |
|---|---|---|
| बी एच ई एल BHEL | **Daily HSE Report (BHEL)**<br>**Health, Safety & Environment**<br>**Power Sector Headquarters** | **Format No. HSEP13:F31A**<br>**Rev. 00** |

| | | | | | |
|---|---|---|---|---|---|
| **Day** | | **Month** | | **Year** | |
| **Project** | | | **Agency** | | |

**Important:**

**1. N-Night Shift**

**2. Photographs of inspection of height work, hazardous activities, T&Ps, Toolbox Talks, Training, Reward Function, Housekeeping/ Plantation drives etc. to be attached**

**4. Report to be compiled daily at day end and submitted to BHEL**

**5. Format to be preferably used in soft copy only and submitted by e-mail**

| General Info | | | Manpower Details | | | | Safety Statistics | | | | | | | | | | | | Incident Statistics | | | | | NCs | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SHIFT | Submitted by | Work Area (s) | Staff | Man-Power | Safety Officers | Safety Stewards | Tool Box (Topics and No. of Participants) | Induction Training (No. of Participants) | Vertigo Test (Numbers Tested) | On-the-job Training (Topic & participants) | Work Permits | Job Safety Analysis conducted | Height Work Inspection | Other Hazardous Activities Inspection | T&P Inspection (Names & Nos Inspected) | Safety Walk (Designation, Areas) | HSE Meeting | Safety Reward (Details) | Housekeeping/ Dust Suppression/ Tree Plantation Activities (Locations/ Details) | Lost time Accident | Restricted Work | Medical Treatment Case | First Aid Case | Near miss | Non-Compliances Submitted by BHEL | Complied by Agency |
| **DAY** | | | | | | | | | | | | | | | | | | | | | | | | | |
| **Night** | | | | | | | | | | | | | | | | | | | | | | | | | |

**POWER SECTOR**

**Format for Weekly HSE Reporting**

# Weekly HSE Report (BHEL)

## Health, Safety & Environment

## Power Sector Headquarters

| Day | | Month | | Year | |
|---|---|---|---|---|---|
| **Project** | | | | **Agency** | |

**Important:**

**1. N-Night Shift**

**2. Photographs of inspection of height work, hazardous activities, T&Ps, Toolbox Talks, Training, Reward Function, Housekeeping/ Plantation drives etc. to be attached**

**4. Report to be compiled daily at day end and submitted to BHEL-PSWR Nagpur HQ**

**5. Format to be preferably used in soft copy only and submitted by e-mail**

| General Info | | | Manpower Details | | | | Safety Statistics | | | | | | | | | | | | | Incident Statistics | | | | | | | Weekly Safety Points | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SHIFT | Submitted By | Work Area(s) | Staff | Man-Power | Safety Officers | Safety Stewards | Tool Box Inspected | Induction Training Inspected | Vertigo Test Inspected | On-the-Job Training Given/ Inspected | Work Permits Issued | Job Safety Analyses Approved | Height Work Inspection Conducted (Areas) | Other Hazardous Activities Inspection (Areas) | T&P Inspection (Names & Nos. Inspected) | Safety Walk (Designation | HSE Meeting | Safety Reward (Details) | Housekeeping/ Dust Suppression/ Tree Plantation Activities | Lost time Accident | Restricted Work Case | Medical Treatment Case | First Aid Case | Near miss | Property Damage/ Fire | Any other Remarks/ Inputs | No. Of Work done without Safety Permit | No. of Non-Compliance on Safety Violation |
| **DAY** | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| **Night** | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

| SL | Parameter for Measurement | M/ O | Wt | Supporting Documents |
|---|---|---|---|---|
| 1a | Induction training for new workers conducted through audio-visual medium & documented? | M | 1 | Induction Training Records |
| 1b | Tool box talk conducted regularly as per plan, and documented? | M | 1 | Toolbox Talk Records |
| 1c | Contractor in charge and safety in charge attended safety meetings? | M | 2 | Minutes of Meeting |
| 1d | Whether observations in safety meetings are compiled before next meeting? | M | 2 | -do- |
| 1e | Preparation and submission of Monthly HSE report within stipulated time | M | 1 | Report submission date |
| 1f | Preparation and submission of Incident/near-miss report and RCA Report (as applicable) within stipulated time | M | 1 | Incident/ Near Miss Records |
| 1g | Carrying out Inspections and submission of Inspection reports within stipulated time | M | 1 | Inspection Records |
| 1h | Regular Job Specific Training ensured for High Risk Workers (through audio-visual medium) as per plan | M | 1 | Training & Attendance Records |
| 2a | Whether the contractor is registered under BOCW | M | 2 | BOCW Registration Certificate |
| 2b | Availability of Qualified safety officer (1 for every 500 labor) | M | 2 | Safety Officer qualification & experience records |
| 2c | Availability of Qualified safety supervisor (1 for every 100 labor ) | M | 2 | Safety Officer qualification & experience records |
| 2d | All the workers are provided and using safety helmets and safety shoes/gum boots | M | 2 | PPE Issue Records, Inspection/ non-conformity records |
| 2e | Housekeeping done on regular basis and scrap removal at site | M | 1 | Housekeeping records, Inspection/ non-conformity records |
| 2f | Usage of Goggles/Face shields and Hand gloves for gas cutter and grinders | | 1 | PPE Issue Records, Inspection/ non-conformity records |
| 2g | Wall openings & floor openings are guarded? | | 1 | Inspection/ non-conformity records |
| 2h | Adequate illumination provided in all working area? | | 1 | Inspection/ non-conformity records |
| 2i | Safety posters, sign boards and emergency contact numbers in all prominent location are displayed? | | 1 | Inspection/ non-conformity records |
| 2j | Availability of automatic reverse horns, Main horn, hook latches for Vehicles, mobile cranes, Hydraulic Mobile Cranes | | 1 | Inspection/ non-conformity records |
| 2k | Ban of carrying mobile phones to work place is implemented for workers | | 1 | Inspection/ non-conformity records |
| 2l | Availability of Tags & Inspection Certificates for Cranes of all capacities | | 1 | Master T&P List with internal & external test details |
| 2l.2 | Availability of Tags & Inspection Certificates for Winches of all capacities | | 1 | Master T&P List with internal & external test details |
| 2l.3 | Availability of Tags & Inspection Certificates, color coding for Chain pulley blocks | | 1 | Master T&P List with internal & external test details |
| 2l.4 | Availability of Tags & Inspection Certificates for Vehicles - Trailers, Dozers, Dumpers, Excavators. Mixers etc. | | 1 | Master T&P List with internal & external test details |
| 2l.5 | Availability of Tags & Inspection Certificates for Welding machines, grinders, Drilling machines, etc. | | 1 | Master T&P List with internal & external test |

| | | | | |
|---|---|---|---|---|
| | | | | details |
| **2l.6** | Availability of Tags & Inspection Certificates, colour coding for Wire rope slings etc. | | 1 | Master T&P List with internal & external test details |
| **2l.7** | Availability of Tags & Inspection Certificates for Batching plants | | 1 | Master T&P List with internal & external test details |
| **2m.1** | Use of Lifting Permit as per requirement | | 1 | Permit Records |
| **2m.2** | Use of Height Permit as per requirement | | 1 | Permit Records |
| **2m.3** | Use of Hot Work Permit as per requirement | | 1 | Permit Records |
| **2m.4** | Use of Excavation permit as per requirement | | 1 | Permit Records |
| **2m.5** | Use of Confined space work permit as per requirement | | 1 | Permit Records |
| **2m.6** | Use of Grating removal and safety net removal permit as per requirement | | 1 | Permit Records |
| **2m.7** | Use of Lockout-Tag out permit as per requirement | | 1 | Permit Records |
| **2m.8** | Use of Radiography permit as per requirement | | 1 | Permit Records |
| **2m.9** | Use of Night/ Holiday Work Permit as per requirement | | 1 | Permit Records |
| **2m.10** | Use of Any other Applicable Permit as per requirement | | 1 | Permit Records |
| **3a** | Material safety data sheet(MSDS) available for all chemicals and displayed in usage and storage area? | | 1 | Inspection/ non-conformity records |
| **3b** | Spillages of oil/concrete and other chemical is controlled and cleaned by proper method in case of spill? | | 1 | Inspection/ non-conformity records |
| **3c** | Availability of adequate number of urinals in workplace and in elevations and maintained | **M** | 1 | |
| **3d** | Availability of rest rooms for workers at site | **M** | 1 | |
| **3e** | Availability of Drinking water facility at work spot | | 1 | |
| **3f** | Hygienic Labor colony is provided for workers. | | 1 | |
| **4a** | Is heavy/complex critical lifting permit obtained for heavy, complex materials before handling/erection activity? | | 1 | Work Permit records |
| **4b** | Whether area below lifting activities barricaded | | 1 | Inspection/ non-conformity records |
| **4c** | Availability of experienced rigging foreman | | 1 | Experience details of rigging foreman |
| **4d** | Is agency is following proper storage and handling procedure as per manufacturer standard for all hazardous material? | | 1 | Procedure for storage & handling |
| **4e** | Are oxygen and acetylene cylinders are transported to work place from storage area in trolleys | | 1 | |
| **5a** | Whether all deep excavation has been protected by barrier | | 1 | Inspection/ non-conformity records |
| **5b** | Sloping/benching & shoring provided for excavation as per requirement? | | 1 | -do- |
| **5c** | Proper access and egress provided for excavations? | | 1 | -do- |
| **5d** | Blasting is done in controlled manner? | | 2 | -do- |
| **6a** | Whether Electrical booth is equipped with $Co_2$ fire extinguishers and fire buckets filled with sand? | | 2 | Inspection/ non-conformity records |
| **6b** | Availability of Illumination lamp in electric booth? | | 1 | -do- |
| **6c** | whether Caution Boards have been displayed? | | 1 | -do- |
| **6d** | Usage of Metal Plug top for all hand power tools? | | 1 | -do- |
| **6e** | Usage of Insulated welding cables. | | 1 | -do- |
| **6f** | Electrical Booth/Distribution Board to be covered by proper Canopy. | | 1 | -do- |
| **6g** | Availability of functional & individual 30ma ELCB / RCCB and MCB for protection and conducting periodical check-up? | | 1 | -do- |
| **6h** | Double earthing for panel boards and all machinery & proper earth pit with regular inspection available? | | 1 | -do- |
| **6i** | Whether Electrician is qualified and experienced | | 1 | Qualification & Experience records of electrician |
| **6j** | Availability and usage of Rubber hand gloves by electrician? | | 1 | Inspection/ non-conformity records |
| **7a** | Whether Scaffolding pipes made with steel or aluminum, are being used and checked periodically by experienced/ certified scaffolder? | | 2 | Inspection/ non-conformity records |

| | | | | |
|---|---|---|---|---|
| **7b** | 8mm Stainless Steel wire rope with plastic cladding is provided for life line (Vertical / Horizontal) during height work? | | 2 | -do- |
| **7c** | Availability of emergency lighting in case of power failure | | 1 | -do- |
| **7d** | Whether all the openings are covered with Safety Nets made of fire proof Nylon? | | 1 | -do- |
| **7e** | Whether MS pipe rails around staircases & platforms in usage are provided with top, middle rails and toe guard? | | 1 | -do- |
| **7f** | Whether Ladder with vertical life line /Fall arrestor is available to climb? | | 1 | -do- |
| **7g** | Whether all workers deployed for working at height have been issued height pass after undergoing vertigo test? | | 1 | Height Pass records |
| **7h** | Whether all workers deployed for height work / climbing ladder are provided and using Double lanyard safety belt? | | 1 | PPE Issue records, inspection/ non-conformity reports |
| **7i** | Is all hand tools/Small material used by height workers is tied firmly to prevent fall? | | 1 | -do- |
| **8a** | Flash back arrestors for all gas cutting sets is available on Torch side and cylinder side | | 1 | Inspection/ non-conformity records |
| **8b** | Oxygen/Acetylene/LPG cylinders not in use have caps in place and stored separately? | | 1 | -do- |
| **8c** | Availability of Face screen, Hand gloves, and Apron, for welders | | 1 | -do- |
| **8d** | Protection from falling hot molten metal during metal cutting / welding at height by providing GI sheet below the cutting area especially in fire prone areas | | 1 | -do- |
| **9a** | Pre-employment medical check-up done for all workers and submitted? | | 1 | Medical check records |
| **9b** | Availability of first aid center & first aider at work place | **M** | 2 | Attendance records |
| **9c** | Ambulance facility as required - 24 hours (Centrally arranged by BHEL) | **M** | 2 | -do- |
| **9d** | Is First aid trained personnel's are available and their names are displayed at site? | **M** | 1 | -do- |
| **9e** | Availability of Emergency vehicle at site | | 1 | |
| **9f** | Periodical medical check-up is conducted for all the workers and submitted? | | 1 | Medical check records |
| **9g** | Availability of sufficient number of first aid box as per standard list and maintaining record | | 1 | Inspection records |
| **10a** | Availability of Fire extinguishers, buckets at all vulnerable points | | 2 | Fire extinguisher records |
| **10b** | Periodic fire mock drill conducted? | | 1 | Fire, Mock drill records |
| **10c** | Are all flammable materials are stored separately? | | 1 | |
| **10d** | Periodic grass cutting is done in material storage area? | | 1 | |
| **10e** | Availability of 24V DC lighting in confined space work area | | 1 | |
| **10f** | Availability of exhaust fan in confined space work area | | 1 | |

**Note:**

- **M: Mandatory; O: Optional**. Points other than mandatory can be excluded with appropriate justification (scope etc.) by BHEL
- Additionally: 30 Marks for each Fatal Accident and 10 mark for each major accident shall be deducted.

# ANNEXURE 10

# WORK PERMITS

HSEP:14-FP1

| GENERAL WORK PERMIT | Permit No. & Date |
|---|---|
| **Project & Unit:** | **Emergency Contact Nos:** |
| **BHEL Contractor:** | |

Exact Location of Work:_____

Nature / Description of Work:_____

Duration of Work Execution *: From Date:_____ to Date:_____ Daily from _____ hrs. to _____ hrs.

Name of Contractor Performing the Work: _____

Name of Contractor's Site Engineer (Permit Requesting Authority):_____ Sign:_____

Name of Contractor's Package In-charge:_____ Sign:_____ Date:_____

*The above described work will be done under all the safety precautions mentioned on this permit to work as under during the currency of the Permit*.

| No. | Item | Yes | Not required / Remarks |
|---|---|---|---|
| | **Job Specific Permit Required :** | | |
| | | | |
| 1. | Height Work Permit Required | | |
| 2. | Hot Work Permit Required | | |
| 3. | Confined Space Work Permit Required | | |
| 4. | Excavation Work Permit Required | | |
| 5. | Radiation Work Permit Required | | |
| 6. | Heavy / Complex / Critical Lifting Activity Permit Required | | |
| 7. | Night Work / Holiday Work Permit Required | | |
| 8. | Loading / Unloading Permit Required | | |
| 9. | Grating / Safety Net / Safety Facility Removal Permit Required | | |
| 10. | Lockout / Tag out Request Permit Required | | |
| 11. | Other Permit required. Pl specify : | | |
| | **Specific PPEs for the Activity:** | | |
| 1. | Dust Mask/ other respiratory equipment required. List details: | | |
| 2. | Welding and/or Grinding Shield required. | | |
| 3. | Gloves: Leather ( ) / PVC ( ) / Welding ( ) | | |
| 4. | Other PPE, List: | | |
| | **Procedure Required :** | | |
| 1. | OCP No. Ref : | | |

**Declaration:**

***All the points mentioned in the above checklist have been checked and found OK.***

**Permit Receiver:**

| **Site Engineer (Contractor):** | **Site Safety Officer (Contractor):** |
|---|---|
| Signature: | Signature: |
| Name: Designation: | Name: Designation: |

**Permit Issuer:**

| **Site Engineer (BHEL):** | **Site Safety Officer (BHEL):** |
|---|---|
| Signature: | Signature: |
| Name: Designation: | Name: Designation: |

| **Package-in-charge (BHEL):** |
|---|
| Signature: |
| Name: Designation: |

**(This permit is valid only for max. 15 days)**

**Original: Permittee** ☐ **2nd Copy: Contractor Deptt. HOS** ☐ **3rd Copy: BHEL Site HSE** ☐

HSEP:14-FP2

| WORK AT HEIGHT PERMIT | Permit No. & Date |
|---|---|
| Project & Unit: | Emergency Contact Nos |
| Agency: | |

Exact Location of Work:_____

Nature / Description of Work:_____

Duration of Work Execution *: From Date:_____ to Date:_____ Daily from _____ hrs. to _____ hrs.

Name of Agency Performing the Work: _____

Name of Agency's Site Engineer (Permit Requesting Authority):_____ Sign:_____

Name of Agency's Package In-charge:_____ Sign:_____ Date:_____

*The above described work will be done under all the safety precautions mentioned on this permit to work as under during the currency of the Permit*.

| No. | Item | Yes | Not required / Remarks |
|---|---|---|---|
| 1. | All workers on job are competent and medically fit (No Height Phobia) for working at height | | |
| 2. | Horizontal life lines are provided and are installed on a rigid & independent structure | | |
| 3. | Safety harness with life line support/ fall arrester are checked and available in working condition | | |
| 4. | Scaffolding soundness inspected is available for use with valid tag | | |
| 5. | Work platform is not made of bamboo or weak material. Barricading is available with Top, Mid Rails and Toe Guard. (Temporary platform is having temporary side railing) | | |
| 6. | Working platform is clean without any unwanted material. Floor openings are covered. | | |
| 7. | Access and exit to workplace are safe, marked and without obstruction. | | |
| 8. | Adequate lighting provided (for dark hours) as per applicable lux standards (Refer HSEP:13) | | |
| 9. | Safety nets are provided below working area as secondary line of fall protection | | |
| 10. | Area below the working platform has been cleared of all activity | | |
| 11. | Ladders have been secured, inspected and provided as per BHEL standard/contract. | | |
| 12. | Safety Belt, Safety shoes (non-slip), Helmet with chin strip available with employees | | |
| 13. | Visible Signboards provided on working platforms in workers' understandable language | | |
| 14. | All lifting / tightening tools, hand tools/equipment checked and in good condition | | |
| 15. | 30mA ELCB provided for Electrical connections individually. Electrical cable, welding Hose/Compressed air hose properly secured and laid down without obstruction. Earth resistance is OK. | | |
| 16. | Crane / Winch / Hydraulic Mobile Crane operator is qualified and experienced | | |
| 17. | Emergency response team & Medical Facilities available. | | |
| 18. | Work hazards are identified, controlled and communicated to the worker. | | |
| 19. | Method Statements/ Job Safety Analyses attached: | | |
| 20. | Other:1. Permit form filled in completely? 2. Access ladder is provided to reach the work location | | |
| 21. | List of Other Permits Required for the Activity (Attached): | | |

**Declaration:**

***All the points mentioned in the above checklist have been checked and found OK.***

**Permit Receiver:**

| Site Engineer (Agency): | Site HSE Officer (Agency): |
|---|---|
| Signature: | Signature: |
| Name: Designation: | Name: Designation: |

**Permit Issuer:**

| Site Engineer (BHEL): | Site HSE Officer (BHEL): |
|---|---|
| Signature: | Signature: |
| Name: Designation: | Name: Designation: |

| Package-in-charge (BHEL): |
|---|
| Signature: |
| Name: Designation: |

**(* Permit valid for 7 days, subject to daily renewal, and extension as per overleaf instructions / record formats)**

| Original: Permittee | | 2nd Copy: Agency Deptt. HOS | | 3rd Copy: BHEL Site HSE | |
|---|---|---|---|---|---|

Work at Height Permit No. & Date: _____

**Daily Work Area Condition Endorsement**

| Sl. No. | Date | Signature with Date & Time | | | Remarks |
|---|---|---|---|---|---|
| | | Agency Site Engineer | Agency HSE Officer | BHEL HSE Officer | |
| Day 2 | | | | | |
| Day 3 | | | | | |
| Day 4 | | | | | |
| Day 5 | | | | | |
| Day 6 | | | | | |
| Day 7 | | | | | |

**Permit Extension Beyond Initially Requested Hours**

| Sl. No. | Extension Period | | Remarks | Signature with Date & Time | | | |
|---|---|---|---|---|---|---|---|
| | From……. (Date, Time) | To…… (Date, Time) | | Agency Site Engineer | Agency HSE Officer | BHEL Site Engineer (PIA) | BHEL HSE Officer |
| **1.** | | | | | | | |
| **2.** | | | | | | | |
| **3.** | | | | | | | |
| **4.** | | | | | | | |
| **5.** | | | | | | | |
| **6** | | | | | | | |

**Permit Closure After Work Completion**

| **Permit is here by returned after completing the job & ensuring safe removal of men and material.** | |
|---|---|
| **Site Engineer, Agency** | **Site HSE Officer, Agency** |
| Signature: | Signature: |
| Name: | Name: |
| **Verified the area is safe and Permit is Closed** | |
| **Site HSE Officer, BHEL** | **Site Engineer, BHEL** |
| Signature: | Signature: |
| Name: | Name: |

***General Instructions:***

1. Each Permit shall be given a unique number and recorded.
2. Method Statement & Job Safety Analysis for the critical tasks to be ensured by concerned engineers and attached
3. Any other Work Permits required for the task to be taken and attached along with this Permit
4. Ensue that workers and supervisors involved are trained & medical check-up done
5. This permit must be available at the work site all the times of the work.
6. Location and description of the work must be clearly indicated by the permittee.
7. Terms applicable must be clearly indicated by the permittee.
8. This permit shall be endorsed each day by the agency and BHEL only after checking compliance to all points. Any violations shall be resolved before proceeding.
9. Compliance to Permit conditions to be checked regularly by concerned execution department
10. Permit shall be issued for not more than **7 days** including the issue date.
11. Permit shall be returned to the HSE Department of BHEL after completion of the job and closed.
12. All additional safety precautions to be taken as per HSE Management System.

*(For system details, please refer HSEP12: HSE Procedure for Permit to Work)*

**Distribution**

**Original**- Permittee – At Site, **Duplicate** –Agency Department HOS, **Contractor**, Triplicate - Site HSE Dept.

HSEP:14-FP3

| BURNING/ WELDING/ HOT WORK PERMIT | Permit No. & Date |
|---|---|
| Project & Unit: | Emergency Contact Nos |
| Agency: | |

Exact Location of Work:_____

Nature / Description of Work:_____

Duration of Work Execution *: From Date:_____ to Date:_____ Daily from _____ hrs. to _____ hrs.

Name of Agency Performing the Work: _____

Name of Agency's Site Engineer (Permit Requesting Authority):_____ Sign:_____

Name of Agency's Package In-charge:_____ Sign:_____ Date:_____

*The above described work will be done under all the safety precautions mentioned on this permit to work as under during the currency of the Permit*.

| No. | Item | Yes | Not required / Remarks |
|---|---|---|---|
| 1. | Welding area ensured safe and free from all hazards (explosives etc.) with barricading and safe inlet / exit | | |
| 2. | Proper ventilation and /or lighting provided (in case of dark hours). | | |
| 3. | Welding platform ensured safe and strong. Not built of bamboo or similar material | | |
| 4. | For enclosed / confined spaces, the integrity of the structure and supports are ensured, Gas Testing done | | |
| 5. | Gas hoses, Welding machine input/output cables, welding holder and weld return clamp (Holder) are in good condition, routed and insulated as required | | |
| 6. | Emergency STOP buttons are in working condition. Welder /Helper knows how to operate it. | | |
| 7. | Welder & Fitter trained to connect ground/work return clamps (Holder) to work place prior to energization of welding machine. | | |
| **8.** | Gas cylinders are stacked vertically and not below the welding / cutting area. Regulator key is available with cylinder. Gas cylinders covered with shields to prevent falling splinters. | | |
| 9. | Pressure gauges/Flash back arrestor (at both ends) provided and in working condition. | | |
| 10. | Personal Protective equipment Minimum applicable: safety helmet, safety goggles, welding helmet, safety shoes, leather gloves, long sleeve and nose mask -provided | | |
| 11. | In case of pits, water removed from the pit and wood/rubber insulation provided. | | |
| 12. | Safety signboards / cautions are in place. | | |
| 13. | Adequate and Suitable nos. of firefighting extinguisher provided. Sufficient water for firefighting available. | | |
| 14. | Nearby combustible material removed. Housekeeping done. | | |
| 15. | Emergency response team & Medical Facilities available. | | |
| 16. | Work hazards are identified, controlled and communicated to the worker. | | |
| 17. | Method Statements/ Job Safety Analyses attached: | | |
| 18. | Other: 1. Permit form filled in completely? 2. Electrical equipment to be protected and grounded. | | |
| **19.** | List of Other Permits Required for the Activity (Attached): | | |

**Declaration:**

***All the points mentioned in the above checklist have been checked and found OK.***

**Permit Receiver:**

| Site Engineer (Agency): | | Site HSE Officer (Agency): | |
|---|---|---|---|
| Signature: | | Signature: | |
| Name: | Designation: | Name: | Designation: |

**Permit Issuer:**

| Site Engineer (BHEL): | | Site HSE Officer (BHEL): | |
|---|---|---|---|
| Signature: | | Signature: | |
| Name: | Designation: | Name: | Designation: |

| Package-in-charge (BHEL): | |
|---|---|
| Signature: | |
| Name: | Designation: |

**(* Permit valid for 7 days, subject to daily renewal, and extension as per overleaf instructions / record formats)**

| Original: Permittee | | 2nd Copy: Agency Deptt. HOS | | 3rd Copy: BHEL Site HSE | |
|---|---|---|---|---|---|

**P.T.O.** **To be printed on both sides of an A4 Sheet**

Hot Work Permit No. & Date: _____

**Daily Work Area Condition Endorsement**

| Sl. No. | Date | Signature with Date & Time | | | Remarks |
|---|---|---|---|---|---|
| | | Agency Site Engineer | Agency HSE Officer | BHEL HSE Officer | |
| Day 2 | | | | | |
| Day 3 | | | | | |
| Day 4 | | | | | |
| Day 5 | | | | | |
| Day 6 | | | | | |
| Day 7 | | | | | |

**Permit Extension Beyond Initially Requested Hours**

| Sl. No. | Extension Period | | Remarks | Signature with Date & Time | | | |
|---|---|---|---|---|---|---|---|
| | From……. (Date, Time) | To…… (Date, Time) | | Agency Site Engineer | Agency HSE Officer | BHEL Site Engineer (PIA) | BHEL HSE Officer |
| **1.** | | | | | | | |
| **2.** | | | | | | | |
| **3.** | | | | | | | |
| **4.** | | | | | | | |
| **5.** | | | | | | | |
| **6** | | | | | | | |

**Permit Closure After Work Completion**

| **Permit is here by returned after completing the job & ensuring safe removal of men and material.** | |
|---|---|
| **Site Engineer, Agency** | **Site HSE Officer, Agency** |
| Signature: | Signature: |
| Name: | Name: |
| **Verified the area is safe and Permit is Closed** | |
| **Site HSE Officer, BHEL** | **Site Engineer, BHEL** |
| Signature: | Signature: |
| Name: | Name: |

***General Instructions:***

1. Each Permit shall be given a unique number and recorded.
2. Method Statement & Job Safety Analysis for the critical tasks to be ensured by concerned engineers and attached
3. Any other Work Permits required for the task to be taken and attached along with this Permit
4. Ensue that workers and supervisors involved are trained & medical check-up done
5. This permit must be available at the work site all the times of the work.
6. Location and description of the work must be clearly indicated by the permittee.
7. Terms applicable must be clearly indicated by the permittee.
8. This permit shall be endorsed each day by the agency and BHEL only after checking compliance to all points. Any violations shall be resolved before proceeding.
9. Compliance to Permit conditions to be checked regularly by concerned execution department
10. Permit shall be issued for not more than **7 days** including the issue date.
11. Permit shall be returned to the HSE Department of BHEL after completion of the job and closed.
12. All additional safety precautions to be taken as per HSE Management System.

*(For system details, please refer HSEP12: HSE Procedure for Permit to Work)*

**Distribution**

**Original**- Permittee – At Site, **Duplicate** –Agency Department HOS, **Contractor**, Triplicate - Site HSE Dept.,

| | | |
|---|---|---|
| HSEP:14-FP4 | **CONFINED AREA WORK PERMIT** | **Permit No. & Date** |
| | **Project & Unit:** | **Emergency Contact Nos** |
| | **Agency:** | |

Exact Location of Work:_____

Nature / Description of Work:_____

_____

Duration of Work Execution *: From Date:_____ to Date:_____ Daily from _____ hrs. to _____hrs.

Name of Agency Performing the Work: _____

Name of Agency's Site Engineer (Permit Requesting Authority):_____ Sign:_____

Name of Agency's Package In-charge:_____ Sign:_____ Date:_____

*The above described work will be done under all the safety precautions mentioned on this permit to work as under during the currency of the Permit*.

| No. | Item | Yes | Not required / Remarks |
|---|---|---|---|
| 1. | Has the equipment been Isolated from Power/Steam/Air? | | |
| 2. | Has the equipment been Isolated from liquid or gasses? | | |
| 3. | Has the equipment been de-pressurized &/or drained? | | |
| 4. | Has the equipment been Blanked/blinded or disconnected? | | |
| 5. | Has the equipment been water flushed &/or steamed? | | |
| 6. | Whether man ways open and ventilated?(open at least 2 manholes & keep for hours) | | |
| 7. | Whether constant Inert gas flow arranged? | | |
| 8. | Whether mechanically ventilated and adequately cooled? | | |
| 9. | Whether 24 V lighting provided inside the confined space? | | |
| 10. | Whether Radiation sources removed? | | |
| 11. | Whether training on confined space provided to the group? | | |
| 12. | Whether required PPEs used? | | |
| 14. | Whether Dust/Gas/Air Line mask used? | | |
| 15. | Whether attendant with SCBA/Air mask available? | | |
| 16. | Whether grounded air Exhaust/Blower/ AC provided? | | |
| 17. | Whether Personal Gas alarm provided? | | |
| 18. | Whether communication Equipment Provided? | | |
| 19. | Whether rescue equipment (Breathing Set, Waist Rope, Light Mounted Helmet)/team available? | | |
| 20. | Whether firefighting arrangement done | | |
| 21. | Emergency response team & Medical Facilities available. | | |
| 22. | Work hazards are identified, controlled and communicated to the worker. | | |
| 23. | Method Statements/ Job Safety Analyses attached: | | |
| 24. | Other:1. Permit form filled in completely? | | |
| 25. | List of Other Permits Required for the Activity (Attached): | | |

**Declaration:**

***All the points mentioned in the above checklist have been checked and found OK.***

**Permit Receiver:**

| **Site Engineer (Agency):** | |
|---|---|
| Signature: | |
| Name: | Designation: |

| **Site HSE Officer (Agency):** | |
|---|---|
| Signature: | |
| Name: | Designation: |

**Permit Issuer:**

| **Site Engineer (BHEL):** | |
|---|---|
| Signature: | |
| Name: | Designation: |

| **Site HSE Officer (BHEL):** | |
|---|---|
| Signature: | |
| Name: | Designation: |

| **Package-in-charge (BHEL):** | |
|---|---|
| Signature: | |
| Name: | Designation: |

**(* Permit valid for 7 days, subject to daily renewal, and extension as per overleaf instructions / record formats)**

**Original: Permittee** ☐ **2nd Copy: Agency Deptt. HOS** ☐ **3rd Copy: BHEL Site HSE** ☐

**Daily Work Area Condition Endorsement**

| Sl. No. | Date | Signature with Date & Time | | | Remarks |
|---|---|---|---|---|---|
| | | Agency Site Engineer | Agency HSE Officer | BHEL HSE Officer | |
| Day 2 | | | | | |
| Day 3 | | | | | |
| Day 4 | | | | | |
| Day 5 | | | | | |
| Day 6 | | | | | |
| Day 7 | | | | | |

**Permit Extension Beyond Initially Requested Hours**

| Sl. No. | Extension Period | | Remarks | Signature with Date & Time | | | |
|---|---|---|---|---|---|---|---|
| | From……. (Date, Time) | To…… (Date, Time) | | Agency Site Engineer | Agency HSE Officer | BHEL Site Engineer (PIA) | BHEL HSE Officer |
| **1.** | | | | | | | |
| **2.** | | | | | | | |
| **3.** | | | | | | | |
| **4.** | | | | | | | |
| **5.** | | | | | | | |
| **6** | | | | | | | |

**Permit Closure After Work Completion**

| **Permit is here by returned after completing the job & ensuring safe removal of men and material.** | |
|---|---|
| **Site Engineer, Agency** | **Site HSE Officer, Agency** |
| Signature: | Signature: |
| Name: | Name: |
| **Verified the area is safe and Permit is Closed** | |
| **Site HSE Officer, BHEL** | **Site Engineer, BHEL** |
| Signature: | Signature: |
| Name: | Name: |

***General Instructions:***

1. Each Permit shall be given a unique number and recorded.
2. Method Statement & Job Safety Analysis for the critical tasks to be ensured by concerned engineers and attached
3. Any other Work Permits required for the task to be taken and attached along with this Permit
4. Ensue that workers and supervisors involved are trained & medical check-up done
5. This permit must be available at the work site all the times of the work.
6. Location and description of the work must be clearly indicated by the permittee.
7. Terms applicable must be clearly indicated by the permittee.
8. This permit shall be endorsed each day by the agency and BHEL only after checking compliance to all points. Any violations shall be resolved before proceeding.
9. Compliance to Permit conditions to be checked regularly by concerned execution department
10. Permit shall be issued for not more than **7 days** including the issue date.
11. Permit shall be returned to the HSE Department of BHEL after completion of the job and closed.
12. All additional safety precautions to be taken as per HSE Management System.

***(For system details, please refer HSEP12: HSE Procedure for Permit to Work)***

**Distribution**

**Original**- Permittee – At Site, **Duplicate** –Agency Department HOS, **Contractor**, Triplicate - Site HSE Dept.,

| | | |
|---|---|---|
| HSEP:14-FP5 | **EXCAVATION WORK PERMIT** | **Permit No. & Date** |
| | **Project & Unit:** | **Emergency Contact Nos** |
| | **Agency:** | |

Exact Location of Work:_____

Nature / Description of Work:_____

_____

Duration of Work Execution *: From Date:_____to Date:_____Daily from _____ hrs. to _____hrs.

Name of Agency Performing the Work: _____

Name of Agency's Site Engineer (Permit Requesting Authority):_____Sign:_____
Name of Agency's Package In-charge:_____Sign:_____Date:_____

*The above described work will be done under all the safety precautions mentioned on this permit to work as under during the currency of the Permit*.

| No. | Item | Yes | Not required / Remarks |
|---|---|---|---|
| 1. | Precautions taken for Underground Electrical Cable | | |
| 2. | Precautions taken for Under / Above ground sewer/Drinking Water Line | | |
| 3. | Precautions taken for Underground Telecommunication Line | | |
| 4. | Precautions taken for Underground Product/Utility Line | | |
| 5. | Precautions taken for Underground Fire Water Line | | |
| 6. | Shoring / Shuttering / Sheet piling done to prevent collapse of excavation walls. Strength of Excavation wall ensured at all times | | |
| 7. | Hard Barricading & Edge Protection provided | | |
| 8. | Separate Safe Access for Man and Vehicle | | |
| 9. | Lighting arrangement | | |
| 10. | Banks Man Provided | | |
| 11. | Required basic PPEs provided | | |
| 12. | Slope Cutting/Benching Maintained | | |
| 13. | Excavated soil / Construction Material / equipment kept away from the edge. | | |
| 14. | Emergency response team & Medical Facilities available. | | |
| 15. | Work hazards are identified, controlled and communicated to the worker. | | |
| 16. | Method Statements/ Job Safety Analyses attached: | | |
| 17. | Other: | | |
| 18. | List of Other Permits Required for the Activity (Attached): | | |

**Declaration:**

***All the points mentioned in the above checklist have been checked and found OK.***

**Permit Receiver:**

| **Site Engineer (Agency):** | | **Site HSE Officer (Agency):** | |
|---|---|---|---|
| Signature: | | Signature: | |
| Name: | Designation: | Name: | Designation: |

**Permit Issuer:**

| **Site Engineer (BHEL):** | | **Site HSE Officer (BHEL):** | |
|---|---|---|---|
| Signature: | | Signature: | |
| Name: | Designation: | Name: | Designation: |

| **Package-in-charge (BHEL):** | |
|---|---|
| Signature: | |
| Name: | Designation: |

**(* Permit valid for 7 days, subject to daily renewal, and extension as per overleaf instructions / record formats)**

| **Original: Permittee** | | **2nd Copy: Agency Deptt. HOS** | | **3rd Copy: BHEL Site HSE** | |
|---|---|---|---|---|---|

Excavation Permit No. & Date: _____

**Daily Work Area Condition Endorsement**

| Sl. No. | Date | Signature with Date & Time | | | Remarks |
|---|---|---|---|---|---|
| | | Agency Site Engineer | Agency HSE Officer | BHEL HSE Officer | |
| Day 2 | | | | | |
| Day 3 | | | | | |
| Day 4 | | | | | |
| Day 5 | | | | | |
| Day 6 | | | | | |
| Day 7 | | | | | |

**Permit Extension Beyond Initially Requested Hours**

| Sl. No. | Extension Period | | Remarks | Signature with Date & Time | | | |
|---|---|---|---|---|---|---|---|
| | From……. (Date, Time) | To…… (Date, Time) | | Agency Site Engineer | Agency HSE Officer | BHEL Site Engineer (PIA) | BHEL HSE Officer |
| **1.** | | | | | | | |
| **2.** | | | | | | | |
| **3.** | | | | | | | |
| **4.** | | | | | | | |
| **5.** | | | | | | | |
| **6** | | | | | | | |

**Permit Closure After Work Completion**

| **Permit is here by returned after completing the job & ensuring safe removal of men and material.** | |
|---|---|
| **Site Engineer, Agency** | **Site HSE Officer, Agency** |
| Signature: | Signature: |
| Name: | Name: |
| **Verified the area is safe and Permit is Closed** | |
| **Site HSE Officer, BHEL** | **Site Engineer, BHEL** |
| Signature: | Signature: |
| Name: | Name: |

***General Instructions:***

1. Each Permit shall be given a unique number and recorded.
2. Method Statement & Job Safety Analysis for the critical tasks to be ensured by concerned engineers and attached
3. Any other Work Permits required for the task to be taken and attached along with this Permit
4. Ensue that workers and supervisors involved are trained & medical check-up done
5. This permit must be available at the work site all the times of the work.
6. Location and description of the work must be clearly indicated by the permittee.
7. Terms applicable must be clearly indicated by the permittee.
8. This permit shall be endorsed each day by the agency and BHEL only after checking compliance to all points. Any violations shall be resolved before proceeding.
9. Compliance to Permit conditions to be checked regularly by concerned execution department
10. Permit shall be issued for not more than **7 days** including the issue date.
11. Permit shall be returned to the HSE Department of BHEL after completion of the job and closed.
12. All additional safety precautions to be taken as per HSE Management System.

*(For system details, please refer HSEP12: HSE Procedure for Permit to Work)*

**Distribution**

**Original**- Permittee – At Site, **Duplicate** –Agency Department HOS, **Contractor**, Triplicate - Site HSE Dept.,

HSEP:14-FP6

| RADIATION WORK PERMIT | Permit No. & Date |
|---|---|
| Project & Unit: | Emergency Contact Nos |
| Agency: | |

Exact Location of Work: _____

Nature / Description of Work: _____

_____

Duration of Work Execution *: From Date: _____ to Date: _____ Daily from _____ hrs. to _____ hrs.

Name of Agency Performing the Work: _____

Name of Agency's Site Engineer (Permit Requesting Authority): _____ Sign: _____

Name of Agency's Package In-charge: _____ Sign: _____ Date: _____

*The above described work will be done under all the safety precautions mentioned on this permit to work as under during the currency of the Permit*.

| No. | Item | Yes | Not required / Remarks |
|---|---|---|---|
| 1. | All the persons at the site informed/removed from the area. | | |
| 2. | Area around the source of radiation cordoned off with the rope/chord. | | |
| 3. | Radiation warning symbol/boards displayed around radiography work on rope/chord. | | |
| 4. | Radiographer worn radiation badges during testing and is within safe limits. | | |
| 5. | Radiography camera and carrying case box having radiation symbol. | | |
| 6. | Radiation Survey Meter is in working condition, calibrated & within validity period. | | |
| 7. | Radiographer has valid certificate from BARC. | | |
| 8. | Blinking light provided on road during radiography (in dark hours). | | |
| 9. | Proper required Illumination provided | | |
| 10. | Safe access and working platform provided to conduct RT work | | |
| 11. | All the persons involved in Radiography work are aware of the hazard of radiation | | |
| 12. | Emergency response team & Medical Facilities available. | | |
| 13. | Work hazards are identified, controlled and communicated to the worker. | | |
| 14. | Method Statements/ Job Safety Analyses attached: | | |
| 15. | Other: | | |
| 16. | List of Other Permits Required for the Activity (Attached): | | |

**Declaration:**

***All the points mentioned in the above checklist have been checked and found OK.***

**Permit Receiver:**

| Site Engineer (Agency): | |
|---|---|
| Signature: | |
| Name: | Designation: |

| Site HSE Officer (Agency): | |
|---|---|
| Signature: | |
| Name: | Designation: |

**Permit Issuer:**

| Site Engineer (BHEL): | |
|---|---|
| Signature: | |
| Name: | Designation: |

| Site HSE Officer (BHEL): | |
|---|---|
| Signature: | |
| Name: | Designation: |

| Package-in-charge (BHEL): | |
|---|---|
| Signature: | |
| Name: | Designation: |

**(* Permit valid for 7 days, subject to daily renewal, and extension as per overleaf instructions / record formats)**

| Original: Permittee | | 2nd Copy: Agency Deptt. HOS | | 3rd Copy: BHEL Site HSE | |
|---|---|---|---|---|---|

## Daily Work Area Condition Endorsement

| Sl. No. | Date | Signature with Date & Time | | | Remarks |
|---|---|---|---|---|---|
| | | Agency Site Engineer | Agency HSE Officer | BHEL HSE Officer | |
| Day 2 | | | | | |
| Day 3 | | | | | |
| Day 4 | | | | | |
| Day 5 | | | | | |
| Day 6 | | | | | |
| Day 7 | | | | | |

## Permit Extension Beyond Initially Requested Hours

| Sl. No. | Extension Period | | Remarks | Signature with Date & Time | | | |
|---|---|---|---|---|---|---|---|
| | From……. (Date, Time) | To…… (Date, Time) | | Agency Site Engineer | Agency HSE Officer | BHEL Site Engineer (PIA) | BHEL HSE Officer |
| **1.** | | | | | | | |
| **2.** | | | | | | | |
| **3.** | | | | | | | |
| **4.** | | | | | | | |
| **5.** | | | | | | | |
| **6** | | | | | | | |

## Permit Closure After Work Completion

| **Permit is here by returned after completing the job & ensuring safe removal of men and material.** | |
|---|---|
| **Site Engineer, Agency** | **Site HSE Officer, Agency** |
| Signature: | Signature: |
| Name: | Name: |
| **Verified the area is safe and Permit is Closed** | |
| **Site HSE Officer, BHEL** | **Site Engineer, BHEL** |
| Signature: | Signature: |
| Name: | Name: |

## ***General Instructions:***

1. Each Permit shall be given a unique number and recorded.
2. Method Statement & Job Safety Analysis for the critical tasks to be ensured by concerned engineers and attached
3. Any other Work Permits required for the task to be taken and attached along with this Permit
4. Ensue that workers and supervisors involved are trained & medical check-up done
5. This permit must be available at the work site all the times of the work.
6. Location and description of the work must be clearly indicated by the permittee.
7. Terms applicable must be clearly indicated by the permittee.
8. This permit shall be endorsed each day by the agency and BHEL only after checking compliance to all points. Any violations shall be resolved before proceeding.
9. Compliance to Permit conditions to be checked regularly by concerned execution department
10. Permit shall be issued for not more than **7 days** including the issue date.
11. Permit shall be returned to the HSE Department of BHEL after completion of the job and closed.
12. All additional safety precautions to be taken as per HSE Management System.

*(For system details, please refer HSEP12: HSE Procedure for Permit to Work)*

**Distribution**

**Original**- Permittee – At Site, **Duplicate** –Agency Department HOS, **Contractor**, Triplicate - Site HSE Dept.,

HSEP:14-FP7

| HEAVY/ COMPLEX/ CRITICAL LIFTING ACTIVITY WORK PERMIT | Permit No. & Date |
|---|---|
| Project & Unit: | Emergency Contact Nos |
| Agency: | |

Exact Location of Work:_____

Nature / Description of Work:_____

_____

Duration of Work Execution *: From Date:_____to Date:_____Daily from _____ hrs. to _____hrs.

Name of Agency Performing the Work: _____

Name of Agency's Site Engineer (Permit Requesting Authority):_____Sign:_____

Name of Agency's Package In-charge:_____Sign:_____Date:_____

*The above described work will be done under all the safety precautions mentioned on this permit to work as under during the currency of the Permit*.

| No. | Item | Yes | Not required / Remarks |
|---|---|---|---|
| 1. | Crane used for lifting activity TPI tested, certified and approved for rated lifting | | |
| 2. | All lifting tackles, gears/appliances (chain pulley blocks, wire rope slings etc.) are tested and certified for lifting works with valid Serial numbers traceable to certificates. (SWL marked on it) | | |
| 3. | Chain Pulley Blocks are exclusively used for alignment, not loading | | |
| 4. | Crane operator is trained and competent for lifting operation. (Having Licenses /Experience Certificate)? | | |
| 5. | Lifting sling/ belt is protected against sharp edge of the jobs to be lifted. | | |
| 6. | Lifting hook is properly latched to prevent material falling over | | |
| 7. | Access and exit marked and without obstruction.(Have soil, wind, atmospheric, and work area conditions been considered throughout the job so that work can be done safely) | | |
| 8. | In case of lifting multiple materials at once, same are tied up with strong rope / material | | |
| 9. | Area below lifting activity barricaded to prevent movement | | |
| 10. | Minimum 2 guidelines have been provided for balancing and guiding jobs to be lifted. | | |
| 11. | Periphery area of crane booms as well as lifting job is barricaded and unauthorized/no-entry sign board posted. | | |
| 12. | Rigger and signal man is trained and competent for lifting work. | | |
| 13. | No lifting activity to be carried out during lightening, heavy wind/rain. | | |
| 14. | If scaffolding to be used during lift, scaffolding with valid tag available for use. | | |
| 15. | Emergency response team & Medical Facilities available. | | |
| 16. | Work hazards are identified, controlled and communicated to the worker. | | |
| 17. | Method Statements/ Job Safety Analyses/ Lifting Plan attached: | | |
| 18. | Other : Is the vehicle for transportation adequate for the load ? | | |
| 19. | List of Other Permits Required for the Activity (Attached): | | |

**Declaration:**

***All the points mentioned in the above checklist have been checked and found OK.***

**Permit Receiver:**

| Site Engineer (Agency): | |
|---|---|
| Signature: | |
| Name: | Designation: |

| Site HSE Officer (Agency): | |
|---|---|
| Signature: | |
| Name: | Designation: |

**Permit Issuer:**

| Site Engineer (BHEL): | |
|---|---|
| Signature: | |
| Name: | Designation: |

| Site HSE Officer (BHEL): | |
|---|---|
| Signature: | |
| Name: | Designation: |

| Package-in-charge (BHEL): | |
|---|---|
| Signature: | |
| Name: | Designation: |

**(* Permit valid for 7 days, subject to daily renewal, and extension as per overleaf instructions / record formats)**

| Original: Permittee | | 2nd Copy: Agency Deptt. HOS | | 3rd Copy: BHEL Site HSE | |
|---|---|---|---|---|---|

Critical lifting Permit No. & Date: _____

**Daily Work Area Condition Endorsement**

| Sl. No. | Date | Signature with Date & Time | | | Remarks |
|---|---|---|---|---|---|
| | | Agency Site Engineer | Agency HSE Officer | BHEL HSE Officer | |
| Day 2 | | | | | |
| Day 3 | | | | | |
| Day 4 | | | | | |
| Day 5 | | | | | |
| Day 6 | | | | | |
| Day 7 | | | | | |

**Permit Extension Beyond Initially Requested Hours**

| Sl. No. | Extension Period | | Remarks | Signature with Date & Time | | | |
|---|---|---|---|---|---|---|---|
| | From……. (Date, Time) | To…… (Date, Time) | | Agency Site Engineer | Agency HSE Officer | BHEL Site Engineer (PIA) | BHEL HSE Officer |
| **1.** | | | | | | | |
| **2.** | | | | | | | |
| **3.** | | | | | | | |
| **4.** | | | | | | | |
| **5.** | | | | | | | |
| **6** | | | | | | | |

**Permit Closure After Work Completion**

| **Permit is here by returned after completing the job & ensuring safe removal of men and material.** | |
|---|---|
| **Site Engineer, Agency** | **Site HSE Officer, Agency** |
| Signature: | Signature: |
| Name: | Name: |
| **Verified the area is safe and Permit is Closed** | |
| **Site HSE Officer, BHEL** | **Site Engineer, BHEL** |
| Signature: | Signature: |
| Name: | Name: |

***General Instructions:***

1. Each Permit shall be given a unique number and recorded.
2. Method Statement & Job Safety Analysis for the critical tasks to be ensured by concerned engineers and attached
3. Any other Work Permits required for the task to be taken and attached along with this Permit
4. Ensue that workers and supervisors involved are trained & medical check-up done
5. This permit must be available at the work site all the times of the work.
6. Location and description of the work must be clearly indicated by the permittee.
7. Terms applicable must be clearly indicated by the permittee.
8. This permit shall be endorsed each day by the agency and BHEL only after checking compliance to all points. Any violations shall be resolved before proceeding.
9. Compliance to Permit conditions to be checked regularly by concerned execution department
10. Permit shall be issued for not more than **7 days** including the issue date.
11. Permit shall be returned to the HSE Department of BHEL after completion of the job and closed.
12. All additional safety precautions to be taken as per HSE Management System.

*(Please refer HSEP12: HSE Procedure for Permit to Work for details of critical lift and permit workflow)*

**Distribution**

**Original**- Permittee – At Site, **Duplicate** –Agency Department HOS, **Contractor**, Triplicate - Site HSE Dept.,

HSEP:14-FP8

| NIGHT WORK PERMIT | Permit No. & Date |
|---|---|
| Project & Unit: | Emergency Contact Nos |
| Agency: | |

Exact Location of Work:_____

Nature / Description of Work:_____

_____

Duration of Work Execution *: From Date:_____ to Date:_____ Daily from _____ hrs. to _____ hrs.

Name of Agency Performing the Work: _____

Name of Agency's Site Engineer (Permit Requesting Authority):_____ Sign:_____

Name of Agency's Package In-charge:_____ Sign:_____ Date:_____

*The above described work will be done under all the safety precautions mentioned on this permit to work as under during the currency of the Permit*.

| No. | Item | Yes | Not required / Remarks |
|---|---|---|---|
| 1. | No heavy complex work is being carried out involving heavy, moving machinery etc. during night work | | |
| 2. | Proper illumination (lux value) as per prescribed standards has been provided | | |
| 3. | All required safety precautions / Permits /PPEs have been taken | | |
| 4. | Work area certified safe (with barricading, w/o hazards, proper access / ingress) | | |
| 5. | Workers are trained for the task | | |
| 6. | Adequate supervision is in order during the course of work | | |
| 7. | Emergency response team & Medical Facilities available. | | |
| 8. | Work hazards are identified, controlled and communicated to the worker. | | |
| 9. | Method Statements/ Job Safety Analyses attached: | | |
| 10. | Other: | | |
| 11. | List of Other Permits Required for the Activity (Attached): | | |

**Declaration:**

***All the points mentioned in the above checklist have been checked and found OK.***

**Permit Receiver:**

| Site Engineer (Agency): | | Site HSE Officer (Agency): | |
|---|---|---|---|
| Signature: | | Signature: | |
| Name: | Designation: | Name: | Designation: |

**Permit Issuer:**

| Site Engineer (BHEL): | | Site HSE Officer (BHEL): | |
|---|---|---|---|
| Signature: | | Signature: | |
| Name: | Designation: | Name: | Designation: |

| Package-in-charge (BHEL): | |
|---|---|
| Signature: | |
| Name: | Designation: |

**(* Permit valid for 7 days, subject to daily renewal, and extension as per overleaf instructions / record formats)**

| Original: Permittee | | 2nd Copy: Agency Deptt. HOS | | 3rd Copy: BHEL Site HSE | |
|---|---|---|---|---|---|

Night work Permit No. & Date: _____

**Daily Work Area Condition Endorsement**

| Sl. No. | Date | Signature with Date & Time | | | Remarks |
|---|---|---|---|---|---|
| | | Agency Site Engineer | Agency HSE Officer | BHEL HSE Officer | |
| Day 2 | | | | | |
| Day 3 | | | | | |
| Day 4 | | | | | |
| Day 5 | | | | | |
| Day 6 | | | | | |
| Day 7 | | | | | |

**Permit Extension Beyond Initially Requested Hours**

| Sl. No. | Extension Period | | Remarks | Signature with Date & Time | | | |
|---|---|---|---|---|---|---|---|
| | From……. (Date, Time) | To…… (Date, Time) | | Agency Site Engineer | Agency HSE Officer | BHEL Site Engineer (PIA) | BHEL HSE Officer |
| **1.** | | | | | | | |
| **2.** | | | | | | | |
| **3.** | | | | | | | |
| **4.** | | | | | | | |
| **5.** | | | | | | | |
| **6** | | | | | | | |

**Permit Closure After Work Completion**

| **Permit is here by returned after completing the job & ensuring safe removal of men and material.** | |
|---|---|
| **Site Engineer, Agency** | **Site HSE Officer, Agency** |
| Signature: | Signature: |
| Name: | Name: |
| **Verified the area is safe and Permit is Closed** | |
| **Site HSE Officer, BHEL** | **Site Engineer, BHEL** |
| Signature: | Signature: |
| Name: | Name: |

***General Instructions:***

1. Each Permit shall be given a unique number and recorded.
2. Method Statement & Job Safety Analysis for the critical tasks to be ensured by concerned engineers and attached
3. Any other Work Permits required for the task to be taken and attached along with this Permit
4. Ensue that workers and supervisors involved are trained & medical check-up done
5. This permit must be available at the work site all the times of the work.
6. Location and description of the work must be clearly indicated by the permittee.
7. Terms applicable must be clearly indicated by the permittee.
8. This permit shall be endorsed each day by the agency and BHEL only after checking compliance to all points. Any violations shall be resolved before proceeding.
9. Compliance to Permit conditions to be checked regularly by concerned execution department
10. Permit shall be issued for not more than **7 days** including the issue date.
11. Permit shall be returned to the HSE Department of BHEL after completion of the job and closed.
12. All additional safety precautions to be taken as per HSE Management System.

*(For system details, please refer HSEP12: HSE Procedure for Permit to Work)*

**Distribution**

**Original**- Permittee – At Site, **Duplicate** –Agency Department HOS, **Contractor**, Triplicate - Site HSE Dept.,

HSEP:12-FP9

| MATERIAL LOADING/ UNLOADING | Permit No. & Date |
|---|---|
| Project & Unit: | Emergency Contact Nos |
| Agency: | |

Exact Location of Work:_____

Nature / Description of Work:_____

_____

Duration of Work Execution *: From Date:_____to Date:_____Daily from _____ hrs. to _____hrs.

Name of Agency Performing the Work: _____

Name of Agency's Site Engineer (Permit Requesting Authority):_____Sign:_____
Name of Agency's Package In-charge:_____Sign:_____Date:_____

*The above described work will be done under all the safety precautions mentioned on this permit to work as under during the currency of the Permit*.

| No. | Item | Yes | Not required / Remarks |
|---|---|---|---|
| 1. | Sufficient Area has been provided for material unloading | | |
| 2. | Material loaded properly / Safety precautions taken – Unlashing can be undertaken. (In case loosening the material lashes could lead to material falling in uncontrolled manner) | | |
| 3. | Loading / Unloading Cranes, T&Ps are in order with valid TPI certificate. | | |
| 4. | Workers involved are properly trained and sensitized to the dangers | | |
| 5. | Crane operator is authorized. | | |
| 6. | Communication methodology between different gangs is in place. Communication gear (walkie-talkie sets etc.) provided where required | | |
| 7. | Adequate supervision is in order | | |
| 8. | Area barricaded including backside movement of crane. | | |
| 9. | Emergency response team & Medical Facilities available. | | |
| 10. | Work hazards are identified, controlled and communicated to the worker. | | |
| 11. | Method Statements/ Job Safety Analyses attached: | | |
| 12. | Other: | | |
| 13. | List of Other Permits Required for the Activity (Attached): | | |

**Declaration:**

***All the points mentioned in the above checklist have been checked and found OK.***

**Permit Receiver:**

| Site Engineer (Agency): | |
|---|---|
| Signature: | |
| Name: | Designation: |

| Site HSE Officer (Agency): | |
|---|---|
| Signature: | |
| Name: | Designation: |

**Permit Issuer:**

| Site Engineer (BHEL): | |
|---|---|
| Signature: | |
| Name: | Designation: |

| Site HSE Officer (BHEL): | |
|---|---|
| Signature: | |
| Name: | Designation: |

| Package-in-charge (BHEL): | |
|---|---|
| Signature: | |
| Name: | Designation: |

**(* Permit valid for 7 days, subject to daily renewal, and extension as per overleaf instructions / record formats)**

| Original: Permittee | | 2nd Copy: Agency Deptt. HOS | | 3rd Copy: BHEL Site HSE | |
|---|---|---|---|---|---|

Loading/Unloading Permit No. & Date: _____

**Daily Work Area Condition Endorsement**

| Sl. No. | Date | Signature with Date & Time | | | Remarks |
|---|---|---|---|---|---|
| | | Agency Site Engineer | Agency HSE Officer | BHEL HSE Officer | |
| Day 2 | | | | | |
| Day 3 | | | | | |
| Day 4 | | | | | |
| Day 5 | | | | | |
| Day 6 | | | | | |
| Day 7 | | | | | |

**Permit Extension Beyond Initially Requested Hours**

| Sl. No. | Extension Period | | Remarks | Signature with Date & Time | | | |
|---|---|---|---|---|---|---|---|
| | From……. (Date, Time) | To…… (Date, Time) | | Agency Site Engineer | Agency HSE Officer | BHEL Site Engineer (PIA) | BHEL HSE Officer |
| **1.** | | | | | | | |
| **2.** | | | | | | | |
| **3.** | | | | | | | |
| **4.** | | | | | | | |
| **5.** | | | | | | | |
| **6** | | | | | | | |

**Permit Closure After Work Completion**

| **Permit is here by returned after completing the job & ensuring safe removal of men and material.** | |
|---|---|
| **Site Engineer, Agency** | **Site HSE Officer, Agency** |
| Signature: | Signature: |
| Name: | Name: |
| **Verified the area is safe and Permit is Closed** | |
| **Site HSE Officer, BHEL** | **Site Engineer, BHEL** |
| Signature: | Signature: |
| Name: | Name: |

***General Instructions:***

1. Each Permit shall be given a unique number and recorded.
2. Method Statement & Job Safety Analysis for the critical tasks to be ensured by concerned engineers and attached
3. Any other Work Permits required for the task to be taken and attached along with this Permit
4. Ensue that workers and supervisors involved are trained & medical check-up done
5. This permit must be available at the work site all the times of the work.
6. Location and description of the work must be clearly indicated by the permittee.
7. Terms applicable must be clearly indicated by the permittee.
8. This permit shall be endorsed each day by the agency and BHEL only after checking compliance to all points. Any violations shall be resolved before proceeding.
9. Compliance to Permit conditions to be checked regularly by concerned execution department
10. Permit shall be issued for not more than **7 days** including the issue date.
11. Permit shall be returned to the HSE Department of BHEL after completion of the job and closed.
12. All additional safety precautions to be taken as per HSE Management System.

*(For system details, please refer HSEP12: HSE Procedure for Permit to Work)*

**Distribution**

**Original**- Permittee – At Site, **Duplicate** –Agency Department HOS, **Contractor**, Triplicate - Site HSE Dept.,

HSEP:12-FP10

| SAFETY FACILITY REMOVAL PERMIT | Permit No. & Date |
|---|---|
| Project & Unit: | Emergency Contact Nos |
| Agency: | |

Exact Location of Work:_____

Nature / Description of Work:_____

_____

Duration of Work Execution *: From Date:_____ to Date:_____ Daily from _____ hrs. to _____ hrs.

Name of Agency Performing the Work: _____

Name of Agency's Site Engineer (Permit Requesting Authority):_____ Sign:_____

Name of Agency's Package In-charge:_____ Sign:_____ Date:_____

*The above described work will be done under all the safety precautions mentioned on this permit to work as under during the currency of the Permit*.

| No. | Item | Yes | Not required / Remarks |
|---|---|---|---|
| 1. | Has the area been hard barricaded (tape/rope not to be used), to cordoned off area | | |
| 2. | Has signage been displayed to caution others of the hazard | | |
| 3. | Has proper illumination been arranged to ensure area is well lit as required | | |
| 4. | Are personal fall arrest systems being used around hole-opening as required? | | |
| 5. | Is a structurally solid hole-cover, marked with do not remove notice being used | | |
| 6. | Has the grating been properly installed with clamp/ nut & bolt/ welded | | |
| 7. | Emergency response team & Medical Facilities available. | | |
| 8. | Work hazards are identified, controlled and communicated to the worker. | | |
| 9. | Method Statements/ Job Safety Analyses attached: | | |
| 10. | Other: | | |
| 11. | List of Other Permits Required for the Activity (Attached): | | |

**Declaration:**

***All the points mentioned in the above checklist have been checked and found OK.***

**Permit Receiver:**

| Site Engineer (Agency): | | Site HSE Officer (Agency): | |
|---|---|---|---|
| Signature: | | Signature: | |
| Name: | Designation: | Name: | Designation: |

**Permit Issuer:**

| Site Engineer (BHEL): | | Site HSE Officer (BHEL): | |
|---|---|---|---|
| Signature: | | Signature: | |
| Name: | Designation: | Name: | Designation: |

| Package-in-charge (BHEL): | |
|---|---|
| Signature: | |
| Name: | Designation: |

**(* Permit valid for 7 days, subject to daily renewal, and extension as per overleaf instructions / record formats)**

| Original: Permittee | | 2nd Copy: Agency Deptt. HOS | | 3rd Copy: BHEL Site HSE | |
|---|---|---|---|---|---|

Safety Facility Removal Permit No. & Date: _____

## Daily Work Area Condition Endorsement

| Sl. No. | Date | Signature with Date & Time | | | Remarks |
|---|---|---|---|---|---|
| | | Agency Site Engineer | Agency HSE Officer | BHEL HSE Officer | |
| Day 2 | | | | | |
| Day 3 | | | | | |
| Day 4 | | | | | |
| Day 5 | | | | | |
| Day 6 | | | | | |
| Day 7 | | | | | |

## Permit Extension Beyond Initially Requested Hours

| Sl. No. | Extension Period | | Remarks | Signature with Date & Time | | | |
|---|---|---|---|---|---|---|---|
| | From……. (Date, Time) | To…… (Date, Time) | | Agency Site Engineer | Agency HSE Officer | BHEL Site Engineer (PIA) | BHEL HSE Officer |
| **1.** | | | | | | | |
| **2.** | | | | | | | |
| **3.** | | | | | | | |
| **4.** | | | | | | | |
| **5.** | | | | | | | |
| **6** | | | | | | | |

## Permit Closure After Work Completion

| **Permit is here by returned after completing the job & ensuring safe removal of men and material.** | |
|---|---|
| **Site Engineer, Agency** | **Site HSE Officer, Agency** |
| Signature: | Signature: |
| Name: | Name: |
| **Verified the area is safe and Permit is Closed** | |
| **Site HSE Officer, BHEL** | **Site Engineer, BHEL** |
| Signature: | Signature: |
| Name: | Name: |

***General Instructions:***

1. Each Permit shall be given a unique number and recorded.
2. Method Statement & Job Safety Analysis for the critical tasks to be ensured by concerned engineers and attached
3. Any other Work Permits required for the task to be taken and attached along with this Permit
4. Ensue that workers and supervisors involved are trained & medical check-up done
5. This permit must be available at the work site all the times of the work.
6. Location and description of the work must be clearly indicated by the permittee.
7. Terms applicable must be clearly indicated by the permittee.
8. This permit shall be endorsed each day by the agency and BHEL only after checking compliance to all points. Any violations shall be resolved before proceeding.
9. Compliance to Permit conditions to be checked regularly by concerned execution department
10. Permit shall be issued for not more than **7 days** including the issue date.
11. Permit shall be returned to the HSE Department of BHEL after completion of the job and closed.
12. All additional safety precautions to be taken as per HSE Management System.

*(For system details, please refer HSEP12: HSE Procedure for Permit to Work)*

**Distribution**

**Original**- Permittee – At Site, **Duplicate** –Agency Department HOS, **Contractor**, Triplicate - Site HSE Dept.

HSEP:12-FP11

| LOCKOUT TAG OUT WORK PERMIT | Permit No. & Date |
|---|---|
| Project & Unit: | Emergency Contact Nos |
| Agency: | |

Exact Location of Work: _____

Nature / Description of Work: _____

_____

Duration of Work Execution *: From Date: _____ to Date: _____ Daily from _____ hrs. to _____ hrs.

Name of Agency Performing the Work: _____

Name of Agency's Site Engineer (Permit Requesting Authority): _____ Sign: _____

Name of Agency's Package In-charge: _____ Sign: _____ Date: _____

*The above described work will be done under all the safety precautions mentioned on this permit to work as under during the currency of the Permit*.

The following precautions are to be taken:

| Tag No. | Device to be Tagged / Locked I.D. No. | Device Location | Device Position *OPEN / CLOSED - ON/OFF* | Lock No. | Tag Lock Placed by Name/Sign - Date/Time | | Tag/ Lock Removed by Name/Sign - Date/Time | |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | | |
| | | | | | | | | |
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| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

| Item | Yes | Not Required/ Remarks |
|---|---|---|
| Emergency response team & Medical Facilities available. | | |
| Work hazards are identified, controlled and communicated to the worker. | | |
| Method Statements/ Job Safety Analyses attached: | | |
| Other: | | |
| List of Other Permits Required for the Activity (Attached): | | |

**Declaration:**

***All the points mentioned in the above checklist have been checked and found OK.***

**Permit Receiver:**

| Site Engineer (Agency): | |
|---|---|
| Signature: | |
| Name: | Designation: |

| Site HSE Officer (Agency): | |
|---|---|
| Signature: | |
| Name: | Designation: |

**Permit Issuer:**

| Site Engineer (BHEL): | |
|---|---|
| Signature: | |
| Name: | Designation: |

| Site HSE Officer (BHEL): | |
|---|---|
| Signature: | |
| Name: | Designation: |

| Package-in-charge (BHEL): | |
|---|---|
| Signature: | |
| Name: | Designation: |

**(* Permit valid for 7 days, subject to daily renewal, and extension as per overleaf instructions / record formats)**

| Original: Permittee | | 2nd Copy: Agency Deptt. HOS | | 3rd Copy: BHEL Site HSE | |
|---|---|---|---|---|---|

Lockout Tagout Permit No. & Date:

## Daily Work Area Condition Endorsement

| Sl. No. | Date | Signature with Date & Time | | | Remarks |
|---|---|---|---|---|---|
| | | Agency Site Engineer | Agency HSE Officer | BHEL HSE Officer | |
| Day 2 | | | | | |
| Day 3 | | | | | |
| Day 4 | | | | | |
| Day 5 | | | | | |
| Day 6 | | | | | |
| Day 7 | | | | | |

## Permit Extension Beyond Initially Requested Hours

| Sl. No. | Extension Period | | Remarks | Signature with Date & Time | | | |
|---|---|---|---|---|---|---|---|
| | From……. (Date, Time) | To…… (Date, Time) | | Agency Site Engineer | Agency HSE Officer | BHEL Site Engineer (PIA) | BHEL HSE Officer |
| **1.** | | | | | | | |
| **2.** | | | | | | | |
| **3.** | | | | | | | |
| **4.** | | | | | | | |
| **5.** | | | | | | | |
| **6** | | | | | | | |

## Permit Closure After Work Completion

| **Permit is here by returned after completing the job & ensuring safe removal of men and material.** | |
|---|---|
| **Site Engineer, Agency** | **Site HSE Officer, Agency** |
| Signature: | Signature: |
| Name: | Name: |
| **Verified the area is safe and Permit is Closed** | |
| **Site HSE Officer, BHEL** | **Site Engineer, BHEL** |
| Signature: | Signature: |
| Name: | Name: |

***General Instructions:***

1. Each Permit shall be given a unique number and recorded.
2. Method Statement & Job Safety Analysis for the critical tasks to be ensured by concerned engineers and attached
3. Any other Work Permits required for the task to be taken and attached along with this Permit
4. Ensue that workers and supervisors involved are trained & medical check-up done
5. This permit must be available at the work site all the times of the work.
6. Location and description of the work must be clearly indicated by the permittee.
7. Terms applicable must be clearly indicated by the permittee.
8. This permit shall be endorsed each day by the agency and BHEL only after checking compliance to all points. Any violations shall be resolved before proceeding.
9. Compliance to Permit conditions to be checked regularly by concerned execution department
10. Permit shall be issued for not more than **7 days** including the issue date.
11. Permit shall be returned to the HSE Department of BHEL after completion of the job and closed.
12. All additional safety precautions to be taken as per HSE Management System.

***(For system details, please refer HSEP12: HSE Procedure for Permit to Work)***

**Distribution**

**Original**- Permittee – At Site, **Duplicate** –Agency Department HOS, **Contractor**, Triplicate - Site HSE Dept.,

HSEP:12-FP12

| BEAM / TRUSS/ DUCT/ STRUCTURE ALIGNMENT PERMIT | Permit No. & Date |
|---|---|
| Project & Unit: | Emergency Contact Nos: |
| Agency: | |

Exact Location of Work:_____

Nature / Description of Work:_____

_____

Duration of Work Execution *: From Date:_____to Date:_____Daily from _____ hrs. to _____hrs.

Name of Agency Performing the Work: _____

Name of Agency's Site Engineer (Permit Requesting Authority):_____Sign:_____

Name of Agency's Package In-charge:_____Sign:_____Date:_____

*The above described work will be done under all the safety precautions mentioned on this permit to work as under during the currency of the Permit*.

| No. | Item | Yes | Not required / Remarks |
|---|---|---|---|
| 1. | Is the alignment procedure & Plan submitted, checked and verified safe (Please attach plan along with drawing, location & capacities of lifting tools & tackles) | | |
| 2. | Are all lifting tools & tackles, equipment tested and with valid serial numbers traceable to valid certificates | | |
| 3. | Ensured that (for load above 5 Ton) chain pulley blocks will not be used to bear full load of the hanging structure and will only be used for lateral movement. Either Winches, Leashing, Structural supports or similar arrangement will be used for hanging the load | | |
| 4. | Ensure that area below is cordoned off and barricaded | | |
| 5. | Ensured that all the workers working on the load (if any): (check whichever is applicable)<br>a. have double lanyard safety harnesses which are hooked to a lifeline anchored with rigid structure independent of the hanging load<br>b. have retractable fall arrestors, which are hooked to a lifeline anchored with rigid structure independent of the hanging load | | |
| 6. | Other Permits (Height Work, Hot Work etc. are ensured) | | |
| 7. | All necessary PPEs to be ensured | | |
| 8. | List of associated workers attached | | |
| 9. | Emergency response team & Medical Facilities available. | | |
| 10. | Work hazards are identified, controlled and communicated to the worker. | | |
| 11. | Method Statements/ Job Safety Analyses attached: | | |
| 12. | Other: | | |
| 13. | List of Other Permits Required for the Activity (Attached): | | |

**Declaration:**

***All the points mentioned in the above checklist have been checked and found OK.***

**Permit Receiver:**

| Site Engineer (Agency): | |
|---|---|
| Signature: | |
| Name: | Designation: |

| Site HSE Officer (Agency): | |
|---|---|
| Signature: | |
| Name: | Designation: |

**Permit Issuer:**

| Site Engineer (BHEL): | |
|---|---|
| Signature: | |
| Name: | Designation: |

| Site HSE Officer (BHEL): | |
|---|---|
| Signature: | |
| Name: | Designation: |

| Package-in-charge (BHEL): | |
|---|---|
| Signature: | |
| Name: | Designation: |

**(* Permit valid for 7 days, subject to daily renewal, and extension as per overleaf instructions / record formats)**

| Original: Permittee | | 2nd Copy: Agency Deptt. HOS | | 3rd Copy: BHEL Site HSE | |
|---|---|---|---|---|---|

Alignment Permit No. & Date: _____

**Daily Work Area Condition Endorsement**

| Sl. No. | Date | Signature with Date & Time | | | Remarks |
|---|---|---|---|---|---|
| | | Agency Site Engineer | Agency HSE Officer | BHEL HSE Officer | |
| Day 2 | | | | | |
| Day 3 | | | | | |
| Day 4 | | | | | |
| Day 5 | | | | | |
| Day 6 | | | | | |
| Day 7 | | | | | |

**Permit Extension Beyond Initially Requested Hours**

| Sl. No. | Extension Period | | Remarks | Signature with Date & Time | | | |
|---|---|---|---|---|---|---|---|
| | From……. (Date, Time) | To…… (Date, Time) | | Agency Site Engineer | Agency HSE Officer | BHEL Site Engineer (PIA) | BHEL HSE Officer |
| **1.** | | | | | | | |
| **2.** | | | | | | | |
| **3.** | | | | | | | |
| **4.** | | | | | | | |
| **5.** | | | | | | | |
| **6** | | | | | | | |

**Permit Closure After Work Completion**

| **Permit is here by returned after completing the job & ensuring safe removal of men and material.** | |
|---|---|
| **Site Engineer, Agency** | **Site HSE Officer, Agency** |
| Signature: | Signature: |
| Name: | Name: |
| **Verified the area is safe and Permit is Closed** | |
| **Site HSE Officer, BHEL** | **Site Engineer, BHEL** |
| Signature: | Signature: |
| Name: | Name: |

***General Instructions:***

1. Each Permit shall be given a unique number and recorded.
2. Method Statement & Job Safety Analysis for the critical tasks to be ensured by concerned engineers and attached
3. Any other Work Permits required for the task to be taken and attached along with this Permit
4. Ensue that workers and supervisors involved are trained & medical check-up done
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7. Terms applicable must be clearly indicated by the permittee.
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12. All additional safety precautions to be taken as per HSE Management System.

*(For system details, please refer HSEP12: HSE Procedure for Permit to Work)*

**Distribution**

**Original**- Permittee – At Site, **Duplicate** –Agency Department HOS, **Contractor**, Triplicate - Site HSE Dept.

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BHEL