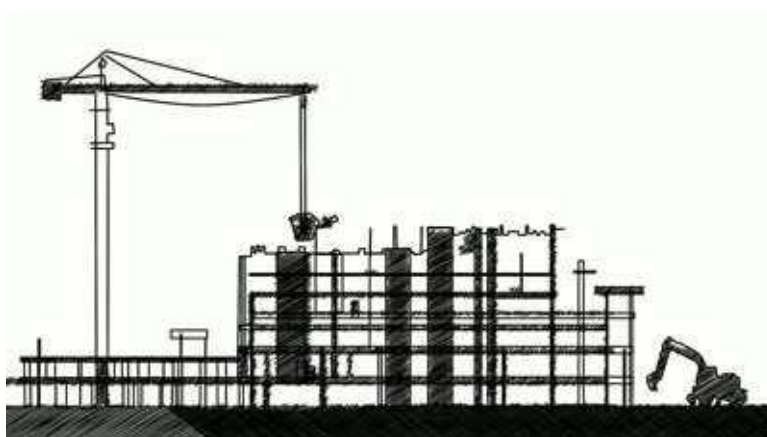




HEALTH, SAFETY and ENVIRONMENT PLAN

**for
SITE
OPERATIONS**

**INDUSTRIAL
SYSTEMS GROUP**

 ISG	HEALTH, SAFETY AND ENVIRONMENT PLAN FOR SITE OPERATIONS	Doc. No.: HSEP:13 Rev.: 01
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1.0 PURPOSE

- 1.1** The purpose of this HSE Plan is to provide for the systematic 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 BHEL as well as BHEL's Sub-Contractors at all installation and servicing sites. In case customer specific documents are to be implemented, the same will be followed in conjunction with this document.
- 1.3** Although every effort has been made to make the procedures and guidelines in line with statutory requirements, in case of any discrepancy relevant statutory guidelines must be followed.

2.0 SCOPE

The document is applicable for installation / servicing activities of BHEL Industrial systems Group as per the relevant contractual obligations.

3.0 OBJECTIVES

The HSE Plan reflects that BHEL places high priority upon the Occupational Health, Safety and Environment at workplaces. BHEL and all sub-contractors are committed to:

- Ensure the Health and Safety of all persons at work site is not adversely affected by the work.
- Ensure protection of environment of the work site.
- Comply at all times with the relevant statutory and contractual HSE requirements.
- Provide trained, experienced and competent personnel. Ensure medically fit personnel only are engaged at work.
- Provide and maintain plant, places and systems of work that are safe and without risk to health and the environment.
- Provide all personnel with adequate information, instruction, training and supervision.
- Effectively control, co-ordinate and monitor the activities of all personnel on the Project sites including contractors in respects of HSE.
- Establish effective communication on HSE matters with all relevant parties involved in the Project works.
- Ensure that all work planning takes into account all persons that may be affected by the work.
- Ensure fitness testing of all T&Ps. Lifting appliances like cranes, chain pulley blocks etc. are to be certified by competent authority.
- Ensure timely provision of resources to facilitate effective implementation of HSE requirements.



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- Ensure continual improvements in HSE performance
- Ensure conservation of resources and reduction of wastage.
- Capture the data of all incidents including near misses, process deviation etc. Investigate and analyze the same to find out the root cause.
- Ensure timely implementation of correction, corrective action.

Goals and Targets –

- To achieve “Zero Incident at Site”
- 100% compliance of all legal/statutory requirements related to EHS.
- 100% Health, Safety and Environmental Induction training attendance for all employees and sub-contractors.
- 100% High Risk activities to be carried out only after approved Method Statement, HIRA/JSA and Permit to Work are implemented.
- 100% PPEs compliance in high and medium risk activities.
- 100% incident reporting, recording and reviewing for corrective actions.
- A monthly review shall be scheduled and conducted to assess HSE program compliance and to close any recognized gaps to improve safety management and incident prevention.

4.0 REFERENCES

- Contract documents
- Relevant legislations
- HSE Management System Manual
- HSE Procedures:

Table 4.1 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



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- Relevant Indian standards as listed below (illustrative list)

Table 4.2 List of Relevant IS Codes

Sl. No	Code Name	Title
1	IS: 818-1888 (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:2925 – 1984 (Reaffirmed 2010)	Specification for Industrial Safety Helmets
5	IS:3521: 1999 (Reaffirmed 2002)	Industrial Safety Belts & Harnesses-Specification
6	IS:3646(Part II) – 1966(Reaffirmed 2003)	Code of Practice for Interior Illumination
7	IS:3696 (Part I) – 1987 (Reaffirmed 2002)	Safety Code for Scaffolds and Ladders
8	IS: 3696(Part 2) : 1991 (Reaffirmed 2002)	Scaffolds and Ladders-Code of Safety
9	IS:3786 – 1983 (Reaffirmed 2002)	Method for Computation of Frequency and Severity Rates for Industrial Injuries and Classification of Industrial Accidents
10	IS:4770: 1991 (Reaffirmed 2006)	Rubber Gloves – Electricals purposes-Specification
11	IS:4912: 1978 (Reaffirmed 2002)	Safety Requirements for Floor and Wall Openings, Railings and Toe Boards
12	IS: 5983 – 1980 (Reaffirmed 2002)	Specification for Eye-Protectors
13	IS:6519 – 1971 (Reaffirmed 1997)	Code of Practice for Selection, Care and Repair of Safety Footwear
14	IS:9167:1979	Specification for Ear-Protectors
15	IS:6994(Part I)-1973 (Re affirmed 1996)	Specification for Industrial Safety Gloves Leather and Cotton Gloves
16	IS:8519 – 1977 (Reaffirmed 1983)	Guide for Selection of Industrial Safety Equipment for Body Protection.
17	IS 11006 : 2011	Flash Back(Flame Arrestor) Specification



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18	IS:8520 – 1977 (Reaffirmed 2002)	Guide for Selection of Industrial Safety Equipment for Eye, Face and Ear Protection.
19	IS:9473:2002	Respiratory Protective Devices-Filtering Half Masks to protect against Particles-Specification.
20	IS: 9944:1992 (Reaffirmed 2003)	Natural and Man-made Fiber Rope Slings-Recommendations on Safe working loads.
21	IS:11057 – 1884 (Reaffirmed 2001)	Specification for Industrial Safety Nets
22	IS: 12254:1993 (Reaffirmed 2002)	Polyvinyl Chloride (PVC) Industrial Boots-Specification
23	IS:13367(Part 1):1992 (Reaffirmed 20030)	Safe Use of Cranes-Code of Practice
24	IS: 14166:1994 (Reaffirmed 2002)	Respiratory Protective Devices-Full Face Masks Specification
25	IS:14746: 1999 (Reaffirmed 2003)	Respiratory Protective Devices-Half Masks and Quarter Masks - Specification
26	IS: 15397 :2003 (Reaffirmed 2008)	Portable Extinguisher Mechanical Foam Type(Stored Pressure)-Specification
27	IS: 19011:2002	Guidelines for Quality and/or Environmental Management Systems Auditing
28	IS: 3764:1992	Excavation Work – Code of Safety
29	IS.4014.2.1967	Steel tubular Scaffolding
30	IS.6549.1972	Glossary of terms used for Lifting tackles
31	IS.7215.1974	Steel Structure Fabrication
32	IS.7969.1975	Handling and storage of building material
33	IS.818.1968	Electric and Gas Welding & Cutting Operations



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5.0 HEALTH, SAFETY & ENVIRONMENT POLICY

Industrial systems Group HSE Policy

We, at BHEL Industrial systems Group, reaffirm our belief that the Health and Safety of our stakeholders and conservation of Environment is of utmost importance takes precedence in all our business decisions. In pursuit of this belief and commitment, we strive to:

- ✓ Ensure total compliance with applicable legislation, regulations and other requirements concerning occupational health, safety and environment.
- ✓ Prevent injury and ill-health of all employees & contract workers across all operations
- ✓ Prevent damage to environment across all operations
- ✓ Ensure continual improvement in the occupational health, safety and environment Management system performance.
- ✓ Enhance occupational health, safety and environment awareness amongst employees, customers and suppliers by proactive communication and training.
- ✓ Review periodically and improve occupational health, safety and environment Management system to ensure its continuing suitability, adequacy and effectiveness in a continuously changing business environment.
- ✓ Develop a culture of safety through active leadership and provide appropriate training at all levels to enable employees to fulfil their Health, Safety and Environmental obligations.
- ✓ Incorporate appropriate Occupational Health, Safety and Environmental criteria into business decisions for selection of plant, technology and services as well as appointment of key personnel.
- ✓ Ensure availability at all times of appropriate resources to fully implement the Occupational Health, Safety and Environmental policy of the company.

This policy will be communicated to all employees and made available to interested parties.

(ISG HSE)



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6.0 TERMS AND DEFINITIONS

6.1 DEFINITIONS

6.1.1 INCIDENT

Work- related event(s) in which an injury or ill health (regardless of severity) or fatality occurred, or could have occurred.

6.1.2 NEAR MISS

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 incident".

6.1.3 MAN-HOURS WORKED

The total number of employee hours worked by all employees including subcontractors working in the premises. It includes managerial, supervisory, professional, technical, clerical and other workers including contract laborers. 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 workday 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.

6.1.4 FIRST AID CASES

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.

6.1.5 LOST TIME INJURY

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.

6.1.6 MEDICAL CASES

Medical cases come under non-reportable cases, where owing to illness or other reason the employee was absent from work and seeks Medical treatment.



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6.1.7 TYPE OF INCIDENT / ACCIDENT & THEIR REPORTING:

The three categories of Incident / accident are as follows:

Non-Reportable Cases:

An accident, where the injured person is given medical help and discharged for work without counting any lost time.

Reportable Cases:

In this case the injured person is disable for 48 hours or more and is not able to perform his duty.

Injury Cases:

These are covered under the heading of non-reportable cases. In these cases, the accident caused injury to the person, but he still continues his duty.

6.1.8 TOTAL REPORTABLE FREQUENCY RATE

Frequency rate is the number of Reportable Lost Time Injury (LTI) per one Million Man hours worked. Mathematically, the formula read as:

$$\frac{\text{Number of Reportable LTI}}{\text{Total Man Hours Worked}} \times 1,000,000$$

6.1.9 SEVERITY RATE

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:

$$\frac{\text{Days lost due to LTI}}{\text{Total Man Hours Worked}} \times 1,000,000$$

6.1.10 INCIDENCE RATE

Incidence Rate is the Number of LTI per one thousand manpower deployed. Mathematically, the formula reads as:

$$\frac{\text{Number of LTI} \times 1000}{\text{Average number of manpower deployed}}$$



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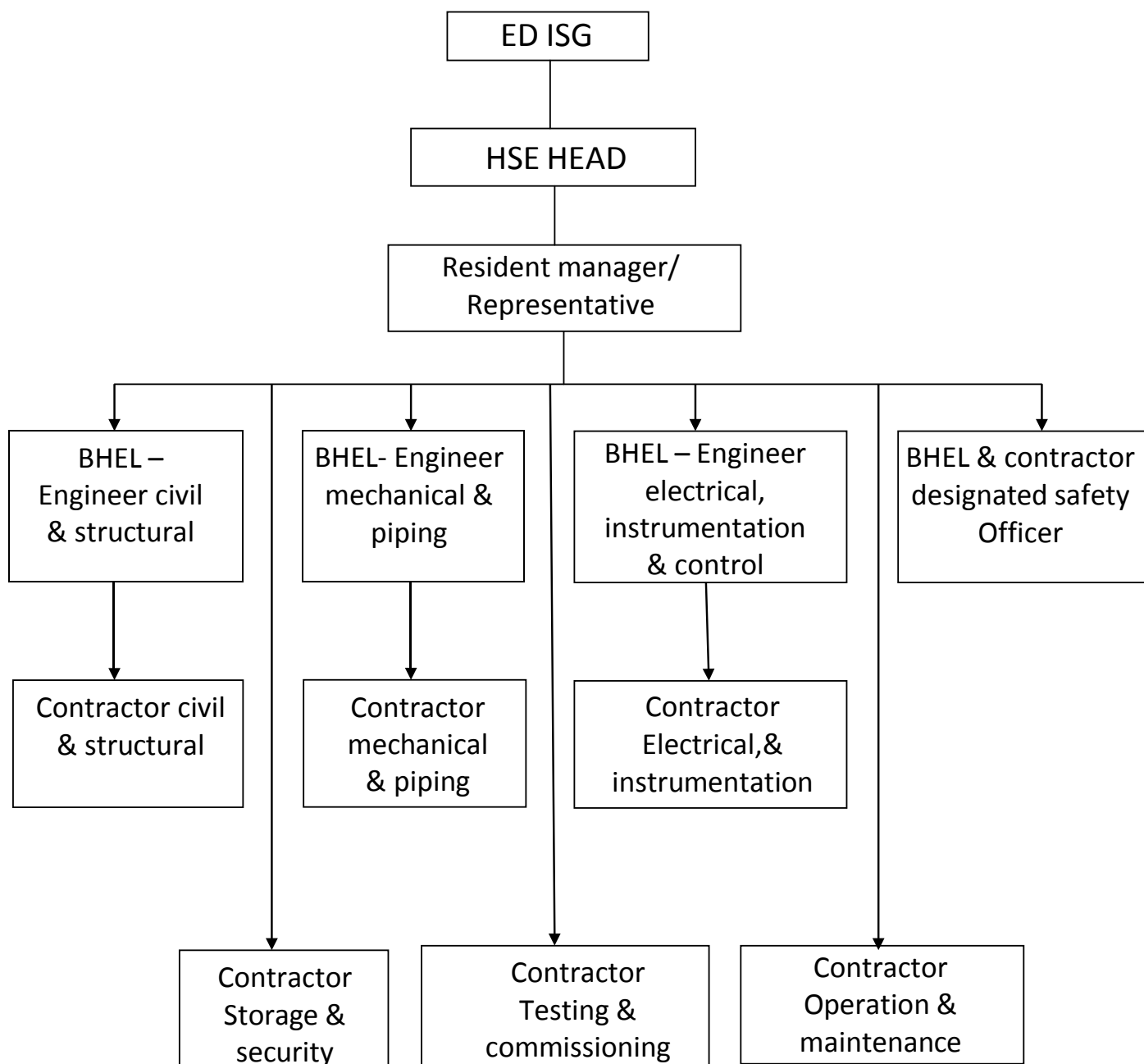
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7.0 HSE ORGANISATION

7.1 ORGANIZATION CHART





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7.2 COMPETENCY MATRIX FOR HSE PERSONNEL

Sl.no	Designation	Qualification	Experience
1	HSE Coordinator	Degree or Diploma in Engineering with at least 2 Days HSE Training from a reputed institute like RLI, CLI or a BHEL manufacturing unit.	Minimum two years
2	HSE officer (BHEL/Construction Agency)	Degree or Diploma in Engineering with full time diploma in Industrial Safety	Minimum two years for degree holder and five years for diploma holder

Depending on the project size and scope, posting of above HSE personnel will be decided by Head (HSE) of the region.

7.3 RESPONSIBILITIES

7.3.0 General Responsibilities:

1. To be aware of and ensure implementation of all Systems and Procedures of HSE Management Systems and Procedures:
 - To ensure implementation of Work Permit System
 - To ensure implementation of HSE Procedure for OHS Hazards & Risks, and HSE Procedure for Environmental Aspects & Impacts
 - To ensure implementation of Operational Control Procedures (OCPs)
 - To ensure implementation of Penalty System
 - To ensure implementation of Training Programmes and provide infrastructure and manpower for the same
 - To ensure effective implementation of Emergency Preparedness Response Plans
2. To ensure implementation of contractual HSE requirements by all subcontractors
3. To ensure that all site employees follow the HSE Systems and Procedures



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7.3.1 BHEL SITE IN-CHARGE

- To appoint HSE Coordinators.
- To chair monthly site HSE review Meetings.
- To define roles and responsibilities of the employees under their control with respect to HSE Management System implementation.
- To coordinate with MR for setting HSE objectives and targets in BSC.
- To formulate detailed schedule of activities for implementation of HSE programs.
- To implement Operational Control Procedures (OCPs).
- To arrange resources for implementation of HSE programs.
- To identify and arrange for provision of required training to employees as well as suppliers/ contractors.
- To ensure investigation into any significant incident or safety lapse.
- To ensure basic infrastructure for HSE officials and for carrying out HSE training programmes.
- To ensure corrective action for non- conformities / observations.
- To generate HSE performance reports and forwarding the same to MR.
- To communicate the feedback received from interested parties to MR and vice versa.
- To communicate to suppliers / contractors regarding HSE issues pertaining to the activities / services provided by suppliers / contractors and to ensure their training, if required.
- To ensure effective implementation of Emergency Preparedness Response Plans and periodical mock drills.
- To facilitate HSE promotion.

7.3.2 HEALTH, SAFETY AND ENVIRONMENT CO-ORDINATOR/ OFFICER

- Carry out safety inspection of Work Area, Work Method, Men, Machine & Material, P&M and other tools and tackles.
- Facilitate inclusion of safety elements into Work Method Statement.
- Highlight the requirements of safety through Tool-box / other meetings.
- Help concerned HOS to prepare Job Specific instructions for critical jobs.
- Conduct investigation of all accident/dangerous occurrences & recommend appropriate safety measures.
- Advice & co-ordinate for implementation of HSE permit systems, OCPs & MPs.
- Convene HSE meeting & minute the proceeding for circulation & follow-up action.
- Plan procurement of PPE & Safety devices and inspect their healthiness.
- Report to ISG Region/HQ on all matters pertaining to status of safety and promotional program at site level.
- Facilitate administration of First Aid
- Facilitate screening of workmen and safety induction.
- Conduct fire Drill and facilitate emergency preparedness
- Design campaigns, competitions & other special emphasis programs to promote safety in the workplace.
- Apprise ISG-Region/HQ on safety related problems.
- Deploy safety wardens suitably.
- Notify site personnel non-conformance to safety norms observed during site visits / site inspections.
- 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.



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- To decline acceptance of such PPE / safety equipment that do not conform to specified requirements.
- Encourage raising Near Miss Report on safety along with, improvement initiatives on safety.
- Shall work as interface between various agencies such customer, package-in-charges, sub-contractors on HSE matters

7.3.3 SECTION IN-CHARGE (RESPECTIVE PACKAGE IN CHARGE)

- Shall report to Construction Manager.
- Shall demonstrate the personal commitment of his subordinates towards implementation of HSE targets.
- Shall implement the requirements of the client and company safety policy and the HSE Plan.
- Shall manage supervisory structure within their respective sections to ensure that the detailed requirements of Health Safety and Environment Policy of the Customer/ Company is understood and implemented by all personnel engaged in their respective area of operation.
- Shall ensure that the persons working under him shall be competent to maintain the Safety Standards at their site.
- Shall continuously review HSE performance within his sections to ensure that performance targets are being achieved.
- Shall ensure that Induction Training and Tool Box talks are conducted at his site regularly.
- Shall conduct periodic HSE inspection and mock-drill.
- Shall ensure that specific Risk Assessments conducted by trained and competent personnel at the appropriate time and that the resultant control measures are communicated to the persons responsible for supervising and executing the work.
- Shall ensure that all management and supervisory personnel engaged within his section conduct routine HSE surveillance.



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7.3.4 ALL EMPLOYEES

- To adopt safe working practices wherever they are undergoing.
- To take corrective action actions in case any non-conformity is observed on product / process / system with respect to Occupational Health, Safety and Environment.
- To report all incidents including near miss to HSE officer or HSE coordinator (Site) / HOD (SOX).
- In case any particular activity / work has extremely high consequential risk or high environmental impact, the employee shall bring it to the notice of Site In charge before starting the work.
- To ensure that the workers are engaged by the contractor for the job after undergoing induction training.
- To ensure that the persons engaged in his area follow the safety rules like using appropriate PPEs.
- To get involved in exercises like Job Safety Analysis and Work Permit System.
- To engage licensed electricians for site electrical works.
- To report any incident including near misses or safety lapses immediately to safety officer/HSE coordinator/RCM.
- To interfere/ stop work as & when identified unsafe.
- To maintain & promote improved level of house-keeping all the time at site.
- To support/co-operate with audit team members as & when safety audits are carried out.
- To involve in investigation, if any incident occurs in his work area.
- To participate in safety promotional programmes.
- To attend the safety committee meeting, if he is a member/ invitee
- To ensure that only fit T&Ps and qualified persons are engaged.



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7.3.5 SITE IN -CHARGE OF SUBCONTRACTOR

- Shall fill-up agreement form for compliance to BHEL's HSE Plan for Site Operations.
- Shall ensure fulfillment of HSE requirements of BHEL contract as given in chapter IX of SCC.
- Shall engage qualified safety officer(s) as per contract.
- 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.
- Shall screen all workmen for health and competence requirement before engaging for the job and periodically thereafter as required.
- Shall not engage any employee below 18 years.
- Shall arrange for all necessary PPEs like safety helmets, belts, full body harness, shoes, face shield, hand gloves etc. before starting the job. Shall ensure that no working men/women carry excessive weight more than stipulated in Factory Rule Regulation R57.
- Shall ensure that all T&Ps engaged are tested for fitness and have valid certificates from competent authorities.
- Shall ensure that provisions stipulated in contract Labor Regulation Act 1970, Chapter V C.9, canteen, rest rooms/washing facilities to contracted employees at site.
- Shall adhere to the instructions laid down in Operation Control Procedures (OCPs).
- Shall ensure that person working above 2.0 meter should use Safety Harness tied to a life line/stable structure.
- Shall ensure that materials are not thrown from height. Cautions to be exercised to prevent fall of material from height.
- Shall report all incidents (Fatal/Major/Minor/Near Miss) to the Site engineer /HSE officer of BHEL.
- Shall ensure that Horseplay is strictly forbidden.
- Shall ensure that adequate illumination is arranged during night work.
- Shall ensure that all personnel working under subcontractor are working safely and do not create any Hazard to self and to others.
- Shall ensure display of adequate signage/posters on HSE.
- Shall ensure that mobile phone is not used by workers while working.



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- Shall ensure conductance of HSE audit, mock drill, medical camps, induction training and training on HSE at site.
- Shall ensure full co-operation during HQ/External /Customer HSE audits.
- Shall ensure submission of look-ahead plan for procurement of HSE equipment's and PPEs as per work schedule.
- Shall ensure good housekeeping.
- Shall ensure adequate valid fire extinguishers are provided at the work site.
- Shall ensure availability of sufficient number of toilets /restrooms and adequate drinking water at work site and labor colony.
- Shall ensure adequate emergency preparedness
- Site In-charge also involve in the induction training so as to share knowledge of some incident and guide the worker to perform work safely.
- Site In-charge is responsible for the Load test certificate and renewal timely of all machinery (winches/crane/hydra/tools/equipment so on.)

7.3.6 SITE HSE COMMITTEE

- Site HSE committee shall consist of Construction Manager (Chairman), Site HSE coordinator (Secretary/Convener), HOS (Member), Site In charge of Subcontractors (Member) and Safety officer of Subcontractors (Member).
- 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.
- Shall meet monthly and as and when required, to discuss ways and means to eliminate unsafe acts/condition.
- Shall monitor the performance of the HSE programs and suggest improvements as required.
- Shall discuss exception points relating to HSE Audits, sub-contractors HSE practices, incident reports, near miss reports, etc.
- 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.
- Shall inspect the site on regular intervals to locate unsafe conditions with reference to the inspection checklist.
- Shall investigate all accidents and strengthening the safety programme by additional precautions, if any based on the accident investigate.



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8.0 PLANNING

A. Identifying Hazards / Risks & Aspects / Impacts and implementing control measures

- All applicable OHS Hazards and Risks applicable to all activities of the project to be identified as per HSEP01: HSE Procedure for OHS Hazards and Risks, and control measures to be planned and implemented.
- All applicable Environmental Aspects and Impacts applicable to all activities of the project to be identified as per HSEP02: HSE Procedure for Environmental Aspects and Impacts, and control measures to be planned and implemented.

These assessments are to be carried in each area of operation

B. Register of Regulations:

A register of applicable rules and regulations to be prepared as per HSEP03: HSE Procedure for Register of Regulations and compliance ensured.

8.1 MOBILISATION OF MACHINERY/EQUIPMENT/TOOLS

- 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 complies with legislative and owner requirement, inspection shall be arranged by in-house competent authority for acceptance as applicable.
- The machinery and equipment to be embraced for this purpose shall include but not limited to the following:

- Mobile cranes.
- Side Booms.
- Forklifts.
- Grinding machine.
- Drilling machine.
- Air compressors.
- Welding machine.
- Batching Plants

- Generator sets.
- Dump Trucks.
- Excavators.
- Dozers
- Grit Blasting Equipment.
- Hand tools.
- Sky Climbers
- Lifts
- Etc.

8.1.1 AVAILABILITY OF HSE TOOLS & EQUIPMENT: HSE related tools and measurement equipment as detailed in **Annexure-D** shall be ensured as per requirement

8.2 MOBILISATION OF MANPOWER

- As a measure to ensure that manpower being mobilized to the construction site is fit and competent for safe working, screening arrangement shall be made by the sub-contractors to fulfill contractual as well as legislative requirement.
 - Examination of medical fitness shall be conducted through qualified medical professional for all workers to be deployed. **(Format No. HSEP13:F02)**
 - Induction training of all workers to be ensured as per clause 9.1 **(Format No. HSEP13:F03)**
 - Only after completion of induction training and medical checkup, permanent gate passes to be issued to the workers
- Appropriate accommodation to be arranged for all workmen in hygienic condition.
- System for Issue of Gate Passes to authorized personnel only shall be ensured at site

8.3 PROVISION OF PPEs

The following matrix recommends usage of minimum PPEs against the respective job. The PPEs shall conform to the relevant standards as listed in the reference under clause 4.0 and bear ISI mark. All the PPEs shall be checked for quality before issue and the same shall be periodically checked. The users shall be advised to check the PPEs themselves for any defect before putting on. The defective ones shall be repaired/ replaced. The issuing agency shall maintain register for issue and receipt of PPEs (Format No. **HSEP:13-F18**). The Helmets shall have logo or name (abbreviation of agency name permitted) affixed or printed on the front. The body harnesses shall be serial numbered. Specific OCPs shall be followed for exact PPEs required.

Sl. No	Type of work	Suggested 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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Besides the PPEs mentioned above, the persons shall use helmet and safety shoe at all times. The visitors shall use Helmet and any other PPEs as deemed appropriate for the area of work.

Color scheme for Helmets:

1. Workmen: Yellow
2. Safety staff: Green or white with green band
3. Electrician: Red
4. Others including visitors: White

Apart from these PPEs, any other PPEs as required shall be issued to ensure safe work.

Corporate Standard PPE Specification Manual shall be referred for detailed specifications

8.4 ARRANGEMENT OF INFRASTRUCTURE

8.4.1 DRINKING WATER

- Drinking water shall be provided and maintained at suitable places at different elevations.
- Container should be labeled as "Drinking Water"
- Cleaning of the drinking water storage tank shall be ensured at least once in a week indicating date of cleaning and next due date. Mild cleaning detergents as used for cleaning vessels shall be applied and scrubbers (3M or equivalent) shall be used for removing scales and deposits on the inside surface. The tank shall be thoroughly cleaned with potable water only before it is refilled (Applicable to labor colony as well).
- Suitability of the water source should be tested as per IS10500 at least once in a year.

8.4.2 WASHING FACILITIES

- In every workplace, adequate and suitable facilities for washing shall be provided and maintained.
- 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.
- If water used for washing is not potable, it shall be marked "Do Not Drink" in English, Hindi and local language (Applicable to labor colony as well).

8.4.3 LATRINES AND URINALS

- Latrines and urinals shall be ensured in every work place at site based on strength of workmen. The availability of Toilets (Latrines, Urinals) shall be ensured at every workplace (Boiler, Turbine, ESP etc. (Applicable to labor colony as well).
(Refer **Rule No. 243 of BOCW Central rules 1998**)
- Urinals shall also be provided at different elevations in all structures including Boiler, TG etc. They shall be adequately lighted and shall be maintained in a clean and sanitary condition at all times, by appointing designated person.
- The drainage from the urinals shall be ensured so that there is no contact with structure and disposal should be environmentally friendly
- Separate facilities shall be provided for the use of male and female worker if required.
- Hand-wash facility shall be provided with clean water and soap

8.4.4 PROVISION OF SHELTER DURING REST

Proper Shed and Shelter big enough to accommodate all possible workers shall be provided for workers to rest during break. Taking rest at height and hazardous locations shall not be allowed.

8.4.5 MEDICAL FACILITIES

8.4.5.1 MEDICAL CENTRE

(Refer Schedule V, X and XI of BOCW central Rules, 1998)

- A medical center shall be setup at site with basic facilities for handling medical emergencies as per contract.
- A qualified medical professional, not less than MBBS, (Refer per Schedule XI of BOCW Central Rules 1998) shall be deployed.
- Ambulance as stipulated in the contract shall be deployed along with a trained driver and accessories as per Schedule V of BOCW Central Rules, 1998. Ambulance shall be utilized exclusively for transporting the accident victim in case the travel distance to hospital is more than 2 KM or extent of injuries is severe.
- Ambulance drivers shall be regularly trained in First Aid.
- Medical waste shall be disposed as per prevailing legislation (Bio-Medical Waste – Management and Handling Rules, 1998). Format No. **HSEP:13-F19** and **F20** shall be used for the purpose

8.4.5.2 FIRST AIDER

- Ensure availability of Qualified First-aider throughout the working hours.
- Every injury shall be treated, recorded and reported.
- Refresher course on first aid shall be conducted as necessary.
- List of qualified first aiders and their contact numbers to be displayed at conspicuous places.



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8.4.5.3 FIRST AID BOX

- First aid box key should be put on proper place or available with responsible person for misuse of medicine
- The subcontractor shall provide necessary first aid facilities. At every work place first aid facilities shall be provided and maintained.
- 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.
- The first aid box shall be distinctly marked with a Green Cross on white background. 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.
- Details of contents of first aid box is given in **Annexure No. 01**
- The subcontractor shall ensure that the Supervisors and Engineers are adequately trained for attending to any emergency.
- Monthly inspection of First Aid Box shall be carried out by the owner as per **format no. HSEP:13-F01**
- A slip of contents of the First Aid Box with following details:
Name, Quantity, Expiry Date, Checked by...

8.4.5.4 HEALTH CHECK UP

The persons engaged at the site shall undergo health checkup as per the **format no. HSEP:13-F02** before induction. The persons engaged in the following works shall undergo regular health checkup at least once in a year:

- a. Height workers
- b. Drivers/crane operators/riggers
- c. Confined space workers
- d. Shot/sand blaster
- e. Welding and NDE personnel

8.4.5.5 VERTIGO TEST

The persons engaged in working at heights (above 2 meters) to be assessed for Vertigo and associated conditions by using a Vertigo Testing Structure (For specifications, see **Annexure-D**) Such workers are to be allowed only on clearing this test, otherwise they shall be allocated ground based jobs.

For all workers at height all PPEs and safety arrangements to be ensured.



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8.4.6 PROVISION OF CANTEEN FACILITY

Minimum or better facilities to be ensured as per BOCW (Rule 244) / Factories Act

- Canteen facilities shall be provided for the workmen of the project inside the project site.
- Proper cleaning and hygienic condition shall be maintained.
- Proper care should be taken to prevent biological contamination.
- Adequate drinking water should be available at canteen.
- Fire extinguisher shall be provided inside canteen.
- Regular health check-up and medication to the canteen workers shall be ensured.

8.4.7 PROVISION OF ACCOMODATION/LABOR COLONY

(Reference to BOCW Act, S. No. 34)

- The subcontractor shall arrange for the accommodation of workmen at nearby houses or by making a labor colony.
- Regular housekeeping of the labor colony shall be ensured.
- Proper sanitation and hygienic conditions to be maintained.
- Drinking water and electricity to be provided at the labor colony. Water shall be cleaned weekly and source tested once in a year as per IS 10500. (Refer Clause 8.4.1)
- Provisions of Clause 8.4.1, 8.4.2 and 8.4.3 of this manual shall be applicable to labor colony as well
- MSDS of LPG shall be put up prominently and shall be included in the induction training also.
- The labor colony shall be secure so that only authorized persons have access to it.
- Availability of local market to be ensured by the Sub-contractor

8.4.8 PROVISION OF EMERGENCY VEHICLE

Dedicated emergency vehicle shall be made available at workplace by each subcontractor to handle any emergency, apart from availability of Ambulance. However, Ambulance shall be given priority for transporting the injured

8.4.9 PEST CONTROL

Regular pest control should be carried out at all offices, mainly laboratories, canteen, labor colony and stores for elimination and prevention of breeding of harmful insects.



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8.4.10 SCRAPYARD

- In consultation with customer, scrapyard shall be developed to store metal scrap, wooden scrap, waste, hazardous waste.
- Scrap/Waste shall be segregated as Bio-degradable and non-bio-degradable and stored separately.

8.4.11 ILLUMINATION

Adequate and suitable light shall be ensured at all work places & their approaches including passage ways as per IS: 3646 (Part-II). Some recommended values are given below:

S. No.	Location	Illumination (Lux)
A. Construction Area		
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
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

8.4.12 MAINTENANCE OF GENERAL DISCIPLINE

- Workmen under influence of liquor or drug or any other intoxication shall not be permitted to work and sent out of the work area.
- Workmen shall not be permitted to smoke in work area.
- None shall be permitted to carry any arms or firearms.
- The workmen shall report to work on time and follow supervisor's instruction.
- Use of cell phone particularly in hazardous jobs like height work, crane operation etc. shall be discouraged
- Horseplay, willful violation of rules shall be dealt with suitable disciplinary action including suspension and termination.
- They shall be subjected to physical frisking or alcohol/drug test at random by security. Security shall be authorized to take appropriate disciplinary action against any delinquent employee like throwing out of the gate for the day. If any such employee returns to work, he shall be put through induction training once again.



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9.0 HSE TRAINING & AWARENESS

HSEP: 04 - HSE Procedure for Training and Awareness shall guide the Training activities at Site. Additionally, following to be followed:

9.1 HSE INDUCTION TRAINING

All persons entering into project site shall be given HSE induction training by the HSE officer of BHEL/subcontractor.

In-house induction training subjects shall include but not limited to:

- Briefing of the Project details.
- Safety objectives and targets.
- Site HSE rules.
- Site HSE hazards and aspects.
- First aid facility.
- Emergency Contact No.
- Accident reporting.
- Fire prevention and emergency response.
- Rules to be followed in the labor colony (if applicable)
- 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.)
- They must arrive fully dressed in safety wear & gear to attend the induction.
- Any one failing to conform to this safety wear & gear requirement shall not qualify to attend.
- On completing attending Contractor's in-house HSE induction, each employee shall sign an induction training form (format no. HSEP:13-F03) to declare that he had understood the content and shall abide to follow and comply with safe work practices. They may only then be qualified to be issued with a personal I.D. card, for access to the work site.

9.2 HSE TOOLBOX TALK

- HSE tool Box talk shall be conducted by frontline foreman/supervisor of subcontractor to specific work groups prior to the start of work. The agenda shall consist of the followings:
- Details of the job being intended for immediate execution.
- The relevant hazards and risks involved in executing the job and their control and mitigating measures.
- Specific site condition to be considered while executing the job like high temperature, humidity, unfavorable weather etc.
- Recent non-compliances observed.
- Appreciation of good work done by any person.
- Any doubt clearing session at the end.
- Record of Tool box talk shall be maintained as per format no. **HSEP:13-F04**
- Tool box talk to be conducted at least once a week for the specific work.

9.3 TRAINING ON HEIGHT WORK

Due to the large percentage of Fall from height in fatal accidents, training on height work shall be imparted to all workers working at height by in- house/external faculty at least twice in a year or more frequently. The training shall include following topics:

- Use of PPEs
- Use of fall arrester, retractable fall arrester, life line, safety nets etc.
- Safe climbing through monkey ladders.
- Inspection of PPEs.
- Medical fitness requirements.
- Mock drill on rescue at height.
- Dos & Don'ts during height work.

9.4 HSE TRAINING DURING PROJECT EXECUTION

- Skilled labor (like fitter, electrician, rigger, scaffolder, carpenter etc.) will pass through the trade test (written and practical) conducted at site by the respective Engineer and Safety officer. A pass sticker of qualified person to be marked on their ID Card/Gate Pass.
- Other HSE training shall be arranged by BHEL/sub-contractor as per the need of the project execution and recommendation of HSE committee of site.
- The topics of the HSE training shall be as follows but not limited to:
 - Hazards identification and risk analysis (HIRA)
 - Identification of Environmental Aspects / Impacts
 - Work Permit System
 - Incident investigation and reporting
 - Fire fighting
 - First aid
 - Fire-warden training
 - EMS and OHSMS
 - T & Ps fitness and operation
 - Electrical safety
 - Welding, NDE & Radiological safety
 - Storage, preservation & material handling.
- A matrix shall be maintained to keep an up-to-date record of attendance of training sessions carried out.



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9.5 HSE PROMOTION-SIGNAGE, POSTERS, COMPETITION, AWARDS ETC

9.5.1 Display of HSE posters and banners

- Site shall arrange appropriate posters, banners, slogans in local/Hindi/English languages at work place

9.5.2 Display of HSE signage

- 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

9.5.3 Competition on HSE and award

Site will arrange different competitions (slogan, poster, essay etc.) on HSE time to time (Safety day, BHEL day, World Environment Day etc.) and winners will be suitably awarded.

9.5.4 HSE awareness programme

Site will arrange HSE awareness programme periodically on different topics including medical awareness for all personnel working at site including BHEL, Subcontractors and customers

10.0 HSE COMMUNICATION

10.1 MONTHLY HSE REPORTING

- HSE information of Site shall be reported monthly through Monthly Site HSE report (MSHR) as per **format no. HSEP: 13-F05**.
- Preparation of MSHR shall be done as per "Guidelines for filling up Monthly HSE report"
- 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.

10.2 INCIDENT INVESTIGATION, REPORTING & CORRECTIVE ACTION

- HSE incidents of site shall be investigated & reported to Regional HQ and ISG-HQ as per **HSEP:08 - HSE Procedure for Incident Investigation, Reporting & Corrective Action**
- 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.



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10.3 HSE EVENT REPORTING

- Important HSE events like HSE training, Medical camp etc. organized at site shall be reported to ISG Regional HQ in detail with photographs for publication in diff house magazines
- Celebration of important days like National Safety Day, World Environment Day etc. shall also be reported as mentioned above.

10.4 HSE SUGGESTIONS

- All BHEL, customer and subcontractor employees to be encouraged to provide suggestions for improvement in Health, Safety & Environment at site. The suggestions to be recorded and maintained at site in appropriate format and shared with HQ. The suggestions found suitable for implementation are to be implemented and due recognition / reward to be given to the individual
- All suggestions to be submitted to PSHQ-HSE for uploading to web portal along with details of the suggestion provider

10.5 CUSTOMER / EXTERNAL PARTIES' COMMUNICATONS

All communication (HSE) from customer / external statutory and regulatory agencies to be handled on priority. Same to be recorded and resolved in expeditious manner

11.0 SAFETY DURING WORK EXECUTION

11.1 HSE ACTIVITIES

HSE activities shall be conducted at site based on the HSEMS developed by Industrial systems Group and issued to site by Regions. While planning for any activity the following documents shall be referred for infrastructural requirements to establish control measures:

- HSEP01: HSE Procedure for Register of OHS Hazards and Risks
- HSEP02: HSE Procedure for Register of Environmental Aspects and Impacts
- HSEP03: HSE Procedure for Register of Regulations
- HSEP04: HSE Procedure for Training and Awareness
- HSEP05: Operational Control Procedures
- HSEP06: HSE Procedure for Emergency Preparedness and Response Plan
- HSEP07: HSE Procedure for performance measurement, monitoring and review
- HSEP08: HSE Procedure for Incident Investigation, reporting & corrective action
- HSEP09: HSE Procedure for Non-Conformity Handling & Corrective Actions
- HSEP10: HSE Procedures for Control of Records
- HSEP11: HSE Procedure for Contract documents
- HSEP12: HSE Procedure for Permit to Work
- HSEP15: HSE Procedure for Operational Control



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All applicable OCPs (Operational control procedures) will be followed by subcontractor as per BHEL instructions. Illustrative list of such OCPs is given below. In case any other OCP is found to be applicable during the execution of work at site, then subcontractor will prepare and follow those.

Table 11.1.1 LIST OF OCPs

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 system
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 hotwell / deaerator
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		

The reference OCPs will be available on HSE Web Portal



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11.1.1 ACTIVITY SPECIFIC REQUIREMENTS FOR SAFETY:

Activity specific safety guidelines as per **Annexure-A** to be followed, in addition to relevant OCPs and Work Permits.

Annexure A provides detailed guidelines for following activities:

1. Work at Height

- Safety Harness
- Lifeline
Minimum Requirements
- Scaffolds
- Safe use of Ladders
- Precautions Against the Fall of Materials, Persons and Collapse of Structures

2. Power Supply & Upkeep of Installation

3. Lifting Operations

- Personnel Lifts (Man-Basket)
- Cranes & Hoisting Equipment
- Safe Rigging Practices
- Slings
- Color Coding Procedure (**All T&Ps to be covered**)

4. Safety in the Use of Hand Tools and Power-Operated Tools

- General provisions
- Hand Tools
- Power operated tools
- Abrasive wheels and tools
- Woodworking tools

5. Start Up, Commissioning and Testing:

6. Demolition Work

7. Civil Works

- Excavation
- Piling
- Batching
- Mobile Plant
- Concrete Vibrators
- Concrete mixture



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11.1.2 HSE PREPAREDNESS FOR ADVERSE CLIMATES AND WEATHER

HSE precautions to be taken for adverse climates and weather conditions are detailed in **Annexure-B**

In addition, site to remain updated on possible adverse weather conditions through reliable sources and all precautions taken accordingly

11.2 WORK PERMIT SYSTEM

- The following activities shall come under Work Permit System
 1. Height working
 2. Hot working at height
 3. Confined space
 4. Excavation more than 4-meter depth
 5. Radiography
 6. Heavy / Complex Critical Lifting Activity
 7. Night / Holiday Work
 8. Loading / Unloading
 9. Grating, Safety Net, Safety Facility Removal
 10. Lockout / Tag out Request
- “HSE Procedure for Permit to Work” (HSEP:12) shall be followed while implementing permit system. Where customer is having separate Work Permit System the same shall be followed in conjunction so as to cover all activities.
- Permit applicant shall apply for work permit of particular work activity at particular location before starting of the work with Job Hazard Analysis.
- Permit signatory shall check that all the control measures necessary for the activity are in place and issue the permit to the permit holder.
- Permit holder shall implement and maintain all control measures during the period of permit
- The permit will be closed after completion of the work. The closed permit shall be archived in HSE Department of site.



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11.3 ENVIRONMENTAL CONTROL

(Refer HSEP02: HSE Procedure for Environmental Aspects and Impacts)

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. 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.

Any chemical including solvents and paints, required for construction shall be stored in designated bonded areas around the site as per MSDS.

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. BHEL shall use appropriate MSDS for clean-up technique

All contractors shall be responsible for the cleanliness of their own areas.

BHEL 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.

Details of E-Waste, Hazardous Waste, shall be ensured as per Format No. HSEP:13-F18 and HSEP:13-F19 respectively

11.4 HOUSEKEEPING

Proper housekeeping to be maintained at work place and the following are to be taken care of on daily basis.

- All surplus earth and debris are removed/disposed of from the working areas to identified locations.
- Unused/Surplus cables, steel items and steel scrap lying scattered at different places/elevation within the working areas are removed to identified locations.
- All wooden scrap, empty wooden cable drums and other combustible packing materials, shall be removed from workplace to identified locations. 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 location.
- Access and egress (stair case, gangways, ladders etc.) path should be free from all scrap



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and other hindrances.

- Workmen shall be educated through tool box talk about the importance of housekeeping and encourage not to litter.
- Labor 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.
- Fabricated steel structures, pipes & piping materials shall be stacked properly.
- 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.
- Utmost care shall be taken to ensure over all cleanliness and proper upkeep of the working areas
- Housekeeping gangs shall be provided all required PPEs

11.5 WASTE MANAGEMENT

11.5.1 BINS AT WORK PLACE

- Sufficient rubbish bins shall be provided close to workplaces.
- Bins should be painted yellow and numbered.
- Sufficient nos. of drip trays shall be provided to collect oil and grease.
- Sufficient qty. of broomsticks with handle shall be provided.
- Adequate strength of employees should be deployed to ensure daily monitoring and service for waste management.

11.5.2 STORAGE AND COLLECTION

- Different types of rubbish/waste should be collected and stored separately.
- Paper, oily rags, smoking material, flammable, metal pieces should be collected in separate bins with close fitting lids.
- Rubbish should not be left or allowed to accumulate on construction and other work places.
- Do not burn construction rubbish near working site.

11.5.3 SEGREGATION

- Earmark the scrap area for different types of waste.
- Store wastes away from building.
- Oil spill absorbed by non-combustible absorbent should be kept in separate bin.
- Clinical and first aid waste stored and incinerated separately.

11.5.4 DISPOSAL

- Sufficient containers and scrap disposal area should be allocated.
- All scrap bin and containers should be conveniently located.
- Provide self-closing containers for flammable/spontaneously combustible material.
- Keep drainage channels free from choking.
- Make schedule for collection and disposal of waste.

11.5.5 WARNING AND SIGNS

- Appropriate sign to be displayed at scrap storage area
- No toxic, corrosive or flammable substance to be discarded into public sewage system.
- Waste disposal shall be in accordance with best practice.
- Comply with all the requirements of Pollution Control Board (PCB) for storage and disposal of hazardous waste.

11.6 TRAFFIC MANAGEMENT SYSTEM

11.6.1 SAFE WORKPLACE TRANSPORT SYSTEM

- 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.
- 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.
- For internal traffic, lines marked on roads / access routes and between buildings shall clearly indicate where vehicles are to pass.
- Temporary obstacles shall be brought to the attention of drivers by warning signs or hazard cones.
- Speed limits shall be clearly displayed. Speed ramps preceded by a warning signs or marker are necessary.
- 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.
- Safest route shall be provided between places where vehicles have to call or deliver.



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- Avoid vulnerable areas/items such as fuel or chemicals tanks or pipes, open or unprotected edges and structures likely to collapse
- Safe areas shall be provided for loading and unloading.
- Avoid sharp or blind bends. If this is not possible hazards should be indicated e.g. blind corner.
- Ensure road crossings are minimum and clearly signed.
- Entrance and gateways shall be wide enough to accommodate a second vehicle without causing obstruction.
- Set sensible speed limits which are clearly sign posted.
- Where necessary ramps should be used to retard speed. This shall be preceded by a warning sign or mark on the road.
- Forklift trucks shall not pass over road hump unless of a type capable of doing so.
- Overhead electric cable, pipes containing flammable hazardous chemical shall be shielded by using goal posts height gauge posts or barriers.
- Road traffic signs shall be provided on prominent locations for prevention of accidents 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.

11.6.2 TRAFFIC ROUTE FOR PEDESTRIANS

- Where traffic routes are used by both pedestrians and vehicles road shall be wide enough to allow vehicles and pedestrians safely.
- 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.
- Where pedestrian and vehicle routes cross, appropriate crossing shall be provided.
- Where crowd is likely to use roadway e.g. at the end of shift, stop vehicles from using them at such times.
- Provide high visibility clothing for people permitted in delivery area.

11.6.3 WORK VEHICLES

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:

- A high level of stability.
- A safe means of access/egress.
- Suitable and effective service and parking brakes.
- Windscreens with wipers and external mirrors giving optimum all round visibility.
- Provision of horn, vehicle lights, reflectors, reversing lights, reversing alarms.
- Provision of seat belts.
- Guards on dangerous parts.
- Driver protection - to prevent injury from overturning and from falling objects/materials.
- Driver protection from adverse weather.
- No vehicle shall be parked below HT/LT power lines.
- Valid Pollution Under Control certification for all vehicles

11.6.4 DAILY CHECKS BY DRIVER

There should also be daily safety checks containing below mentioned points by the driver before the vehicle is used.

- Brakes.
- Tires.
- Steering.
- Mirrors.
- Windscreen waters.
- Wipers.
- Warning signals.
- Specific safety system i.e. control interlocks

Management should ensure that drivers carry out these checks.



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11.6.5 TRANSPORTATION OF PERSONNEL AND MATERIALS BY VEHICLES

- 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.
 - 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.
 - All overhangs shall be made clearly visible and restricted to acceptable limits
 - Load shall be checked before moving off and after traveling a suitable distance.
 - 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.
 - Warning signs shall be displayed during transportation of material.
- All vehicles used by BHEL shall be in worthy condition and in conformance to the Land Transport requirement

11.6.6 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

11.7 EMERGENCY PREPAREDNESS AND RESPONSE

- Emergency preparedness and response capability of site shall be developed as per **HSEP06: HSE Procedure for Emergency Preparedness and Response** issued by Regional HQ
- Availability of adequate number of first aiders and fire warden shall be ensured with BHEL and its sub-contractors
- Assembly point shall be earmarked and access to the same from different location shall be shown
- Fire exit shall be identified and pathway shall be clear for emergency escape.
- Appropriate type and number of fire extinguisher shall be deployed as per Fire extinguisher deployment plan and validity shall be ensured periodically through inspection
- 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.

- First aid center shall be developed at site with trained medical personnel and ambulance
 - Emergency contact numbers (format given in EPRP) of the site shall be displayed at prominent locations.
 - Tie up with fire brigade shall be done in case customer is not having fire station.
 - Tie up with hospital shall be done in case customer is not having hospital.
 - Disaster Management group shall be formed at site
 - Mock drill shall be conducted on different emergencies periodically to find out gaps in emergency preparedness and taking necessary corrective action
- Fire Extinguishers to be installed as per **Annexure C**

11.8 CONTROL OF DOCUMENTS

All documents shall be controlled as per **HSEP:05 - HSE Procedure for Document Control**.

11.9 CONTROL OF RECORDS

All records shall be controlled as per **HSEP:10 - HSE Procedure for Control of Records**.

12.0 HSE INSPECTION

Inspection on HSE for different activities being carried out at site shall be done to ensure compliance to HSEMS requirements.

Checklists for inspection can be taken from PSHQ-HSE Web Portal and distributed to end points.

12.1 DAILY HSE CHECKS

Both the Site Supervisors and HSE Supervisors 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:

- Personal Safety wears & gear compliance.
- Complying with site safety rules and permit-to-work (PTW).
- Positions and postures of workers.
- Use of tools and equipment etc. by the workers.
- 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.



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12.2 INSPECTION OF PPE

- PPEs shall be inspected by HSE officer at random once in a week as per **Format no. HSEP:13-F06** for its compliance to standard and compliance to use and any adverse observation shall be recorded in the PPE register.
- The applicable PPEs for carrying out particular activities are listed below.
- The IS standard to be complied to, for different PPEs, is given as follows:

RELEVANT IS-CODES FOR PERSONAL PROTECTION EQUIPMENT

IS: 2925 – 1984	Industrial Safety Helmets.
IS: 4770 – 1968	Rubber gloves for electrical purposes.
IS: 6994 – 1973 (Part-I)	Industrial Safety Gloves (Leather & Cotton Gloves).
IS: 1989 – 1986 (Part-I-II)	Leather safety boots and shoes.
IS: 3738 – 1975	Rubber knee boots.
IS: 5557 – 1969	Industrial and Safety rubber knee boots.
IS: 6519 – 1971	Code of practice for selections care and repair of Safety Footwear.
IS: 11226 – 1985	Leather Safety footwear having direct molding sole.
IS: 5983 – 1978	Eye protectors.
IS: 9167 – 1979	Ear protectors.
IS: 3521 – 1983	Industrial Safety Belts and Harness

In addition, Corporate Standard PPEs Specifications Manual to be referred.

12.3 INSPECTION OF T&Ps

- A master list of T&Ps shall be maintained by each agency.
- All T& Ps being used at site shall be inspected by HSE officer once in a month as per **format no. HSEP: 13-F07** for its healthiness and maintenance.
- 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.
- Color Coding Procedure** for maintenance of T&Ps shall be followed as per **Clause 3.5 of Annexure-A**
- The validity of T&P shall be monitored as per "Status of T&Ps" **format no. HSEP:13-F08**



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12.4 INSPECTION OF CRANES AND WINCHES

- 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.
- Cranes and Winches shall be inspected by HSE officer once in a month as per **Format no. HSEP: 13-F09 (A&B)** for healthiness, maintenance and validity of third party inspection.
- The date of third party inspection and next due date shall be painted on cranes and winches.
- The operators/drivers shall be authorized by sub-contractor based on their competency and experience and shall carry the I-card

12.5 INSPECTION ON HEIGHT WORKING

- Inspection on height working shall be conducted **daily** by supervisors before start of work to ensure safe working condition including provision of
 - Fall arrestor
 - Lifelines
 - Safety nets
 - Fencing and barricading
 - Warning signage
 - Covering of opening
 - Proper scaffolding with access and egress.
 - Illumination
- Inspection on height working shall be conducted once in a week by HSE officer as per **format no. HSEP: 13-F10**.
- Medical fitness of height worker shall be ensured.
- Height working shall not be allowed during adverse weather.

12.6 INSPECTION ON WELDING AND GAS CUTTING OPERATION

- Supervisor shall ensure that no flammable items are available in near vicinity during welding and gas cutting activity.
- Gas cylinders shall be kept upright.
- Use of Flash back arrestor shall be ensured at both ends.
- Inspection during welding and gas cutting operations shall be carried out by HSE officer once a month as per **format no. HSEP: 13-F11**.
- Use of fire blanket to be ensured to avoid falling of splatters during welding or gas cutting operation at height.
- Availability of fire extinguisher at vicinity shall be ensured.



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12.7 INSPECTION ON ELECTRICAL INSTALLATION / APPLIANCES

- Ensure proper earthing in electrical installation
- Use ELCB at electrical booth
- Electrical installation shall be properly covered at top where required
- Use appropriate PPEs while working
- Use portable electrical light < 24 V in confined space and potentially wet area.
- Monthly inspection shall be carried out as per **format no. HSEP: 13-F12.**

12.8 INSPECTION OF ELEVATOR

- Elevators shall be inspected by concerned supervisors once in a week as per **format no. HSEP: 13-F13.**
- All elevators shall be inspected by competent person and validity shall be ensured.
- The date of third party inspection and next due date shall be painted on elevator.

13.0 HSE PERFORMANCE

- HSE performance shall be monitored as per **HSEP: 07 (HSE Procedure for Performance Monitoring and Review).**
- Suitable HSE reward system shall be developed at site level to promote HSE compliance amongst workmen.
- To decide HSE reward performance towards HSE shall be evaluated for workmen and it shall be awarded regularly in public gathering.
- If safety record of the subcontractor 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 subcontractor may be considered by BHEL after completion of the job.

14.0 HSE PENALTIES

- As per contractual provision HSE penalties shall be imposed on sub-contractors for non-compliance on HSE requirement as per **format no. HSEP: 13-F14.**
- If customer imposes some penalty on HSE due to the non-compliance of the sub-contractor the same shall be passed on to them.
- The penalty amount shall be recovered by Site Finance department from sub-contractors from the RA/Final bill.
- For repeated violation by the same person, the penalty would be double of the previous penalty. For repeated fatal incident under the same subcontractor for the same package in the same Unit, the subcontractor will pay 2 times the penalty compared to previously paid in case there are repeated cases of fatal incidents.
- The recovered penalty amount shall be exclusively used to HSE promotional activities at site



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15.0 HSE AUDIT

15.1 INTERNAL HSE AUDIT

(Refer: HSEP09: HSE Procedure for Non-Conformity Handling & Corrective Action and HSEP11: HSE Procedure for Internal Audit)

- Internal HSE Audit shall be carried out by Regional HQ/ISG-HQ as per HSE audit calendar.
- Qualified HSE auditor shall be engaged for the internal HSE audit.
- HSE checklist (Forma No. **HSEP:13-F20**) 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.
- All non-conformities and observations on HSE shall be disposed of-by site in a time bound manner.
- Corrective action action on HSE issues issued by Regional HQs shall be implemented by site and reported to HQ.
- Same shall be reported to PSHQ by Region-HQ in a consolidated manner

15.2 EXTERNAL HSE AUDIT

- External HSE audit may be carried out by customer/consultant as second party audit or by certification body/government body as third party audit.
- Site shall facilitate smooth conduct of HSE audit and make available all the necessary information data which are not confidential in nature.
- All non-conformities and observations on HSE identified during external HSE audit shall be disposed of by site in a time bound manner and reported back the implementation status (Non-conformities to be handled as per HSEP09: HSE Procedure for Non-conformity, Handling and Corrective Action)
- Corrective action on HSE issues raised by certification body issued by Regional HQs shall be implemented by site and reported to HQ
- Same shall be reported to PSHQ by Region-HQ in a consolidated manner



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16.0 MONTHLY HSE REVIEW MEETING

Site 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:

- Implementation of earlier MOM
- HSE performance
- HSE inspection
- HSE audit and CAPA
- HSE training
- Health check-up camp
- HSE planning for the erection and commissioning and installation activities in the coming month
- HSE reward and promotional activities

The meeting shall be chaired by Construction Manager, convened by HSE coordinator and attended by all HOS, Site In-charge of Subcontractors and HSE officer of Subcontractors.

MOM on the discussion will be circulated to the concerned for implementation.



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17.0 FORMATS USED

SL. No.	Format Name	Format No.	Frequency of check (if applicable)	Rev No.
01	Inspection of First Aid Box	HSEP:13-F01	Weekly	00
02	Health Check Up	HSEP:13-F02	With new Induction & Annually thereafter	00
03	HSE Induction Training	HSEP:13-F03	With New Inductions	00
04	Tool Box Talk	HSEP:13-F04	Daily before job start	01
05	Monthly Site HSE Report	HSEP:13-F05	Monthly	01
06	Inspection of PPE	HSEP:13-F06	Weekly	01
07	Inspection of T&Ps	HSEP:13-F07	Monthly	01
08	Status of T&Ps	HSEP:13-F08	-	00
09	Inspection of Cranes	HSEP:13-F09A	Monthly	00
10	Inspection of Winches	HSEP:13-F09B	Monthly	00
11	Inspection on Height Working	HSEP:13-F10	Weekly	01
12	Inspection on Welding & Gas Cutting	HSEP:13-F11	Monthly	01
13	Inspection on Electrical Installation	HSEP:13-F12	Monthly	00
14	Inspection on Elevator	HSEP:13-F13	Weekly	00
15	HSE Penalty	HSEP:13-F14	-	01
16	Format for Initial Verification of PPE's & Lifting Tools & Tackles	HSEP:13-F15	As and when new PPEs and T&Ps are received	00
17	Format for Inspection of Labor Colony	HSEP:13-F16	Monthly or as per requirement	00
18	Format for Recording of First Aid Injuries	HSEP:13-F17	As per requirement	00
19	Format for Register of Issue and Receipt of PPEs	HSEP:13-F18	As per requirement	00
20	Format for Maintaining Records of E-waste Handled / Generated	HSEP:13-F19	Annually or as per requirement	00
21	Format for Maintaining Records of Hazardous Waste at the Facility	HSEP:13-F20	Annually or as per requirement	00
22	HSE Checklist-cum-Compliance Report	HSEP:13-F21	As per Audit Calendar	00

**Industrial systems Group****Inspection of First Aid Box**

FORMAT NO: HSEP:13-F01

REV NO.: 01

PAGE NO. 01 OF 02

Name of Site :	
Name of Sub-Contractor:	
Inspected by :	
Date of Inspection:	

Number of employees in the site: - _____

Sl. 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 by carbonate 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		

**Industrial systems Group****Inspection of First Aid Box**

FORMAT NO: HSEP:13-F01

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Sl. No.	Item	No. Available	Remarks
19	No of rolls of adhesive plaster (2 cmX1 meter)		
20	Whether snake bite lancet available.		
21	Whether (30 grams) bottle of potassium permanganate crystals 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 Subcontractor's Site I/C

Date:



Industrial systems Group

Health Check-Up

FORMAT NO: HSEP:13-F02

REV NO.: 01

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Name of Site :	
Name of Sub-Contractor:	
Name of Employee :	

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		
<u>Vision</u>		
Left Eye	Right Eye	



Industrial systems Group

Health Check-Up

FORMAT NO: HSEP:13-F02

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EXAMINATION		OBSERVATION	
<u>Cardiovascular System Examination</u>			
Inspection			
Palpation	Pulse	BP	
Auscultation (Heart Sounds)			
<u>Respiratory System</u>			
Inspection	Respiratory Rate		
Palpation:			
Percussion			
Auscultation (Breath Sounds)			
<u>Examination of Abdomen</u>			
Inspection			
Palpation			
Auscultation (Bowel Sounds)			
Any Other			
Clinical Impression			

Signature of the examining doctor

Date:

**Industrial systems Group****HSE Induction Training**

FORMAT NO: HSEP:13-F03

REV NO.: 01

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Name of Site :**Name of Sub-Contractor :****Date :****Name of Training
Co-ordinator:**

Sl. No.	Name	Designation	Organisation	Signature

(Training carried out as per HSEP04: HSE Procedure for Training & Awareness)

Signature of Training Coordinator**Date:**



Industrial systems Group

Toolbox Talk

FORMAT NO: HSEP:13-F04

REV NO.: 01

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Name of Site :	
Sub-Contractors Name :	
Date :	

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

Signature of Site I/C of Subcontractor

Date:



Industrial systems Group

Monthly Site HSE Report

FORMAT NO: HSEP:13-F05

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Name of Site:	Report Month:

A) Accidents/Incidents Details: -

a	Lost time in Accidents	No. of incidents	Man Hours Lost	No. of People Involved	No. of contractors involved	BHEL persons if any	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	BHEL(A)	Contractors(B)	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 _____): (Since the opening of the site)			

Signature of Head (SOX)

Signature of Site HSE Coordinator



Industrial systems Group

Monthly Site HSE Report

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

Description	Name	Qualification & Experience
Safety Officers		
Safety Supervisors		
Construction Medical Officer		
Nursing Staff.		
Electricians		

D) Lifting Tools, Tackles, Equipment and Pressure Vessels:

Item	Nos. Deployed	Identification Nos. (Comma separated) (A)	Nos. Tested by competent person	Validities of Test Certificates (Comma separated – corresponding to column A)
Winches				
Chain Blocks				
Wire Rope Slings				
Man Cages				
D-Shackles				
Air Compressors				
Crawler Cranes				
Mobile Cranes				
Hydra Cranes				
Others				

Signature of Head (SOX)

Signature of Site HSE Coordinator

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E) Reverse Horns in Construction Vehicles:

Item	Nos. Deployed with serial numbers (Comma separated) (A)	Nos. Having Functional reverse horns	Inspection Dates (Comma separated corresponding to column A)
Transit Mixers			
Hydra Cranes			
Dumpers/Trippers			
Backhoes			
Other Vehicles			

F) ELCBs:

No. Of ELCBs provided with Serial Nos. (Comma separated) (A)	Nos. Functional	When They were last Tested (Comma separated corresponding to column A)

G) Electrical Earthing:

No. Of Earth resources with serial numbers and locations (Comma separated) (A)	Whether Double Earthing provided to all equipment	When they were last tested (Comma separated corresponding to column A)

H) Fire Extinguishers:

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

FIRE EXTINGUISHERS AT ERECTION SITE:

Type	Size (Add more rows if required)	Qty + Serial numbers (Comma separated) (A)	Healthiness – Last checked dates (Comma separated corresponding to column A)	Locations (Comma separated corresponding to column A)
FOAM TYPE				
SODA TYPE				
DRY TYPE (DCP)				
CO2 TYPE				

Signature of Head (SOX)

Signature of Site HSE Coordinator

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FIRE EXTINGUISHERS AT BHEL SITE OFFICE & STORES:

Type	Size (Add more rows if required)	Qty + Serial numbers (Comma separated) (A)	Healthiness – Last checked dates (Comma separated corresponding to column A)	Locations (Comma separated corresponding to column A)
FOAM TYPE				
SODA TYPE				
DRY TYPE (DCP)				
CO2 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.			

Signature of Head (SOX)

Signature of Site HSE Coordinator

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K) Safety Observations by BHEL 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:

• Refresher Trainings Conducted: -

Topic	Date Of Programme	No. Of Participants	Level Of Participants

• Tool-Box talks/ Pep-talks on Safety:

Date	Tool Box Talk - No of Participants	Topic	Remarks
Date	Safety Induction No. of Participants	Topic	Remarks

Signature of Head (SOX)

Signature of Site HSE Coordinator

**Industrial systems Group****Monthly Site HSE Report**

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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 Checkup Completed	Medical Checkup Balance

Signature of Head (SOX)

Signature of Site HSE Coordinator

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O) Penalty Imposed On Account of Safety Violation

By Customer	On Subcontractor By BHEL	Amount (Rs)	Deducted (Yes/No, Remarks)	Brief Reason

P) Rewards on Account of Good Safety Performance

Reward issuing Agency (BHEL / Customer/ Subcontractor)	Reward Issued to	Details of Reward Issued (Amount etc.)	Brief Reason

Note: Photos of Reward Functions to be attached

Q) Other Safety initiatives / Safety Activities conducted at sites (with photos, if any):

Signature of Head (SOX)

Signature of Site HSE Coordinator

**Industrial systems Group****Personal Protective Equipment**

FORMAT NO: HSEP:13-F06

REV NO.: 01

PAGE NO. 01 OF 01

Name of Site :	
Name of Sub-Contractor :	
Inspected by :	
Date 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 Site I/C of Subcontractor:

Date:

**Industrial systems Group****Inspection Of T&Ps**

FORMAT NO: HSEP:13-F07

REV NO.: 01

PAGE NO. 01 OF 01

Name of Site :	
Name of Sub-Contractor :	
Date 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-Subcontractor/ Subcontractor's Safety Officer		Signature-Site Safety Officer (BHEL)

**Industrial systems Group****Status Of T&Ps**

FORMAT NO: HSEP:13-F08

REV NO.: 01

PAGE NO. 01 OF 01

Name of Site :	
Name of Sub-Contractor :	
Date 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 Site I/C of Subcontractor:

Date:

**Industrial systems Group****Inspection Of Cranes**

FORMAT NO: HSEP:13-F09A

REV NO.: 01

PAGE NO. 01 OF 01

Name of Site :**Name of Sub-Contractor :****Inspected by :****Date 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 fully 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 Subcontractor:**Date:**

**Industrial systems Group****Inspection Of Winches**

FORMAT NO: HSEP:13-F09B

REV NO.: 01

PAGE NO. 01 OF 01

Name of Site :	
Name of Sub-Contractor :	
Inspected by :	
Date 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 Site I/C of Subcontractor:

Date:

**Industrial systems Group****Inspection of Height Working**

FORMAT NO: HSEP:13-F10

REV NO.: 01

PAGE NO. 01 OF 2

Name of Site :	
Name of Sub-Contractor :	
Inspected by :	
Date of Inspection:	

Sl. No.	Descriptions	Observation (Yes/No)	Remarks
1	All the workers have been explained safe work method?		
2	An established communication system has been established and explained to the workers.		
3	Adequate illumination has been ensured.		
4	Work area inspected prior to the start of the work.		
5	Is the work area barricaded to prevent fall and platforms are of adequate strength (bamboo, jute / plastic ropes not to be used).		
6	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)		
7	Fabricated makeshift arrangements are checked for quality and type of material welding, anchoring etc.		
8	Are floor gaps, permanently covered and barricaded		
9	Area below the work place barricaded, particularly below hot work.		
10	Workers provided with bags /box to carry bolts, nuts and hand tools		
11	Arrangement for fastening hand tools made.		
12	All work platforms ensured to be of adequate strength and ergonomically suitable.		
13	Work at more than one elevation at the same segment is restricted.		

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?		

**Industrial systems Group****Inspection of Height Working**

FORMAT NO: HSEP:13-F10

REV NO.: 01

PAGE NO. 02 OF 2

Sl. No.	Descriptions	Observation (Yes/No)	Remarks
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.		
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.		
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	Safety nets are use wherever required.		
5	Proper fall arrest system is deployed at critical workplaces.		
6	Crawler boards/Safety system or works on fragile roof are used.		

Signature of Site I/C of Subcontractor:

Date:



Inspection of Welding and Gas Cutting

Name of Site :	
Name of Sub-Contractor :	
Inspected by :	
Date of Inspection :	

Welding				
Sl.no.	Description	Y e s	N o	Remarks
1	Is electric connection given through 30 mA ELCB/RCCB to welding m/c?			
2	Is electric cable fitted properly in junction 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 is 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 shall not be used)			
	Total No of NO			
	Total No of YES			

**Industrial systems Group****Inspection of Welding and Gas Cutting**

FORMAT NO: HSEP:13-F11

REV NO.: 01

PAGE NO. 02 OF 02

Gas Cutting				
Sl.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 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 torch both for O2 and LPG cylinder?			
8	Is nozzle of the torch cleaned?			
	Total Number of NO			
	Total No of YES			
	% Compliance			

Signature of Site I/C of Subcontractor:

Date:

**Industrial systems Group****Inspection Of Electrical Installation**

FORMAT NO: HSEP:13-F12

REV NO.: 01

PAGE NO. 01 OF 02

Name of Site :	
Name of Sub-Contractor :	
Inspected by :	
Date of Inspection :	

Sr. No.	Contents	Yes/No	Remarks
A	Cable		
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 main boards 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?		
2.	Is ELCB sensitivity maintained at 30 mA?		

**Industrial systems Group****INSPECTION OF ELECTRICAL INSTALLATION**

FORMAT NO: HSEP:13-F12

REV NO.: 01

PAGE NO. 02 OF 02

Sr. No.	Contents	Yes/No	Remarks
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 information:		

Signature of Site I/C of Subcontractor:

Date:

**Industrial systems Group****Inspection of Elevator**

FORMAT NO: HSEP:13-F13

REV NO.: 01

PAGE NO. 01 OF 01

Name of Site :	
Name of Sub-Contractor :	
Inspected by :	
Date 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-Subcontractor/ Subcontractor's Safety Officer		Signature-Site Safety Officer (BHEL)

**Industrial systems Group****HSE Penalty Format**

FORMAT NO: HSEP:13-F14

REV NO.: 01

PAGE NO. 01 OF 2

Sub: MEMO for Penalty for non-compliances in Safety and Fabrication Quality requirement (Ref. Chapter – IX: HSE & OHSAS, Clause No. 9.60 of Special Conditions of Contract)

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

Safety Area

S. No	Nature of Non - Compliance	Penalty in Rs.)	Remarks
1.	Not wearing safety helmet	350	Per Person/ day
2.	Not Wearing safety shoes	350	Per Person/ day
3.	Not wearing safety belt while working at height (> 2 meters) or not anchoring to lifeline	750	Per Person/ day
4.	Not wearing gloves	50	Per Person/ day
5.	Not using grinding goggles while doing grinding operations	150	Per Person/ day
6.	Not using 24 V supply for lighting in confined spaces	500	Per event
7.	Improper earthing of welding & Other electrical machines	500	Per Machine per incidence
8.	Electrical plug not used for connection/ hand machines	350	Per connection per incidence
9.	Using damaged slings or not slinging properly	500	Per event Per T&P
10.	Use of lifting equipment without having valid Test certificate	750	Per equipment per seven days
11.	Using frayed/ broken welding cables	350	Per machine per week
12.	Non removal of scrap from platforms	500	Per Event Per location per 7 days
13.	Lifting cylinders without cage or rolling of cylinders	500	Per Event per incidence
14.	Gas cutting without flash back arrestor	500	Per machine per incidence
15.	Gas cutting at height without sheet below	500	Per event
16.	Not having valid driving license for the type of vehicle/ T&P	750	Per driver per incidence
17.	Not providing proper barricades (caution tape at 2 elevations)	500	Per location per day
18.	Not keeping gas cylinders vertically	350	Per event
19.	Two wheeler entry in construction area	200	Per vehicle
20.	Using Hydra for material movement at site in unsafe manner	500	Per case
21.	Using Two Hydra in Tandem for material movement	1000	Per case
22.	Vehicles, Hydras, Cranes, Dumpers and Earth Movers not having back horns	200	Per Equipment per day
23.	Wearing of helmets without chin straps	200	Per case

**Industrial systems Group****HSE Penalty Format**

FORMAT NO: HSEP:13-F14

REV NO.: 01

PAGE NO. 02 OF 2

	Nature of Non - Compliance	Penalty in Rs.)	Remarks
24.	Lifting hooks without latches	200	Per hook per day
25.	Use of Lifting T and P's without TPI certificates	350	Per T & P per day
26.	Not using guide rope while transporting material using Hydra or Cranes	500	Per event
27.	Not using temporary platform during work at height	500	Per case per day
28.	Unsafe electrical practice like not installing ELCB/ RCCB	500	Per case per day
29.	Unsafe Act in violation of standards and guidelines	500	Per case
30.	Not maintaining proper hygiene in canteen as per BOCW	500	Per event
31.	Working at night / holiday without Permit, Supervision and Medical Facilities	1000	Per case
32.	Activity carried out without safety work permit	1000	Per person per event
33.	Accident Resulting in Partial Loss in Earning Capacity #	25000	Per victim#
34.	Fatal Accident/Accidents Resulting in total Loss in Earning Capacity #	100000	Per victim#

or as deducted by customer, whichever is higher.

For repeated fatal accidents in the same in it, incremental penalty to be imposed.

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 _____

3. Total Penalty= 1. X 2. = _____

Signatures:

Witnessed by: (Sub- Contractor representative)

(BHEL Personnel)

Name _____

Name _____

Distribution: 1 Copy: to Sub- contractor,

1 Copy to Site Construction Manager(BHEL)

**Industrial systems Group****Format for Initial Verification of PPE's &
Lifting Tools & Tackles**

FORMAT NO: HSEP:13-F15

REV NO.: 01

PAGE NO. 01 OF 1

Name of Site :	
Name of Sub-Contractor :	
Inspected by :	
Date of Inspection :	

S. No	Particulars (Serial Number, make, model of PPE, T&P)	Accepted / Rejected	Remarks
Checked (Name & Sign. Of Subcontractor)		Verified (Name & Sign. Of BHEL HSE Officer)	

**Industrial systems Group****Format for Inspection of Labor Colony**

FORMAT NO: HSEP:13-F16

REV NO.: 01

PAGE NO. 01 OF 1

Name of Site :	
Name of Sub-Contractor :	
Inspected by :	
Date 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: (A) Potential injuries determined (B) Local EMS response determined (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 HSE Officer



Industrial systems Group

FORMAT NO: HSEP:13-F17

REV NO.: 01

PAGE NO. 01 OF 1

Format for Recording of First Aid Injuries

Name of Site:

[illegible]



Industrial systems Group

FORMAT NO: HSEP:13-F18

REV NO.: 01

PAGE NO. 01 OF 1

Format for Register of Issue and Receipt of PPEs

Site:

Subcontractor:

[illegible]

**Industrial systems Group****Format for Maintaining Records of E-waste
Handled / Generated**

FORMAT NO: HSEP:13-F19

REV NO.: 01

PAGE NO. 01 OF 1

(Generated Quantity in Metric Tonnes (MT) per year)

Site		
Subcontractor		
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		
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
	Item Description	
Types and Quantity of e-waste treated & disposed	Category	Quantity
	Item Description	
Name, address and contact details of the destination		

Signature of Subcontractor:

Date



Industrial systems Group

Format for Maintaining Records of Hazardous Waste at the Facility

FORMAT NO: HSEP:13-F20

REV NO.: 01

PAGE NO. 01 OF 1

1. Name of Site:
2. Name of the Subcontractor:
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	Method 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 Subcontractor:

Date:

**Industrial systems Group****HSE Checklist-cum-Compliance Report**

FORMAT NO: HSEP:13-F21

REV NO.: 01

PAGE NO. 01 OF 3

PROJECT: _____

CONTRACTOR: _____

DATE: _____

OWNER : _____

INSPECTION BY: _____

Note : write 'NA' wherever the items is not applicable

Item	Y e s	N o	Remarks	Action
HOUSEKEEPING				
Waste containers provided and used				
Passageways and walkways clear				
General neatness of working area				
Other				
PERSONNEL PROTECTIVE EQUIPMENT				
Goggles; shields				
Face protection				
Hearing protection				
Respiratory masks etc.				
Safety belts				
Other				
EXCAVATIONS / OPENINGS				
Openings properly covered or barricaded				
Excavations shored				
Excavations barricaded				
Overnight lighting provided				
Other				
WELDING, CUTTING				
Gas cylinders chained upright				
Cable and hoses not obstructing				
Fire extinguisher (s) accessible				
Others				
SCAFFOLDING				
Fully decked platforms				
Guard and intermediate rails in place				
Toe boards in place				
Adequate shoring				
Adequate access				
Others				
LADDER				
Extension side rails 1 m above				
Top of landing				
Properly secured				
Angle + 70° from horizontal				
Other				

**Industrial systems Group****HSE Checklist-cum-Compliance Report**

FORMAT NO: HSEP:13-F21

REV NO.: 01

PAGE NO. 02 OF 3

HOISTS, CRANES AND DERRICKS				
Condition of cables and sheaf OK				
Condition of slings, chains, hooks OK				
Inspection & maintenance log maintained				
Outriggers used				
Signals observed and understood				
Qualified operators				
Others				
MACHINERY, TOOLS & EQUIPMENT				
Proper instruction				
Safety devices				
Proper cords				
Inspection and maintenance				
Other				
VEHICLE AND TRAFFIC				
Rules and regulations observed				
Inspection and maintenance				
Licensed drivers				
Other				
TEMPORARY FACILITIES				
Emergency instructions posted				
Fire extinguishers provided				
Fire-aid equipment available				
General neatness				
Others				
FIRE PREVENTION				
Personnel instructed				
Fire extinguishers checked				
No smoking in prohibited areas.				
Hydrants				
Clearance				
Others				
ELECTRICAL				
Proper wiring				
ELCB's provided				
Ground fault circuit interrupters				
Protection against damage				
Prevention of tripping hazards				
Other				
HANDLING & STORAGE OF MATERIALS				
Properly stored or stacked				
Passageways clear				
Other				
FLAMMABLE GASES AND LIQUIDS				
Containers clearly identified				
Proper storage				
Fire extinguisher nearby				
Other				

**Industrial systems Group****HSE Checklist-cum-Compliance Report**

FORMAT NO: HSEP:13-F21

REV NO.: 01

PAGE NO. 03 OF 3

WORKING AT HEIGHT				
Safety nets				
Safety belts				
Safety helmets				
Anchoring of safety belt to the life line rope				
ENVIRONMENT				
Lubricant waste/engine oils properly dispose.				
Waste from Canteen, offices, sanitation etc. disposed properly.				
Disposal of surplus earth, stripping materials, expired batteries, oily rags and combustible materials done properly.				
HEALTH CHECKS				
Hygienic conditions at labor camps O.K.				
Availability of first-aid facilities				
Proper sanitation at site, office & labor camps.				
Arrangement of medical facilities.				
Measures for dealing with illness.				
Availability of potable drinking water for workmen & staff.				
Provision of crèches for children.				

Signature of Subcontractor:

Date:

ANNEXURE 01

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 laborers 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 laborers 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 – A: ACTIVITY SPECIFIC SAFEGUARDS

1. Work at Height

(Note: Respective HSEMSM Systems Procedures and OCPs are to be followed in conjunction with these requirements)

All work at height above 2 meter above ground level without complete platforms, handrails and other related fall protection shall require a work permit in the prescribed form. This shall require approval by the competent authority. The HSE officer of sub-contractors and subsequently BHEL shall follow the checklist religiously by physically verifying the condition of the work area before recommending for approval.

Whenever a fall hazard or other exposure exists for working at heights more than 2.0m/6ft, the nature and scope of work will be evaluated for conditions and environmental factors before selecting the appropriate fall protection system (active, passive or a combination of measures, as appropriate). A Personnel fall protection system must include:

Safety Harness

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 five thousand pounds. 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.

Lanyard & Lifeline

- The type of work and the environment conditions determine lanyard and lifeline selection. If welding, chemical cleaning that may damage lanyards, connectors or lifelines, sandblasting, etc., either protect the components or use more appropriate type of system.
- Lanyards and lifelines must incorporate, or be used with, an appropriate deceleration (shock absorbing) device. Deceleration devices include rope grabs, rip-stitch lanyards, specially woven lanyards, tearing, or deforming lanyards, automatic self-retracting lifelines and lanyards which dissipate or limit the energy imposed on the employee during fall arrest.
- Once in use, the system's effectiveness is to be monitored. In some cases, a program for cleaning and maintaining the system may be necessary. Lanyard and lifelines must use locking snap hooks only and under no circumstances must two lanyard snap hooks be connected.

Minimum Requirements

Prior to the start of work at elevation, the HSE Officer involved with the work must meet with the work supervisor to review the scope of work, and must review all the possible fall hazards and effective safety responses. The evaluation / analysis must be documented and kept on file and on site by the HSE Officer.

The procedures for the safety response to identified fall hazards developed and rescue plans by must be reviewed with all individuals exposed to the hazards.

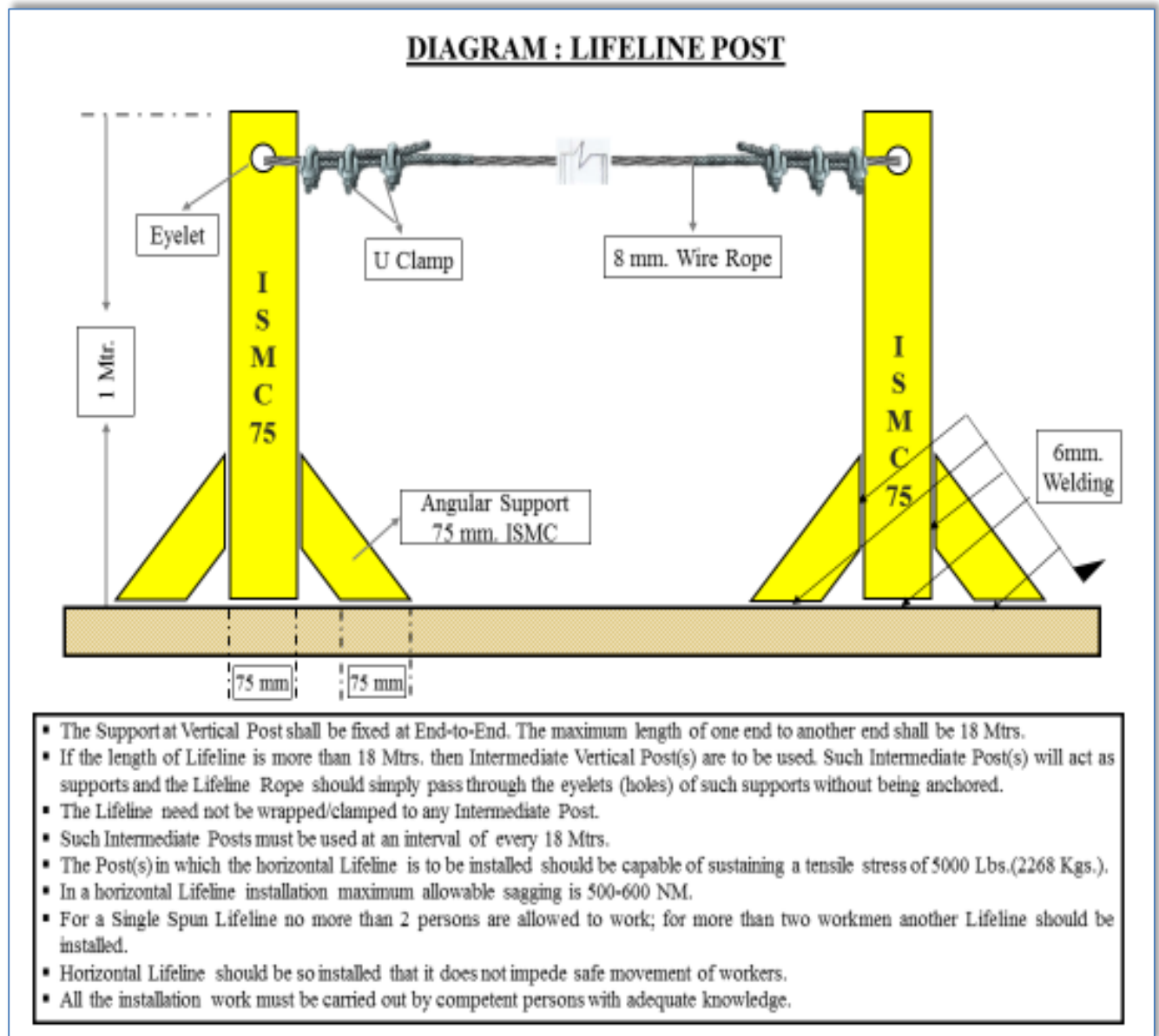
The HSE Officer must establish an inspection process of fall protection systems. Some equipment requires documented inspections by its manufacture on a regular schedule. Such equipment must have evidence of the inspection and re-certification process on it. This information must be reviewed before the equipment is actually used. Individuals must visually inspect the fall protection equipment before each use. Failure to complete this inspection process could result in serious injury or death.

Immediately remove from service any fall protection equipment that is identified as defective, damaged

or has been subjected to an impact. Damaged fall protective equipment must be destroyed to prevent re-use and not be discarded into trash containers, as the worn or damaged equipment could be unintentionally re-used.

Aerial lifting devices, excluding scissor lifts require the use of full body harnesses and lanyards in any elevated position.

All lifelines in general are to be made of min **8mm dia steel rope** and tied to columns with 3 clamps at each end. Wherever columns are not available to tie the lifelines, the vertical posts as per the design below are to be provided after carrying out drop load test initially. A load of 240kg to be dropped off the mid-point of lifeline in this test



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.

There is no such thing as a temporary scaffold. All scaffolds must be erected and maintained to conformed standard. The Scaffold Tagging defines satisfactory, incomplete or defective scaffolds.

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.

All employees must be competent for the type of scaffolding work they are undertaking and should have received appropriate training relevant to the system they are working on.

- All scaffolds shall be erected / dismantled by scaffolding crew under direct supervision of competent scaffolding supervisors.
- All scaffolds shall be capable of supporting 4 times maximum intended load and erected on sound, rigid footing, capable of carrying the maximum intended load without settling or displacement. Bamboo scaffolding is not permitted for use on site.
- Guard rails and toe boards shall be installed on all open sides and ends of platforms more than (2) meters above ground or floor.
- Scaffold planks must be at least 5 cm x 25 cm (2" x 10") full thickness lumber scaffold grade or better.
- Scaffold planks shall not span distances greater than 2.5 meters (8 feet).
- Scaffold planks shall extend over end supports not less than 6 inches nor more than 12 inches and be secured to the scaffold. Scaffolding and accessories with defective parts shall be immediately repaired or replaced. All scaffolding must be a minimum of two planks wide. No one may work from a single plank.
- Scaffold planks must be inspected before use. Planks that have been damaged must be removed from the site.
- Access ladders must be provided for each scaffold. Climbing the end frames is prohibited unless the design incorporates an approved ladder.
- Adequate mudsills or other rigid footing capable of withstanding the maximum intended load must be provided.
- Scaffolds more the 6 meters (20 feet) in height must be tied to the building or structure at intervals which do not exceed 4 meters (13 feet) vertically and 6 meters (20 feet) horizontally.
- Do not overload scaffolds. Material should be brought up as needed. Scaffolding must not be loaded in excess of its rated capacity.
- Barrels, boxes, kegs, blocks or similar unstable object must never be used as work platforms or to support scaffold.
- Where persons must work under or pass under a scaffold then a 18 gauge wire mesh screen must be installed between the toe board and guard rail.
- Employees exposed to overhead hazards while working on a scaffold will be protected by 5 cm (2") thick planks.
- Wooden/bamboo ladders shall not be allowed at any cost. Ladder's rungs shall be fitted /welded properly. Before every use the rungs should be checked for safe use.
- The platform should have permanent hand rail and mid rail with Toe board without fail.
- All platforms are to be tightly planked for the full width of the scaffold, except as may be necessary

for entrance openings. Platforms shall be secured in place.

- On suspension scaffolds designed for a working load of 500 pounds, no more than two workers are permitted to work on the scaffold simultaneously. On suspension scaffolds with a working load of 750 pounds, no more than three workers are permitted on the scaffold simultaneously.
- Each employee on the scaffold shall use an approved safety harness attached to an independent lifeline. The lifeline is to be securely attached to substantial members of the structure (not the scaffold itself) or to securely rigged lines, which shall safely suspend a worker in event of a fall.

Suspension Scaffold

- Suspended scaffolds are platforms suspended by ropes, or other non-rigid means, from an overhead structure.
- Requirements for use are to be preapproved by HSE Head, under a specific Permit to Work.

Rolling Scaffolds

- The height of rolling scaffolds shall not exceed three times the minimum base dimension.
- The minimum base dimension of rolling scaffold will be 1.25 meters (4 feet).
- Adequate help must be provided when moving a rolling scaffold.
- Secure or remove all loose materials, equipment and tools before moving a rolling scaffold.
- No one is permitted to ride a rolling scaffold when it is being moved. Castor brakes must be locked-on when the scaffold is not being moved.

Scaffold Tagging

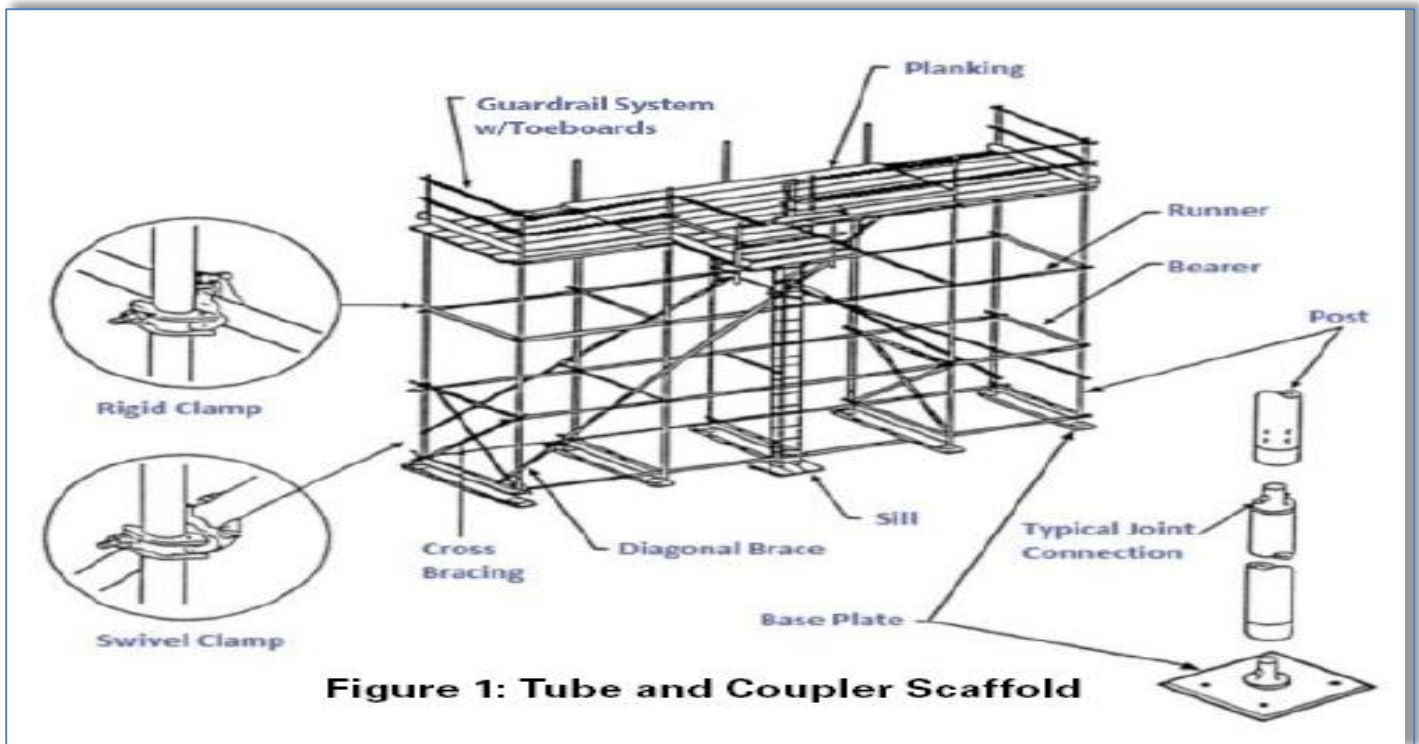
Scaffolds being erected, modified or dismantled must be tagged as suitable for use. The scaffolds can only be accessed by those involved with the process.

GREEN scaffold tag- shall be fixed when scaffold is complete and safe for use, signed and dated by the scaffolding competent person daily.

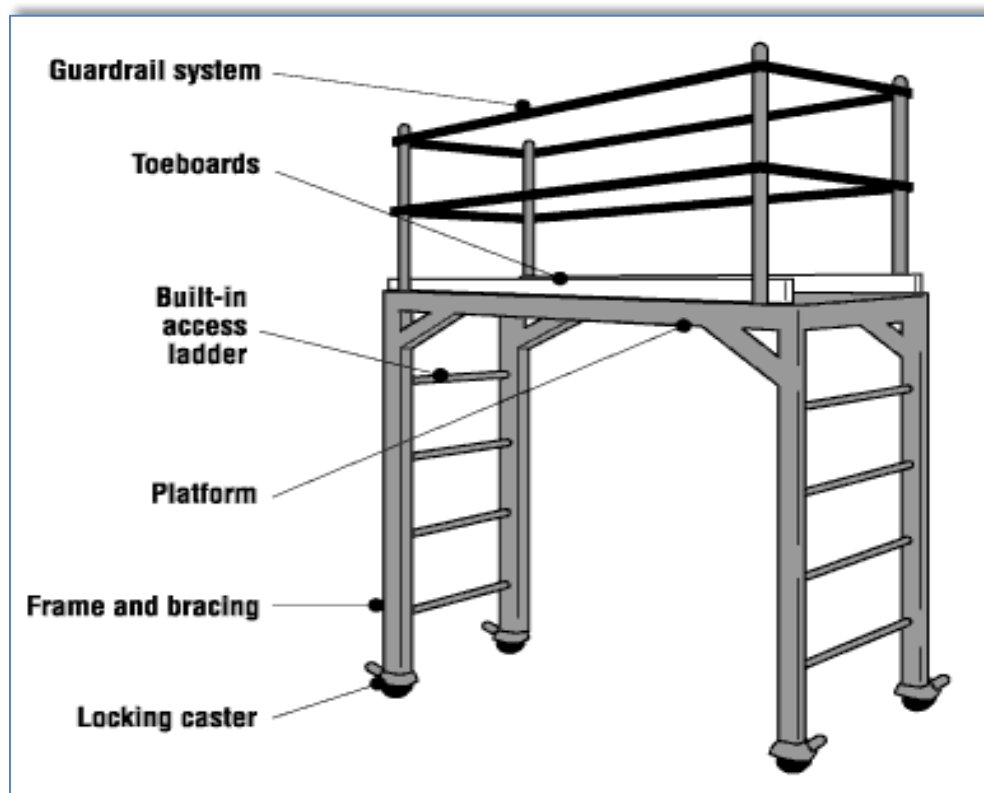
RED scaffold tag – to be fixed if scaffold is in some way defective and cannot be used or is still under erection.

Examples of scaffold tags:

Tube & Coupler Scaffold



Rolling Scaffold

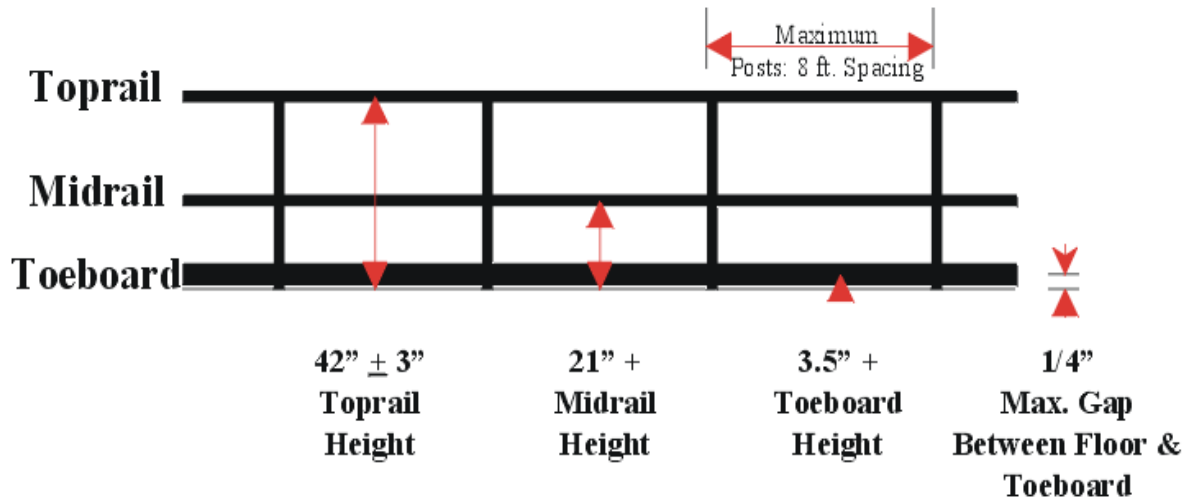


- Fall protection is required when working on a ladder above 2 meters and when climbing above nearby guardrails.
- Ladders must be inspected prior to use and by a competent person quarterly, with documentation.
- Use portable ladders for height up to 4 M only
- Provide fixed ladders for height above 4 M
- Place the ladder at an angle of 75 degrees (approx.) from the horizontal (1:4)
- Extend ladder at least 1 M above the top landing
- Secure top and bottom of the ladder firmly to prevent displacement- anti skid lining at the bottom
- Ensure that the width of the ladder is not less than 300 mm and distance between rungs is not more than 300 mm
- Provide landings of minimum size 600 x 600 mm at intervals not more than 6 M for fixed ladders. Check the ladders daily for any defects
- Ensure that the areas around base and top of the ladder are clear. Getting on and off the ladder is more hazardous than using it. Use a mudsill if the ladder is to rest on soft, loose or rough soil
- Do not use ladders of conducting material near power lines, and only use ladders near power line or other energize system with exposed parts if they are confirmed locked-out and de-energized.
- Stand no higher than the fourth rung from the top for carrying out any job standing on a ladder.
- Never reach out from a ladder to perform work where your belt buckle protrudes past the ladder rung.
- Always face the ladder while climbing up or down
- Maintain three-point contact while climbing up or down a ladder i.e. two hands and one foot or two feet and one hand on the ladder at all the times.
- Avoid climbing up or down a ladder while carrying anything in hands. Lift tools, equipment and materials with a rope.
- Work from portable and extension ladders near guardrail where fall expose exists over the guardrail regardless of height, and above 2.0 mtr. heights from the working/walking surface will require the use of personal fall arrest equipment

1.1 PRECAUTIONS AGAINST THE FALL OF MATERIALS, PERSONS AND COLLAPSE OF STRUCTURES

- 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 - however this shall be made of MS angles and flats only and duly certified by the HSE officer. Operators may also use designed containers for lifting small tools.
- 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.
- Guardrails must be able to withstand a 200-pound force exerted in any one direction.
- 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.
- 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

Guardrail system



- 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:
 - adequate safety nets or safety sheets shall be erected and maintained; or
 - adequate safety harnesses shall be provided and used and or
- adequate fall arrestor shall be provided and used. 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.
- The monkey ladders shall have sufficient fall arrestors. Adequate lifelines of 8mm steel wire rope shall be provided across the work area.
- The HSE officer shall recommend appropriate PPEs after analyzing hazards and risks involved.

2 Power Supply & Upkeep of Installation

(Note: Respective HSEMSM Systems Procedures and OCPs are to be followed in conjunction with these requirements)

- Only persons licensed to Govt of State shall maintain and operate power installations. All distribution boxes shall be locked and the key controlled by site management of concerned contractor.
- Electrical appliance shall have proper earthing and for appliances equal to & more than 415V shall have two separate earthing (as per IS-3043-1987)
- All electrical supply shall be provided through ELCB of 30mA sensitivity.
- The working condition and sensitivity of ELCB shall be checked periodically.
- All fuses and fuse wires shall be of standard size and rating.
- All power supplies through cables shall be underground or overhead with height > 3mtrs.

by requirements of all applicable codes and standards for such work; Wiring and Branch Circuits Must be protected by a proper amperage over-current device such as a HRC fuse or circuit breaker. Such installations must be located so as to prevent physical damage to the wire conductors & panels.

- Portable electric lights used in wet or potentially wet locations must be either low voltage type (24 volts or less) or protected by a GFI (ground fault interrupter).
- Must be visually checked before each use and periodically while in use to assure their original integrity is maintained. Cords with cuts, breaks, deep abrasions, etc. shall be taken out of service immediately. Repairs to extension cords shall only be performed by qualified/ licensed electricians.
- Must not be allowed to lie in wet or potentially wet areas.
- **Underground Cables:**

- Every electric line or cable of unknown origin that is discovered or exposed during a digging, drilling, probing, or similar operation is to be considered as energized and life threatening.
 - The senior company employee on the site will ensure that all necessary safety precautions are taken in order to isolate the line from all workers and the public.
 - Such precautions may include halting the operation if appropriate.
 - The senior company employee on the site is to then contact the proper authorities to have the line identified and either confirmed to be abandoned and/or made safe for continuing the work.
 - Any and all underground lines that are discovered or become severed must be considered energized on both sides, and be treated accordingly.
- In general, equipment or machinery being moved or transported must maintain minimum clearances of 25 ft. to all power lines.
- 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. Ensure "double insulated" three - core cables and three pin connectors are used and are properly ground "all insulated" types, all electrical tools and appliances must be manufactured for industrial use.
- All connections shall be electrically and mechanically sound and properly insulated. Taped joints are not permitted. Connections to socket outlets must be made with proper plugs.
- Splices in electrical cords are not permitted. Repairs must be made at the socket connection and retain the same mechanical and dielectric condition of the original connection.
- Damaged or defective electric tools, equipment and extension cords, etc. must not be used and shall be tagged out of service, removed from the work area and taken back to stores.
- Only licensed electricians are authorized to repair and work on electrical equipment. Tampering with electric tools or equipment by others could result in termination.
- Temporary electric cabling should be elevated 2.2 meters above the floor/ground or covered for protection. It must be kept clear of walkways and other locations where it may be exposed to damage or create a tripping hazard.
- Energized wiring in junction boxes, circuit breaker panels and similar places must be covered and locked at all times.
- Areas with live high voltage wires or terminals must be barricaded against entry and warning signs posted Danger – High Voltage and Authorized Personnel Only.

- Personnel should never work on energized equipment, de-energizing (lockout/tag out) the equipment is always the first requirement.

- The lockout and tag out procedure will be used when testing or working on, or around, energized installation.
- Working around energized equipment should never be done alone. A second electrician must always be available for assistance.
- If lockout/tag out of the work is infeasible (must be demonstrated), work on energized electrical circuits must be approved by the Site In-charge. All safety precautions necessary must be taken, PPE use must be evaluated per the exposure and used, i.e high/low voltage gloves, insulated shoes, overcoats/aprons, face shields, and other protective equipment like insulated tools, blankets, mats, etc. must be used.
- The welding machines earth leads shall be properly fixed without loose contacts. The earth cable only has to be used. No steel members shall be used as earth leads.
- Electrical crews must be qualified for the equipment and tools they work on, including being trained in Cardio-Pulmonary Resuscitation (CPR) methods and First Aid for rendering help in the event of electric shock.

Qualified and Unqualified Workers (Electrical Works)

Basic electrical safety knowledge is a major concern. It is critical that only qualified workers be allowed to perform this work. Therefore, only those persons that are both qualified and authorized may install, fabricate, repair, test, calibrate or modify electrical or electronic wiring, devices, parts, systems or equipment.

Qualified Person:

One who is trained and wiremen licensed to Govt of State and familiar with the construction, operation and safety hazards of the equipment upon which they are permitted to work.

- Qualified persons are intended to be only those who are well acquainted/experienced with and thoroughly conversant in the electric equipment and electrical hazards involved with work being performed.
- Only qualified persons may be permitted to work on or near exposed energized parts. Such persons are required to have been trained in three specific areas:
- Qualified persons must be capable of working safely on energized circuits;
- Must be familiar with the proper use of special precautionary techniques and procedures based on equipment and exposure; and
- Must be familiar with required personal protective equipment, insulating and shielding materials, and insulated tools.
- Qualified persons are expected to be able to evaluate unknown situations and adjust their activities in such a way that only safe work practices are used. Such behavior is the responsibility of the qualified person.
- It is possible and likely for an individual to be 'qualified' with regard to certain equipment in the work place, and unqualified on other equipment they must know their limitation and stop work if not qualified on what equipment they were to work on.
- An employee who is undergoing on-the-job training, who, in the course of such training, has demonstrated an ability to perform duties safely at his or her level of training, and who is under the direct supervision of a qualified person is considered to be a qualified person for the performance of those duties. The process must be documented as proof.

3 Lifting Operations

(Note: Respective HSEMSM Systems Procedures and OCPs are to be followed in conjunction with these requirements)

- 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 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. 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".
- 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.

3.1

3.2 PERSONNEL LIFTS (MAN-BASKET): (TO BE TREATED AS A T&P ITEM)

A Personnel Man-Basket permit shall be completed prior to lifting any people, along with a rigging plan.

- Man-basket shall be used where access through ladders or scaffolding is not feasible.
- Man-baskets shall be designed and engineered by a manufacturer (job made man-baskets are not allowed, unless designed and tested by a certified engineer), and built robust with MS Angles and flats or plates or channels only.
- Guard rails top and mid, must be in place and screened-in to avoid material from falling out of basket. The factor of safety shall be 200%.
- It shall have a door with double latches and shall open inside. Anchor points shall be identified within the man-basket.
- The man-basket shall be thoroughly inspected and load tested and a trial run performed without personnel before being put to job.
- It shall be treated as a lifting tool and shall undergo same certification cycle and inspection as other lifting equipment.
- An additional sling of required lifting capacity shall be fixed the man-basket main lifting point and attached to the crane above the ball or block.
- While lifting man-basket, the crane shall maintain a uniform speed of lift without any swing.
- Once man-basket reaches the destination, the lift brakes shall be locked as long as the basket remains at that point. The same care shall be taken in its descent.
- As for hanging man-basket, the same shall be hung off a rigid structure with help U-shaped handle welded to man-basket. This shall be tested once in a year by a competent person.



3.3 CRANES & HOISTING EQUIPMENT

This section provides the guidelines to ensure proper rigging and lifting activities are accomplished safely and in accordance with applicable specifications, codes, and regulations.

- 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.
- Cranes shall have an Anti-Two-block safety device installed
- All mobile cranes shall have overload and backup alarms, load angle indicators and limit switches
- 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).
- 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
- 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. Make certain that the rigging personnel, material, and equipment have the necessary capabilities for the job and are in safe condition.
- 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.
- Mats/Pads must be used on all lifting equipment, equipped with outriggers.
- Pick and carry must have the load secured to the rig in front.

Proper Crane Setup

SAFE RIGGING PRACTICES

- Review the planned operation and requirements with the operator and rigging crew.
- Ensure a pre-lift meeting is conducted with crane operator, tagline operator, signal personnel, and Safety Manager.
- 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 desired clearance by visual means.
- Clear the lift area of all unnecessary personnel.
- Hydras shall only be allowed for loading & unloading works & shall not be allowed to move with load

Rules for safe rigging

- Use loops, thimbles and corner pads to prevent damage to slings when used around corners or on cutting edges.
 - Never allow wire rope to lie on the ground for any length of time or on rusty steel or near solvents, chemicals or corrosive substances.
 - Slings must not be pulled from between or under loads with load resting on the sling.
 - Keep all rope away from flame cutting or welding operations.
 - Never use rope as sling material.
 - Never wrap a wire rope completely around a hook.
 - Do not bend wire rope near any attached fitting.
-
- The sling must be selected to suit the most heavily loaded leg rather than the total weight when using multi-legged sling to lift loads in which one end is heavier than the other.
 - When using 3 and 4 legged sling configurations, any two legs must be capable of supporting the entire

load.

- Where possible, wire rope choker hitches must include a shackle with the eye around the shackle pin to prevent breaking wires of the choke. The choker hitch must be “snugged down” prior to lifting, not after tension is applied.
- Unless authorized by the hook manufacturer when more than two rope eyes are placed over a hook, install a shackle, pin resting in the hook, and place the rope eyes in the bowl of the shackle.
- Properly rig all loads to prevent dislodgment of any part.
- Use guide ropes or tag lines to prevent the rotation or uncontrolled motion of the load when necessary.
- Loads must be safely landed and properly blocked before being unhooked and unslung. Tag lines must not be used in situations that jeopardize the safety of the lift.
- Lifting beams must be plainly marked with their weight and designed working load and must only be used in the manner for which they were designed.
- The hoist rope or chain must never be wrapped around the load. The load must be attached to the hook by slings or other rigging devices that are adequate for the load being lifted.
- Multiple part lines must not be twisted around each other.
- The hook must be brought over the center of gravity of load before the lift is started.
- If there has been a slack rope condition, determine that the rope is properly seated on the drum and in the sheaves prior to lifting.
- Keep hands away from pinch points as the slack is being taken up.
- Leather gloves are recommended when handling wire rope.
- Avoid impact loading caused by sudden jerking when lifting or lowering. Lift the load gradually until the slack is eliminated.
- Never ride on a load that is suspended.
- Avoid allowing the load to be carried over the heads of any personnel.
- Never work under a suspended load until the load has been adequately supported from the floor and all conditions have been approved by the supervisor in charge of the operation.
- Never leave a load suspended unless emergency evacuation is required.
- Never make temporary repairs to sling.
- The capacity of a sling is determined by its angle, construction, type of hitch and size.
- Never lift loads with one leg of a multi-leg sling until the unused legs are made secure.
- Never point load a hook unless it is especially designed and rated for such use.
- Make certain that the load is broken free before lifting and that all legs are taking the load.
- When using two or more slings on a load make certain all slings are made from the same materials.
- Lower the loads on to adequate blocking to prevent damage to the slings.
- Materials and equipment being hoisted must be loaded and secured to prevent any movement which could create a hazard in transit.
- The weight of the hook, load block and any material handling devices must be included when determining crane capacity.
- Calculated weights cannot exceed 75% of the chart without written approval.
- Personnel must be completely clear of loads being picked up or set down by crane. Tag lines will be used to control the loads. Loads must not be touched by hand while placing/ moving.

3.4 SLINGS

Synthetic Slings

The following are rules for safe use of synthetic slings:

- Synthetic slings must be marked to show the rated capacity for each type of hitch and type of web material.
- Nylon web slings must not be used where fumes, vapors, sprays or mists or liquids of acids or phenolic are present. Web slings with aluminum fittings must apply in this category.

Synthetic web slings must be removed from service and destroyed if any of the following conditions are present:

- Acid or caustic burns
- Melting or charring of any part of the sling surface
- Snags, punctures tears or cuts
- Broken stitches
- Distortion of fittings
- Synthetic web slings of polyester or nylon must not be used at or come in contact with temperatures in excess of 82°C
- Polypropylene web slings must not be used at or come in contact with temperatures in excess of 93°C
- Insulated hooks must be tested yearly to insure insulation integrity to at least manufacturer's specifications.

Wire Rope Slings must be removed from service and destroyed if any of the following conditions are present:

- In (10) randomly distributed wires broken in one (1) rope lay, or five (5) broken wires in one (1) strand in one (1) rope lay.
- Wear or scraping of one-third the original diameter of outside wires.
- Kinking, crushing, bird caging or any other damage resulting in distortion of the wire rope structure such as:
 - Evidence of heat damage.
 - End attachments that are cracked, deformed worn.
 - Corrosion of the rope or end attachments.

Metal mesh slings must be immediately removed from service if any of the following conditions are present:

- A broken weld or broken brazed joint along the sling edge.
- Reduction in wire diameter of 25 percent due to abrasion or 15 percent due to corrosion.
- Lack of flexibility due to distortion or corrosion.

Synthetic web slings must be removed from service and destroyed if any of the following conditions are present:

- Acid or caustic burns
- Melting or charring of any part of the sling service
- Snags, punctures, tears or cuts
- Broken stitches
- Distortion of fittings

- The rated load of the plate clamp must be marked on the main structure.
- Care must be taken to make certain the load is correctly distributed for the plate clamp being used.
- Do not allow load or plate clamp to come into contact with any obstruction.
- The plate clamp must not be used for side pulls or sliding the load.
- When lifting stainless steel or special alloys, ensure plate clamp is designed for use on the specific metal.

Crane operators must follow the following:

- Pass an annual Operator's Physical examination
- Carry a valid training certification card at all time while operating issued by the Govt. or other recognized institute.

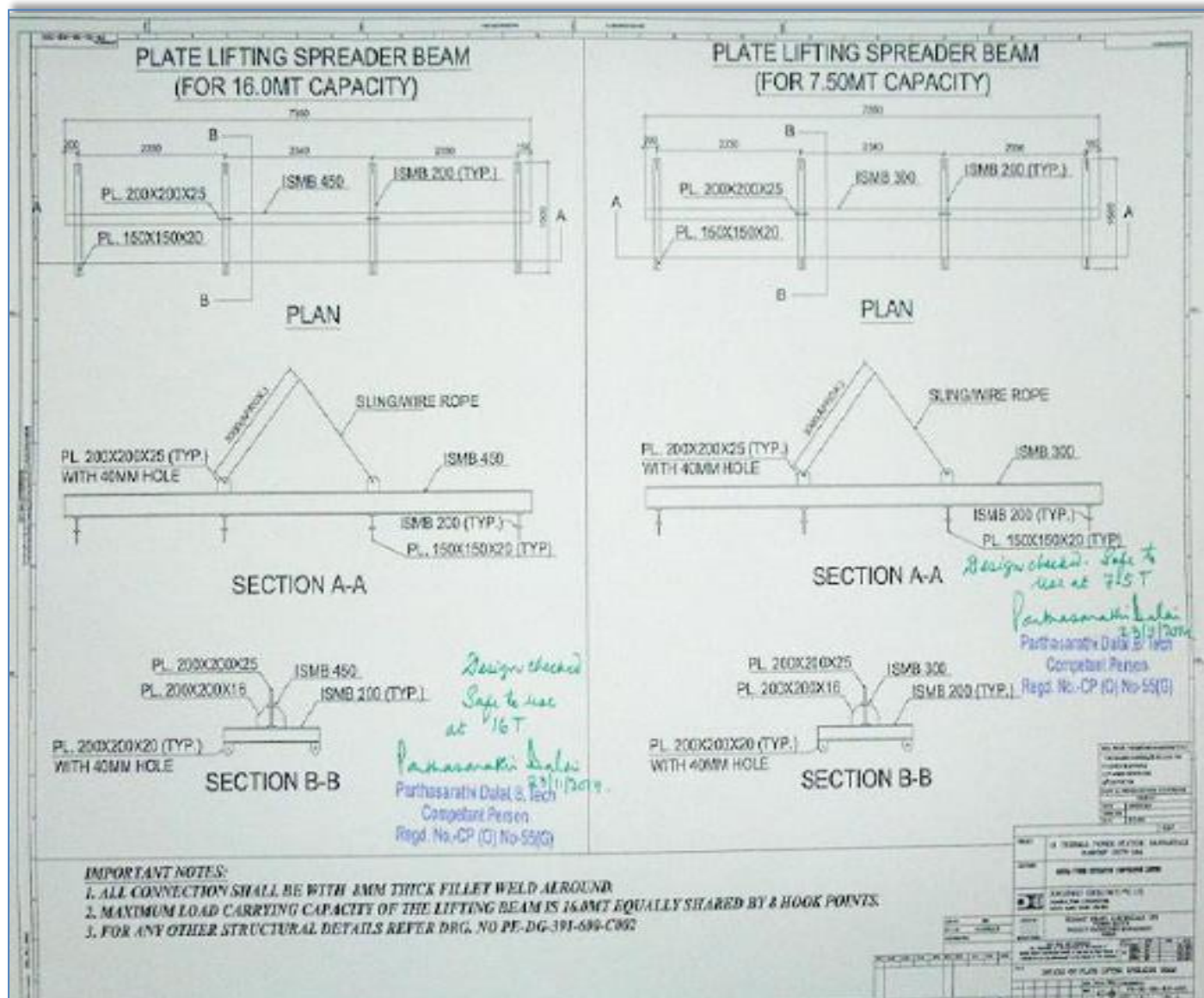


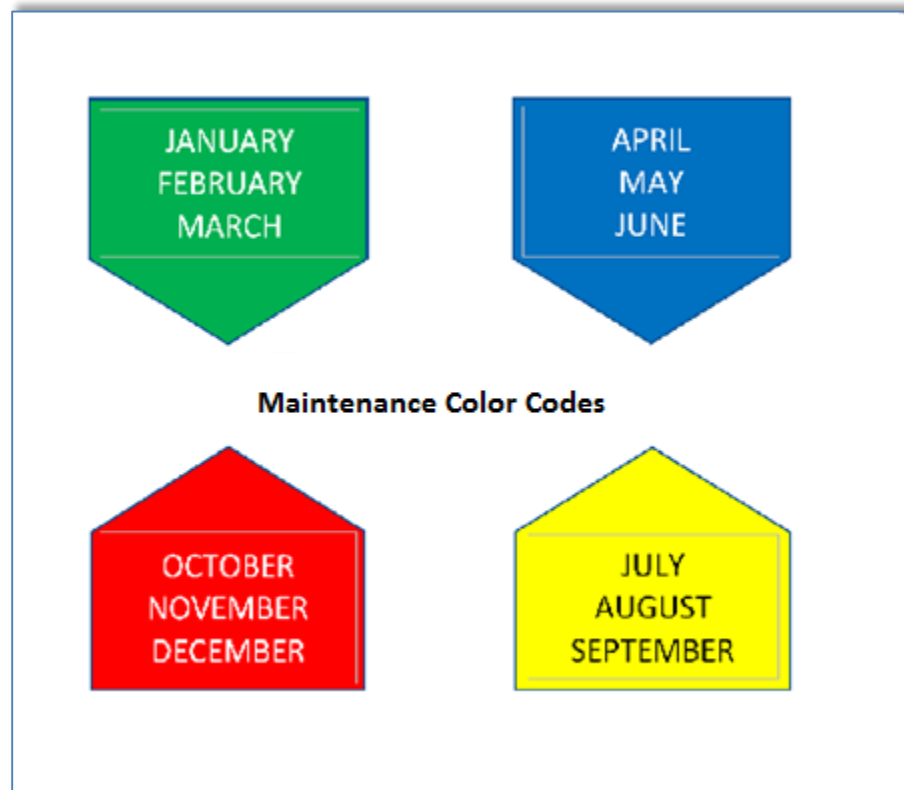
Plate Lifting Spreader Beam Configuration for 7.5 MT and 15 MT Loads

3.5 COLOR CODING PROCEDURE:

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 color codes used on the project shall be:

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

- 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.
- Following the initial inspection, the equipment must be color-coded quarterly as per color-coding instructions that will be issued by the Contractor.
- Fire extinguisher with the current month color-coding inspection sticker must be provided and secured in the platform.
- 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.
- 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.
- A five (10) day interval period shall be given into each monthly color code change. During this five (10) day period either color shall be acceptable.



4 Use of Hand Tools and Power-Operated Tools

(Note: Respective HSEMSM Systems Procedures and OCPs are to be followed in conjunction with these requirements)

4.1 GENERAL PROVISIONS

- All hands and power tools and similar equipment, shall be maintained in safe condition.
- When power operated tools are designed to accommodate guards, they shall be equipped with such guards, when in use;
- Belts, gears, shafts, pulleys, sprockets, spindles, drums, fly wheels, chains and other reciprocating, rotating or moving parts of the equipment shall be similarly guarded;
- 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, vapors, or gases shall be provided with the particular personal protective equipment necessary to protect them from the hazards;
- 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.
- 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.

4.2 HAND TOOLS

- The contractor shall not issue or permit the use of unsafe hand tools;
- Wrenches including adjustable pipe end and socket wrenches shall not be used when saws are sprung to the point that slippage occurs;
- Impact tools such as drift pins, wedges and chisels shall be kept free of mushroomed heads;
- The wooden handles of tools shall be kept free of splinters or cracks and shall be kept tight on the tools.

4.3 POWER OPERATED TOOLS

- Electric power operated tools shall be either of the approved double-insulated type or shall be grounded;
- The use of electric cords for hoisting or lowering loads shall not be permitted;
- Pneumatic power tools shall be secured to the hose or whip by some positive means to prevent the tool from becoming incidentally disconnected;
- Safety clips or retainers shall be securely installed or maintained on pneumatic impact (percussion) tools to prevent attachments from being incidentally expelled;
- 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;
- 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;
- The manufacturer's safe operating for hoses, pipes, valves, filters and other fittings shall not be exceeded;
- Only personnel who has been trained in the operation of the particular tool shall be allowed to operate power-actuated tools;

- 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;
- 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;
- 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;
- Loaded tools shall not be left unattended;
- 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;
- 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;
- No fastener shall be driven into a palled area caused by an unsatisfactory fastening;
- Only non-sparking tools shall be used in an explosive or flammable atmosphere;
- All tools shall be used with the correct shield, guard or attachment as recommended by the manufacturer.

4.4 ABRASIVE WHEELS AND TOOLS

- All grinding machines shall be supplied with sufficient power to maintain the spindle speed at safe levels under all conditions of normal operation;
- Grinding machines shall be equipped with suitable safety guards;
- 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 8.650 above the horizontal plane of the spindle. Safety guards shall be strong enough to withstand the bursting of the wheel;
- 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;
- Cup type wheels used for external grinding shall be protected by either revolving cup guard or a band type guard;
- 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 incidental breakage. The maximum angular exposure of the grinding wheel periphery and sides shall not exceed 1800;
- Portable abrasive wheel used for internal grinding shall be provided with suitable safety flanges;
- 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 incidental breakage, shall be used;
- All abrasive wheels shall be closely inspected and ring tested before mounting to ensure that they are free from cracks or defects;
- 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;
- All employees using abrasive wheels shall be protected by suitable eye protection equipment.
- All fixed power driven woodworking tools shall be provided with a disconnect switch that can either

4.5 WOODWORKING TOOLS

be locked or tagged in the off-position;

- 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;
- 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;
- 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.

5 Start Up, Commissioning and Testing:

(Note: Respective HSEMSM Systems Procedures and OCPs are to be followed in conjunction with these requirements)

There are various activities involved prior to commissioning- the major ones are -Hydraulic Test, Steam Blowing, Transformers Charging, Boiler Light Up, Rolling and Synchronisation and Full loading of unit.

- 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.
- Entry of persons to the area of activity shall be suitably restricted and the emergency functions like Ambulance, first aid center and Fire station shall be intimated about the plan well in advance.
- Tag-in/ 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.

6 Demolition Work

(Note: Respective HSEMSM Systems Procedures and OCPs are to be followed in conjunction with these requirements)

Before any demolition work is commenced and also during the process of the work the following shall be ensured:

- All roads and open areas adjacent to the work site shall either be closed or suitably protected.
- 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.
- 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.

7 Civil Works

(Note: Respective HSEMSM Systems Procedures and OCPs are to be followed in conjunction with these requirements)

7.1 EXCAVATION

Excavation is the essential element of the construction process for making foundations, drainage work and site re-grading of all kinds.

In carrying out excavations the soil condition can vary widely, often in short distances. No soil whatever its nature can be relied upon to support its own weight for any length of time. Even a small fall of earth is capable of inflicting serious injury even if it does not kill. Unless and until the excavation is battered, the sides need supporting to prevent the possibility of collapse.

The following safety measures are to be ensured before and during excavation:

- 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
- Proper and adequate slope is maintained while excavating
- Adequate shoring or sheeting is done wherever require to prevent soil sliding
- Safe access through ladder or steps for exit & entry to excavation
- No material /excavated soil is kept within one meter from the edge
- Safe way is planned and provided for movement of HEM /transport equipment near excavation
- Safety helmet and shoes/gum boots are provided and worn by the workmen at excavation works
- Dewatering arrangement is made where water seepage is prevailed.
- Stop blocks are provided to avoid vehicles reversing into the excavated trenches
- Danger signs /Caution boards are displayed at work spot
- Barricading is provided at excavated pits

Soil Type	Height/Depth ratio	Slope Angle
Stable Rock	Vertical	90 deg.
Type A	$\frac{3}{4} : 1$	53 deg.
Type B	1 : 1	45 deg.
Type C	$1\frac{1}{2} : 1$	34 deg.

TYPE A SOIL Simple Slope Excavation	TYPE B SOIL Simple Slope Excavation	TYPE C SOIL Simple Slope Excavation
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Determining Soil Type		
Type	Description	Examples
A	Cohesive soils with an unconfined compressive strength of 1.5 tons per square foot or greater.	Clay, silty clay, sandy clay, clay loam and in some cases: silty clay loam and sandy clay loam.
B	Cohesive soils with unconfined compressive strength greater than 0.5 tsf but less than 1.5 tsf.	Angular gravel (similar to crushed rock), silt, silt loam, sandy loam and, in some cases silty clay loam and sandy clay loam.
C	Cohesive soils with unconfined compressive strength greater than 0.5 tsf or less.	Granular soils such as gravel, sand and loamy sand; submerged soil or soil from which water is freely seeping; submerged rock that is not stable.

7.2 PILING

It is the first and foremost activity of construction where load bearing capacity of soil is inadequate for

foundation. The working condition of piling rig and other associated tackles is a significant contributing factor for prevention of equipment failure during operation.

Ensure the following precautionary measures before starting piling works:

- Inspection of piling equipment by responsible person for its condition before initiating piling operation.
- Testing and its certification wire ropes, slings, D-shackles, chain pulley blocks using in the process of piling work by competent person
- Adequate support and secured foundation of the piling equipment to avoid toppling
- Hoses should be lashed and adequately secured
- Proper work platform is to be provided on piling frame
- Safe work procedures and close supervision to prevent unsafe acts of operators/any unsafe conditions that may arise
- Only experienced and trained operators are engaged for the piling operation
- Provision of Personal Protective Equipment (PPE) like safety shoes/gumshoes/safety helmet/safety belt etc. and its use by their workmen.
- Special care and precautions If work is near electrical live cables/ electrical equipment
- Cordoning of work area to prevent un authorized entry
- Guarding of revolving parts
- Specific measures to prevent over turning of pile driver/missing of hammer/ hammer movement out of range

7.3 BATCHING PLANT

Following Safety considerations for batching plant are to be ensured:

- Installation of external Electric motovibrators in the feeding hopper of all batching plants to reduce human intervention.
- Installation of safety devices like pull-chord on both the sides of conveyor for stopping the conveyor in emergency
- Workers carrying cement / sand to be given appropriate PPEs like respiratory masks & gloves.
- Conveyor belt/rotating parts must be guarded properly.
- Safety awareness shall be inculcated in workmen about the risk involved in rotating parts.
- The agency shall ensure to erect the batching plant as per drawing including installation of all safety devices as provided by manufacturer and witnessed by BHEL Engineer in charge before starting of machine in future.
- Safety audit to also focus on Batching plant.
- The site shall impose penalty on the agency who has violated the safety norms as per contract.

7.4 MOBILE PLANT

Mobile plant including tractors, trailers, dumpers, excavators, bulldozers, road rollers etc. for earthmoving purpose, concrete mixers, concrete transit mixtures, concrete pumps etc for concreting purpose are extensively used in construction Industry. Due to the very nature of their function and movement in difficult terrains, congested areas, working in tandem with manual work and other operations the danger is inherent.

Many potentially hazardous situations and accidents could be avoided by the application of known safety principles and procedures

Safety measures

- Where movement around site is involved, routes should be planned, obstruction free and well maintained
- Observe specified speed limits
- Operating personnel should be aware of associated risks and its preventive measures
- Only experienced, trained and authorized persons with valid license (wherever applicable) should operate the mobile equipment/vehicles
- Provide and use Warning lights and reverse horn for cautioning the people around
- Operation should be on level and stable ground with adequate working clearance.
- Loading of out riggers/stabilizers should be well within safe ground bearing capacity
- No person should be on equipment or vehicle during loading and unloading of material
- Operators should be protected by warning barriers or switching off power when working in close proximity of overhead power lines

- The equipment /vehicles should be well maintained and provided with effective brake system and other safety devices (wherever require)
- Rotating parts of equipment should be adequately guarded
- Provide necessary personal protective appliances and ensure its use by the operating personnel
Ensure effective measures at source to control harmful emissions, dust, fumes contaminating atmosphere and cause health hazards to the operators and people in the vicinity.
- No overloading/over stressing of vehicles/plant is allowed
- Hoses, pipes, receivers, gauges and valves involved in carrying out hydraulic fluid/ compressed air should be checked for leaks and tested prior to operation.
- Adequate safe clearance for swing and movement is to be judged during operation of Concrete mixer
- Setting of machine on firm and level ground with wheel locked to prevent movement of machine
- Proper instructions and Special precautions are to be ensured to prevent entry in to the danger zone of projectile of bucket while dropping bucket
- Operator leaving work spot should ensure that the equipment/vehicle is kept in neutral position and place on firm and level ground.
- The hand brake should be kept in position and block road wheels as additional safety measure
- Blades/buckets should be kept low while moving
- The dozer blades should not be used as brakes except in emergency
- The ground should be examined for its bearing capacity and general safety especially when operating road roller at the edges of slopes, embankments.
- The roller should not be moved downhill with the engine out of gear
- If operating near excavations the following precautionary measures are to be ensured
- Barricading, edge protection to prevent fall of persons/vehicles over running while reversing etc.
- Suitable support system and adequate allowance to avoid the danger of side collapsing
- Experienced signaler /attendant should be always accompanied with operator/driver for proper direction /signal and also to caution others in the working Zone during operation of mobile plant

7.5 CONCRETE VIBRATORS

- Revolving parts/belt drives should be adequately guarded and Vibrating unit shall be completely enclosed
- Electrically operated compact Vibrators is of completely enclosed type having suitable overload relays and effectively earthed
- Ensure sufficient length of cable to the Vibrator.
- Ensure electric starters and other accessories are firmly fixed adequately supported
- Ensure locking of needle load while inserting needle in to the vibrator,
- Ensure periodical lubrication and maintenance

7.6 CONCRETE MIXTURE

- Setting of machine on firm and level ground with wheel locked to prevent movement of machine
- Proper instructions and Special precautions are to be ensured to prevent entry in to the danger zone of projectile of bucket while dropping bucket

----Annexure-A Ends---

ANNEXURE – B: HSE REQUIREMENTS FOR ADVERSE CLIMATES & WEATHER CONDITIONS

(Note: Respective HSEMSM Systems Procedures and OCPs are to be followed in conjunction with these requirements)

1. Summer Preparedness Guidelines

- The Working Time and Lunch Hour will be as per instruction of Statutory Authorities (no work between 11am to 3:30pm) . However, in case temp comes down due to rain/cloudy weather work will continue as per normal routine.
- 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.
- They will be allowed to take small break during work as per their need.
- Water sprinkling will be done on roads to reduce **dust** concentration.
- Workers will be provided with adequate cool drinking water and Butter milk/Lemon water etc.
- 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.
- 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.
- Worker will be informed about the Do's and Don'ts to be followed during summer in the Pre Job Brief.

Do's & Don'ts

- Drink plenty of cool water and other non-alcoholic fluid and keep body well hydrated.
- Eat salt in food to replenish loss of salt through sweating.
- Avoid over physical exercise.
- Have adequate sleep at night.
- Eat light and less spicy food
- Avoid eating food which was cooked long time ago.
- 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.

Emergency Handling

In case of emergency due to heat disorder:

- Rescue the victim from workplace and place under shed.
- If to be rescued from height, use stoke basket or rescue kit.
- Inform Ambulance immediately.
- If nearby any air conditioned room/shed is available, place him inside the room/shed.
- Administer First aid by trained First aider for Heat Disorder
- If conscious, give him ORS solution to drink.
- If required send the victim hospital immediately.

2. MONSOON PREPAREDNESS GUIDELINES

These guidelines provide procedure to be followed during monsoon period in the entire project with respect:

- To give clear guidance as to other action that must be implemented
- To inform employees what to do in an Emergency Scenario
- To establish an emergency response and communication procedure

Procedure

2.1 During monsoon the following will be implemented:

- 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.
- 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.
- 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.
- Do not permit any one to ride up or come down scaffolds frame work during heavy wind or rain.
- Provide “anchor” of adequate strength to scaffolds and other high-rise structures.
- 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.
- Ensure proper “earthing” for each and every electrical appliance.
- Double earthing need to be provided for 3-phase power supply and for voltage more than 220V.
- All electrical connections / loads have to be routed through RCCB (residual current circuit breaker) whose rating should be 30mA. RCCB operational checks need to be done monthly during monsoon season.
- 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.
- Maintain smooth flow on open drains. i.e. no obstruction or blockade shall be made on storm water drains. If required, make temporary drains.
- Arrange back-filling of excavated pits on war-footing basis.
- Arrange bringing down booms of all cranes, hydra machines during stormy weather (wind speed 40-50 kmph)
- Confirm that all gantry cranes are effectively choked to prevent rolling and toppling.
- Do not forget to deep ready a dew battery operated lights at site-offices during rainy season.
- 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.
- Avoid using wet damp clothes.
- Barricade excavated zone filled with water.
- 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.
- Spread sand/dry soil over slippery area.
- Avoid movement of vehicles as minimum as possible.
- Avoid self-medication – consult doctors/physicians if feeling sneezy or cold.

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:

- 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.
- 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.
- 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 Workman will be made aware of following Do's and Don'ts:

- Do not sleep in daytime.
- Avoid over physical exertion.
- During lightning and thunder storm, do not take shelter under tree. Take shelter inside rest shed or store room.
- Wash vegetables with clean water and steam them well to kill germs.
- Avoid eating un-cooked foods and salads should be washed properly before consumption.
- Drink plenty of water and keep body well-hydrated.
- Always keep the surrounding area dry and clean. Don't allow to get water accumulated around.
- Keep body warm as viruses attack immediately when body temperature goes down.
- Do not enter air conditioned room with wet hair and damp cloths.
- Dry your feet and webs with soft dry cloth whenever they are wet.
- Eat light and less spicy food.
- Avoid eating food which was cooked long time ago.
- Eat salt in food to replenish loss of salt through sweating.

Emergency Conditions

2.4 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.

The actions required during cyclone/rough weather:

- Check and advice subcontractors to cleanup work area. Pick up all loose and unused material of respective supervisor's area.
- Tie to secure all gas cylinders to avoid displacement and unsafe conditions which could be due to wind pressure.
- Secure portable electricity generating sets and other equipment, pumps, hoses etc.
- Make preparation for removal of water logging.
- Take review of work activity and make preparation for removal of equipment and material from vulnerable areas.
- Isolate/turn off all electrical power form the main panel/switches. Secure and anchor panels properly.
- Recheck anchorage/tie of all temporary structures/sheds, tall objects, cranes, rigs, scaffolds etc. to avoid toppling due to wind force.
- 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.
- Group up all trash barrels, wooden pallets, forms; wooden decks etc. and anchor properly.
- 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.
- Set on site vehicles on high ground in the site area with brakes set firmly.
- Anchor all tanks, vessels, gas cylinders that may be moved by high wind and water.
- Evacuate job site.

2.5 Personnel Evacuation:

- 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.
- 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.
- 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".
- 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.
- Checking of gas leaks and wellbeing of electrical appliances is essential before leaving the site.
- Follow local communications for official warning and advice. The construction Manager shall also obtain updates from customer/metrological departments and communicate to the personnel on project site.

3. PREPAREDNESS FOR OTHER ADVERSE CLIMATES AND WEATHER CONDITIONS

Preventive steps for ensuring health and safety of workers in all possible adverse weather conditions to be ensured as per requirement

ANNEXURE – C: FIRE EXTINGUISHER TYPE AND QUANTITY REQUIREMENTS

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. CO ₂ ; 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 CO ₂ ; minimum 3 nos. per room; should not be required to travel more than 10 meter to reach any extinguisher.
7.	CLASS 'D' Fires involving metals like magnesium, aluminum, zinc, potassium etc. where the burning metal is reactive to water and which require special extinguishing media or technique	SPECIAL DRY POWDER IS: 2171 - 1976 IS: 4861 -1968	For every 50 square meter floor area or part, 2 nos. 5 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 CO ₂ . 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 – D: HSE TOOLS & EQUIPMENT

Following is an illustrative list of HSE tools and equipment that are to be ensured at site as per requirement

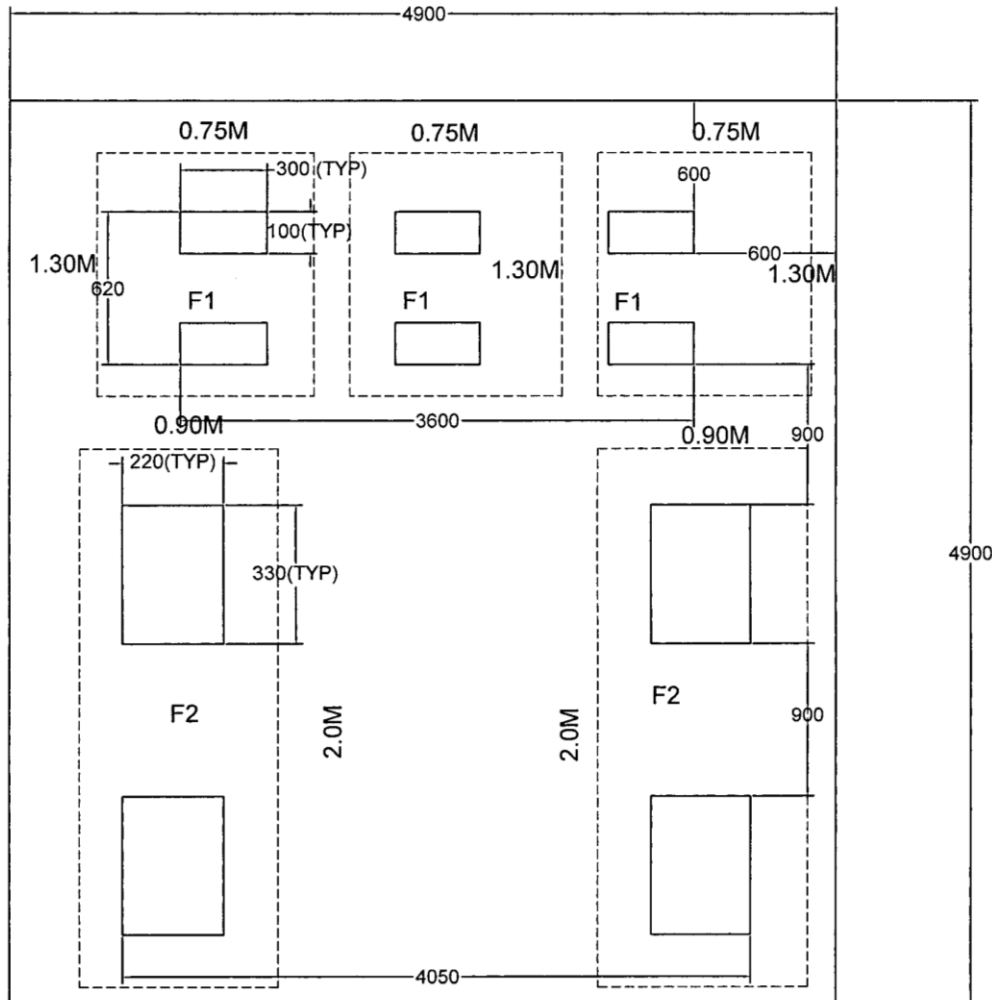
1. ELCB Tester
2. Multi meter (Light cables)
3. Earth Resistance Meter
4. Lux Meter
5. Anemometer
6. Breath Analyzer (Alcohol)
7. Multi-gas dozi-meter (confined space gas detector)
8. Gas leakage detector / alarm
9. Gas monitor (confined space)
10. Oxygen level meter
11. Radiation meter & Badges
12. Blood Pressure Monitor
13. Fire detectors
14. Fire blanket
15. Sand Buckets
16. Flash-back arrestors
17. Barricading tape and Hard barricading planks
18. Standby Fire kits (Types of fire extinguisher)
19. Standby PPEs (safety helmet, shoes, eye protection, welding helmet, face shield, Apron, Ear plug, Nose mask, hand gloves etc.)

Other Equipment / Setups

1. PA System for Training
2. Projector and audio system for training
3. PC/Laptop for Training
4. Vertigo Test Structure
5. Binoculars – Long Range for detection of unsafe acts
6. Walkie-Talkies – for coordination between different gangs as required.
7. LOTO kit (Lock-out & tag-out plate)
8. 24-Volt light

ANNEXURE – E: SPECIFICATIONS OF VERTIGO TEST

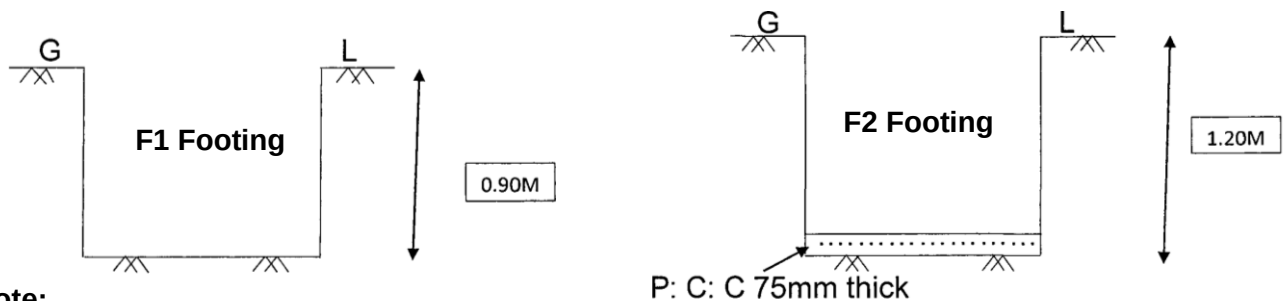
S. No.	Topic
1	Vertigo / Height working Test Structure Layout
2, 3	Structure Layout Sketch
3	Actual Photo of a typical structure
4	Bill of Materials
5	Guidelines for Conducting the Test



Note:

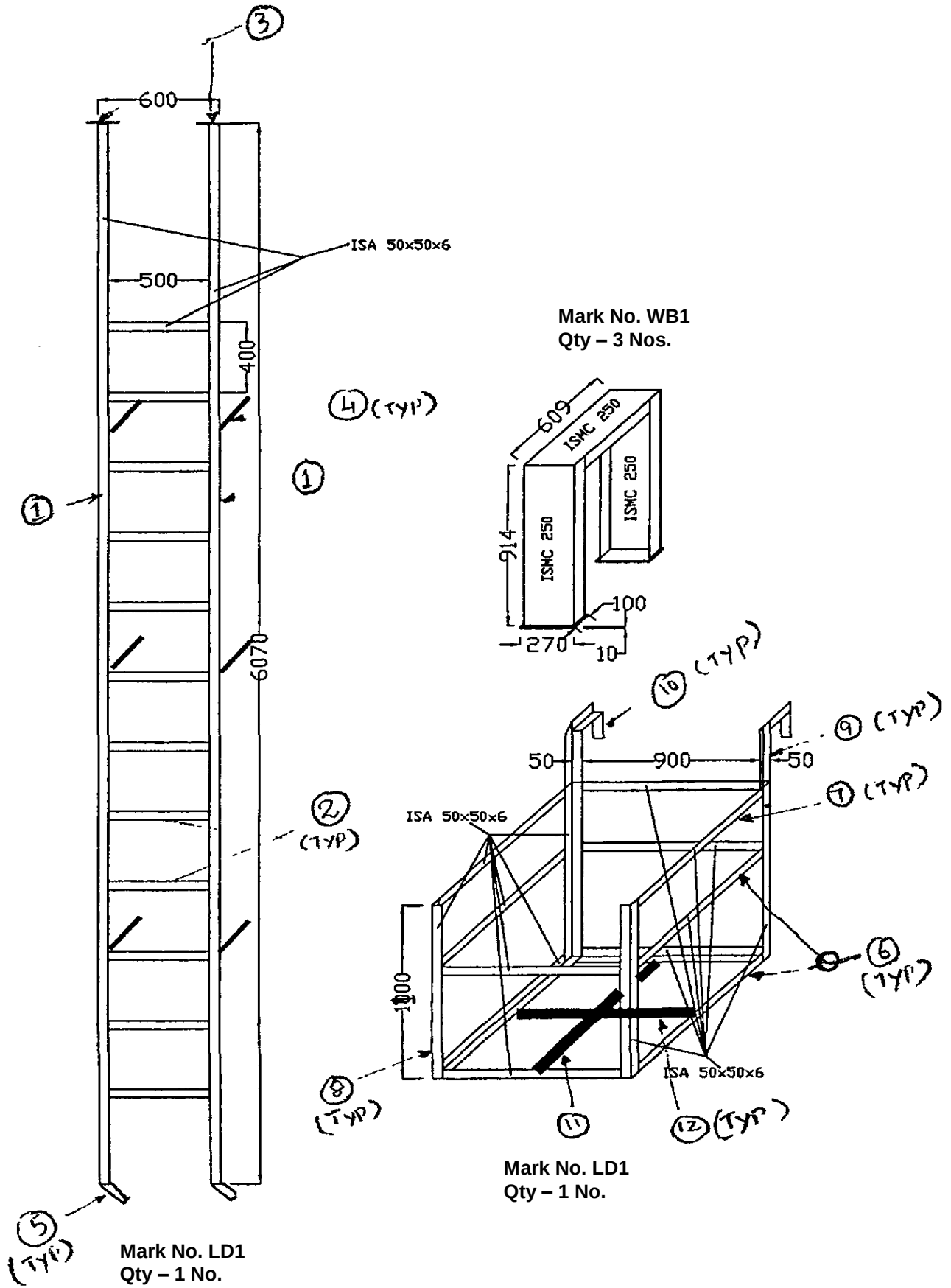
- All dimensions are in mm
- Drawing is not to scale
- Inside boundary area to be filled with sand to level with road (external)
- Details of F1 and F2 are shown below

Vertigo / Height Work Test Structure Layout

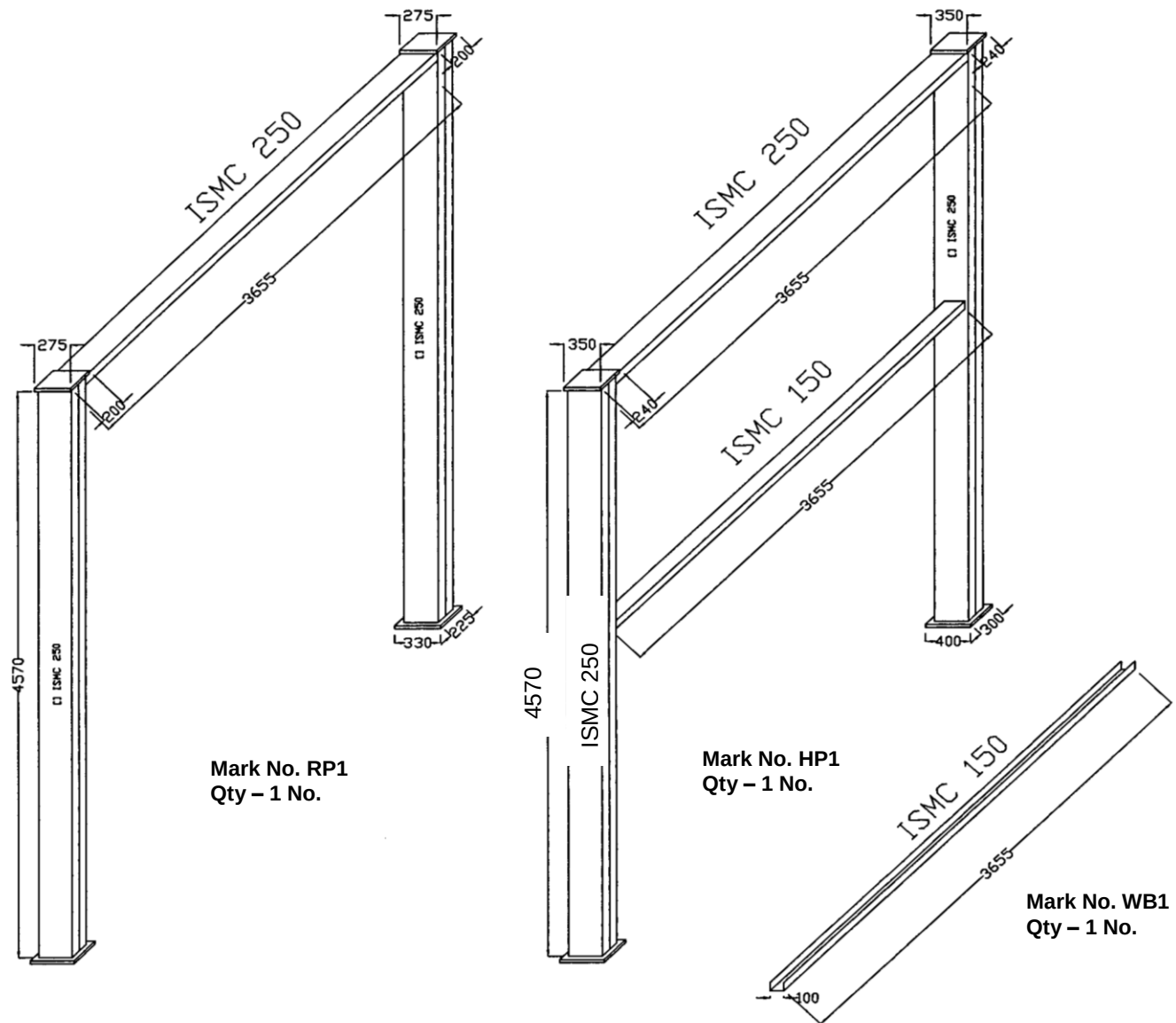


Note:

- Concrete Grade is M15
- Drawing is not to scale
- TOC is at Road Level
- G L refers to Ground Level



Sketch-1



Sketch-2



Actual Image of a Typical Structure

BOM FOR HEIGHT WORK INDUCTION TRAINING MODULE						
Sl. No.	Description	Width (mm)	Length (mm)	Qty (No's)	Unit Wt (Kgs)	Total Wt. (Kgs)
MKD NO. WB1						
1	ISMC250		609	3	34.20	62.483
2	ISMC250		914	6	34.20	187.553
3	ISMC100		3655	1	9.56	34.942
4	PL10	100	270	6	78.50	12.717
			Total Weight (Kgs)			297.695
MKD NO. RP1						
1	ISMC250		4570	4	34.20	625.176
2	ISMC250		3655	1	34.20	125.001
3	PL25	225	330	2	196.25	29.143
4	PL25	200	275	2	196.25	21.588
			Total Weight (Kgs)			800.908
MKD NO. HP1						
1	ISMC250		4570	4	34.20	625.176
2	ISMC250		3655	1	34.20	125.001
3	ISMC150		3655	1	16.80	61.404
4	PL25	300	400	2	196.25	47.100
5	PL25	240	350	2	196.25	32.970
			Total Weight (Kgs)			891.651
MKD NO. LD1						
1	ISA50X50X6		6070	2	4.50	54.630
2	ISA50X50X6		500	12	4.50	27.000
3	PL12	75	75	2	94.20	1.060
4	ISA50X50X6		300	6	4.50	8.100
5	ISA50X50X6		255	2	4.50	2.295
6	ISA50X50X6		1000	8	4.50	36.000
7	ISA50X50X6		910	3	4.50	12.285
8	ISA50X50X6		1100	4	4.50	19.800
9	ISA50X50X6		650	2	4.50	5.850
10	ISA50X50X6		350	2	4.50	3.150
11	PL8	75	900	1	62.80	4.239
12	PL8	75	410	2	62.80	3.862
			Weight (Kgs)			178.271
			Total Weight (Kgs)			2168.525

Guidelines for conducting the Vertigo / Height Work Induction Training / Test:

Background

Fear of height may be physiological or psychological. Therefore, to rule out any possibility of physiological factor, detailed medical check-up of workers is carried out before vertigo test. Medical check-up of workers includes the following: history of past illnesses (like epilepsy, drug allergy, diabetics/ hypertension, unconsciousness etc.), general physical examination (like height, weight, BMI, build and nourishment etc.), measurement of pulse rate, Blood Pressure, respiratory rate. After this check-up, those who are found suitable for height work by examining doctor, are allowed to undergo vertigo test.

During this health check-up, psychology of workers is also studied. If any worker finds it extremely difficult/ frightening to climb the monkey ladder & walk on the beam, during/after performing vertigo test or even before performing, then he is treated as disqualified.

As per standard, during vertigo test, worker is allowed to climb on a foundation through monkey ladder, walk on a beam, then steps down at the other end of beam, through monkey ladder. Height of the beam should be at least six feet from ground level. All necessary safety precautions are taken during this test. Worker has to wear full body harness with double lanyard. A horizontal lifeline is run parallel to the beam and worker has to put his lanyards into the lifeline. Additionally, a safety net is also put below the beam for rescue of the victim in case of a fall from beam.

Following activities are generally carried during testing:

1. Walking Bench Training:

- Person should walk over the channel. He should maintain balance & walk without much problem.
- If the person has problem to balances himself on repeated chances, he may be having flat foot or some other problem. So, he may not be fit for height work.

2. Rope Climb Training:

Person should be able to climb the rope up to the top channel for ensuring that in case of fall, a person hanging on the safety harness, will be able to safely climb back to the platform within minimum time period before the safety harness start breaking down under the load.

3. Height Work Training:

Person should walk freely on the middle channel while holding the top channel with the help of safety harness.

4. Ladder for Vertical fall arrestor Training:

Vertical fall arrestor rope is fixed from top to bottom of the ladder. It will ensure:

- Usage of vertical fall arrestor.
- Usage of two lanyards of a safety harness.
- Ensure 3-point contact on the ladder while climb.

5. Chair for work at height Training:

- Climb though vertical ladder with two lanyard ropes.
- Hooking of two lanyard ropes to life line. With this safe arrangement, he can walk to chair.
- Sits in the chair safely, comes out & walks back to the vertical ladder & come down from vertical ladder.

After completion of vertigo test, blood pressure of worker is again measured. If it is not within acceptable limits for any worker, concerned worker is denied height pass.

Those who pass the above training are fit for height work.

Industrial systems Group SITE SAFETY PLAN - DOCUMENT REVISION HISTORY

Rev No.	Date	Brief of Changes		
00	01.07.2013	First Issue		
01	03.10.2017	General Revision by Task Force formed vide Letter No. PSHQHSE/17-18/TF-01 dated 3-June-2017. Following Changes incorporated:		
		Page	Clause	Change
				References to ISO 14001: 2004 updated to 2015
				Preventive Action Terminology replaced with Corrective Action as per ISO14001:2015
		6	3.0	Additional Goals & Targets added
		6	4.0	Reference to HSE Procedures added
		8	Table 4.2	Additional IS Codes added
		12	7.1	Organization Chart Updated with PS HQ-HSE
		13	7.2(1)	Requirement of HSE Training for HSE Coordinator
		13	7.3.0	General Responsibilities added
		14	7.3.1	Providing basic infrastructure for HSE added
		19	7.3.5	Last 2 bullet points added
		20	8.0	- Section A, added for identification & control of OHS Hazards & Environmental Risks - Section B added for Register of Regulations
		20	8.1.1	Reference to HSE measurement tools & equipment added
		21	8.2	Induction training requirement added before Gate Pass issue & reference to procedure added
		22	8.3	Reference to corporate standard PPE specification manual added
		22	8.4.1	Drinking water cleaning requirements added
		22	8.4.2	Addition of 'Do-Not-Drink' to non-potable water containers
		23	8.4.3	Requirement of toilet availability in all structures & hand wash added; Reference to BOCW Rule added
		23	8.4.4	Wording modified
		23	8.4.5.1	Ambulance to be used exclusively in severe cases and other points; Reference to BOCW Rule added
		24	8.4.5.3	(First Aid) Securing First Aid Box and other details
		24	8.4.5.5	Requirement of Vertigo Test added along with specs in Annexure E
		25	8.4.6	(Canteen Facility) Reference to BOCW Rule added
		25	8.4.7	(Labor colony) Reference to BOCW Act and other details
		25	8.4.8	Ambulance use prioritized
		26	8.4.11	Requirements of Illumination added
		26	8.4.12	Maintenance of General Discipline added
		27	9.0	Reference to HSE Procedure for Training & Awareness added
		28	9.4	Details of Trade Test added
		29	10.2	Investigation word & reference to procedure added
		30	10.4	New Section 'HSE Suggestions' added
		30	10.5	New Section on 'Customer / External Parties' Communications' added
		30	11.1	Details of HSE Procedures & OCPs added
		32	11.1.1	Activity Specific Guidelines for Safety (Annexure A) added
		33	11.1.2	HSE Preparedness for Adverse Climates and Weather (Annexure B) added
		33	11.2	Modification in Bullet-2
		34	11.3	Reference to procedure added; Formats for E-Waste & Hazardous Waste added
		39	11.7	Reference to procedure added
		40	12.0	Reference to checklists added

		41	12.2	Reference to Corporate Standard PPE Specification Manual added
			12.3	Reference to T&P Color Coding Procedure added
		43	13.0	Reference to procedure and other details added
		43	14.0	'Use of penalty for HSE promotional activities' added
		44	15.1	Reference to procedure added
		44	15.2	Reference to procedure added
		46	17.0	New Formats added and existing formats modified as per indicated revisions: • Formats for Cranes and Winches separated • Formats from HSEP:13-F15 to HSEP:13-F20 added • Annexure-1 renamed to Format No. HSEP:13-F21 (HSE Checklist-cum-Compliance Report) • Penalty Format HSEP:13-F14 - New Penalty Clauses Added from S. No. 19-31 • Penalty rates revised for existing points as per follows (S.No, Rev from, Rev to): 1,200,350; 2,200,350; 3,500,750;4,50,150;5,50,150; 8,200,350; 9,200,500; 10,500,750;11,200,350;14,100,500;16,500,750;18,200,350
				Annexure-A added (Activity Specific Requirements for Safety)
				Annexure-B added (HSE Requirements for Adverse Weather / Climates)
				Annexure-C added (Fire Extinguisher Requirements)
				Annexure-D added (List of HSE Measurement Tools & Equipment)
				Annexure-E added (Specifications of Vertigo Test)



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