HEALTH SAFETY & ENVIRONMENT PLAN

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MODIFICATION CONTROL TABLE

REV	Modified Sections	Description	Date

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This HSE should be applicable for Varanasi STP projects limited employees, accordingly please modify the writeup

1 OBJECTIVE

The objective of this Health & Safety Plan is to promote Health & Safety of all persons working with the Essel Infra and follow prescribe Rules, Procedures and Safe Working Practices in order to comply with the applicable laws, Client and Corporate H&S Policies & to create a safe working environment free of unsafe conditions and factors that might contribute to an accident or injury / illness. The project specific H&S plan will provide guide lines for safe execution of project.

This plan contains health & safety information and instructions for carrying out basic acceptable safety practices. It provides basic guidelines for standards of safe work practices for execution of projects undertaken by Essel Infra. Common sense, past experience, various tools of Hazard Identification, Risk Assessment, Tool Box Talk etc. must be applied when considering safety on any specific work assignment.

The avoidance of accidents and promotion of safe and healthy workplace must be basic objective for all. A safe working environment will be achieved through the active and equal participation of all employees including employees of those subcontractors undertaking work for Essel Infra in identifying hazards, and then introducing control measures to ensure positive elimination or reduction of the risk to acceptable risk level.

The objective of a Health & Safety Management System is to provide a safe working environment. This will be achieved through the implementation of planned and controlled procedures which ensures that all aspects of safety are considered at the outset and control measures are introduced to manage identified risks.

2 ABOUT THE PROJECT

PROJECT

Design, development, finance, construction, testing & commissioning of civil, mechanical and electrical & instrumentation works of Varanasi STP with a design capacity of 50 MLD, at Ramana, Varanasi.

The design, finance, rehabilitation operation and maintenance of the Associated Infrastructure.

DETAILS OF THE CLIENT

Utter Pardesh Jal Nigam

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3 DEFINITIONS

Occupational Health & Safety: conditions and factors that affect, or could affect the health and safety of employees or other workers (including temporary workers and contractor personnel), visitors, or any other person in the workplace. NOTE Organizations can be subject to legal requirements for the health and safety of persons beyond the immediate workplace, or who are exposed to the workplace activities.

Incident: Work-related event(s) in which an injury or ill health (regardless of severity) or fatality occurred, or could have occurred. Note 1: An accident is an incident which has given rise to injury, ill-health or fatality. Note 2: An incident where no injury, ill health, or fatality occurs may also be referred to as a "near-miss", "near-hit", "close call" or "dangerous occurrence". Note 3: An emergency situation is a particular type of incident.

Ill – Health: identifiable, adverse physical or mental condition arising from and/or made worse by a work activity and/or work-related situation.

Workplace: Any physical location in which work related activities are performed under the control of the organization. Note: When giving consideration to what constitutes a workplace, the organization should take into account the OH&S effects on personnel who are, for example, travelling or in transit (e.g. driving, flying, on boats or trains), working at the premises of a client or customer, or working at home.

Hazard: source, situation, or act with a potential for harm in terms of human injury or ill health, or a combination of these.

Hazard identification: process of recognizing that a hazard exists and defining its characteristics.

Risk: Combination of the likelihood of an occurrence of a hazardous event or exposure(s) and the severity of injury or ill health that can be caused by the event or exposure(s).

Risk Assessment: Process of evaluating the risk(s) arising from a hazard(s), taking into account the adequacy of any existing controls, and deciding whether or not the risk(s) is acceptable.

Acceptable Risk: risk that has been reduced to a level that can be tolerated by the organization having regard to its legal obligations and its own OH&S Policy.

Corrective Action:

Action to eliminate the cause of a detected nonconformity or other undesirable situation. NOTE 1 There can be more than one cause for nonconformity. NOTE 2 Corrective action is taken to prevent recurrence whereas preventive action is taken to prevent occurrence.

Preventive Action:

Action to eliminate the cause of a potential nonconformity or other undesirable potential situation. NOTE 1 There can be more than one cause for a potential nonconformity. NOTE 2 Preventive action is taken to prevent occurrence whereas corrective action is taken to prevent recurrence.

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4 HSE POLICIES

Essel InfraProjects Limited

(An Essel Group Enterprise)

QUALITY, ENVIRONMENT & OCCUPATIONAL HEALTH SAFETY POLICY

Essel Infraprojects Ltd has ventured into Municipal Solid Waste Management to successfully provide solution for collection, transportation, processing and recycling of solid waste to efficaciously nullify its effects on human being and environment. We aspire to be an integrated environment solution company offering engineering, construction and value added services in areas of Waste to Energy (WTE) through management of Municipal Waste. As India's largest Waste to Energy Company operating in tandem with our globally celebrated technology partners and with our expertise in eco-friendly solution, we envisage to better the lives of the people of our country by addressing the negative impact of municipal solid waste.

Our Vision is to provide Scientific, Innovative and Sustainable solutions to Waste Management.

Our **Quality, Environment & Occupational Health Safety (QEHS)** policy is our commitment towards achieving excellence in our Municipal Solid Waste (MSW)

- We are committed to being a globally responsible and competitive organization that provides energy generation from waste to create value and satisfaction for our customers
- We comply with all applicable legal, statutory, regulatory and other requirements to which the organization subscribes
- We will maintain workplaces to ensure the occupational health and safety of our employees
- We will strive to minimize the adverse impact of organizational activities towards waste management, on the environment
- Safeguarding interests of our valued interested parties
- Improving our integrated QEHS management system on a continual basis
- Communicating our QEHS Policy and Objectives to all interested parties to create awareness and their involvement in achievement of our strategic intent

Essel GROUP

HARSHAD JOSHI
Business Head - MSW
Essel Infraprojects Limited
1st Sep 2016

Essel infra

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5 HSE ORGANISATION CHART

It is everyone's responsibility to ensure that Company's policy is duly followed at site. The ultimate responsibility for the implementation of HSE policy and its objectives as described in this document rests with the Project Manager.

This part of the HSE Plan describes the Company's organizational structure for Safety & Occupational Health on the Project and defines the responsibilities of a number of key personnel who have significant contributions to make in the successful implementation of this HSE Management Plan.

5.1 ROLES & RESPONSIBILITES

The Duties and Responsibilities of all personnel under our health safety and environment program are as follows:

PROJECT MANAGER

Section Heads shall be responsible and Project Heads will be accountable for the safety of all the subordinate staff, workmen, contractor and workers, visitors and operations under their control. They are expected to promote a high degree of Health, Safety and Environment awareness among the personnel and exercise control over all activities.

Responsibilities shall include, but will not be limited to:

- They shall have overall responsibility on HSE issues (including sub-contractors) for the project.
- Ensure that Health Safety & Environment Committees are formed and Meetings are held, minutes of meetings are recorded & recommended corrective actions are implemented within a reasonable time frame. The time frame and person responsible for implementation shall be recorded in MOM.
- Arrange for the scheduled training of all employees in aspects of HSE care, relevant to their work. This will include identification of Training needs, arranging / requesting Head Office to facilitate engaging experienced faculties or hiring external faculty for conducting training at site or sending persons for training.
- Ensure that all incidents involving injury/ill health, dangerous occurrences as well as near-miss incidents are reported to the concern and are thoroughly investigated to identify the causes, so that there is no recurrence. They are also responsible for implementation of corrective actions which are recommended to avoid recurrence.
- Ensure that all subordinate staff is made aware of any potential HSE hazard and know their individual responsibility.
- They shall ensure that all the forms and formats of latest versions are available and issued at site, redundant Forms and Formats are discarded.

Deputy Project Manager/ Construction Manager

Responsibilities shall include, but will not be limited to:

- Shall report to Project Manager.
- In absence of Project Manager shall assume full responsibility for HSE activities on the Project overall management and execution of the Work.
- Shall ensure that construction personnel have the relevant competency and experience to execute the work safety.
- Shall ensure subcontractors comply with rules and regulations, and that terms and conditions related to HSE are incorporated in work orders.
- Shall ensure work procedures contain Safety, Health and Environment requirements and hazards are identified, assessed, properly managed and are understood by supervisors / workers.
- Shall visit the work site on routine basis to ensure a high level S&OH awareness among the workers is maintained.
- Shall encourage and support the supervisors to execute safe working practices.
- Shall manage all subcontractors to ensure that overall Safety, Health and Environment compliance is achieved.
- Shall work in close cooperation with the Safety, Health, and Environment professionals to eliminate and correct all practices and conditions that are deemed unsafe.

- Shall comply with all statutory requirements applicable for the project.

HSE MANAGER

The Project HSE Manager duties include but are not limited to:

- Advise and support the project organization and site personnel in respect to all health safety and environment matters.
- Create awareness of HSE amongst workers / supervisors / subcontractors and also organize regular training programs.
- Organise Health & Safety Induction training for the new employees & visitors & maintain the record of the same.
- Carry out safety inspection (Excavation, Scaffolding, Equipment's, Ladders, Lifting Equipment's and Tools, Tower erection, stacking of material, electrical safety, etc.) on regular basis, recommend corrective actions and monitor implementation of recommended corrective actions within a specified period of time.
- Promote setting up of health safety & environment committees and act as advisor and catalyst to such committees.
- Prepare health safety & environment plan & safe operating procedures.
- Ensure the preparation of HSE statistics and submit on monthly basis to Project Manager, Client and Corporate QHSE Manager.
- Shall review HSE performance statistics and initiates actions for improvement.
- Advise the concerned departments in planning and organizing measures necessary for the effective control of personal injuries.
- Ensure awareness of emergency procedure among all employees. He shall organize required training session at site.
- Investigate all incidents, minor/serious accidents, commuting accidents, dangerous occurrences & insure implementation of all corrective & preventive actions on time.
- Maintain safety promotional activities such as displaying of positive attitude safety posters, safety signs, banners, and publication of safety letters or literature.
- Manage and Control the situation arising during an emergency. Continuously review the emergency procedure and update accordingly.
- Ensuring that adequate PPE's and safety equipment as are required are available at site and are being used appropriately.
- Ensuring that any unsafe condition observed at site is eradicated at the earliest.

PROJECT SITE HSE ENGINEER/ OFFICER

HSE Engineer is responsible for providing HSE advice and guidance to his Site Managers, Site Engineers, Contractors, their supervisors and all workers in their project. His role includes:

- Enforce implementation of all instructions on HSE as directed by company management from time to time.
- Interact with all Site Engineers, Contractor's, their supervisors and workers to ensure that all HSE rules and regulations are followed at all work locations of site.
- Communicating all HSE rules and safe practices to all contractors' staff.
- Organize Health & Safety Induction training for the new employees & visitors & maintain the record of the same.
- Evaluate the need for safety equipment to employees, first-aid, fire protection, hygiene and sanitation etc. and ensure that all meet the minimum safety standards.
- Shall prepare & review risk assessment along with the execution team.
- Organize & ensure all Health & Safety induction for all project personnel.
- Follow up for the closure of Audit Non Conformances and help the Site Managers to decide corrective action / preventive action.
- Report all the Incidents / Accidents / Near Misses to the Project Manager / HSE Manager.
- Investigate all incidents, minor/serious accidents, commuting accidents, dangerous occurrences.
- Ensure that Tool Box meetings are being conducted daily at the sites and the workers are aware of all the hazards at the work site.
- Ensure that adequate PPE's and safety equipment as required are available at site and are being used appropriately.
- Carrying out safety inspections at site with concerned area incharge.
- Reporting of any issues affecting HSE at the work site to the Project Manager /HSE Manager.

HSE STEWARD

- Ensuring that adequate PPEs and safety equipment's as are required are available at site and are being used appropriately.
- Reporting of any issues affecting HSE at the work site to the Project Manager/HSE Manager
- Report all the Incidents / Accidents / Near Misses to the Project Manager / HSE Manager.
- Ensuring that no unsafe act is performed at any site.

ENGINEERS, SUPERVISORS & SKILLED WORKERS

All Engineers, Supervisors and Skilled Workers shall be responsible & accountable to ensure the following:

- Work under their control is executed in a safe manner in order to prevent the risk of injury to personnel and damage to property.
- Employees are made aware of any health, potential hazards and risk to the personnel that may arise during their day-to-day or specific or out-of-work activities.
- No unsafe activity or condition shall be allowed, if any unsafe conditions of plant, equipment and any unsafe act of any employees are noticed, the same will be discouraged which may include stopping the work and shall be reported immediately to the line management.
- All incidents involving personal injury, effect on health, damage to property, effects on the environment, near-miss accidents are to be reported immediately to the line management and the Safety Officer. An investigation shall be carried out to identify root causes & recommended corrective actions shall be implemented to avoid recurrence.
- Shall complete all necessary reports as soon as possible in the event of any incident and submit to the Project In-Charge & Safety Officer. Accident Reporting shall be done abiding by Legal Provisions as applicable at site.

DEIGNER

HSE Responsibilities shall include, but will not be limited to:

- Shall ensure that the safety factors considered in the design complies with the requirement of contract documents, Bureau of Indian Standards Codes, and good engineering practices.
- Shall include the information related to critical HSE risks in drawings or specification.
- Shall obtain the approval from employers' designer or his approved proof check consultants wherever required as per the contract requirement.
- Shall issue design alerts for HSE critical construction issues.

INDIVIDUAL EMPLOYEE

Further to above, individual employees, particularly Managers, Engineers, Supervisors and employees at all level must:

- Abide by all the laid down Company's Health & Safety requirements as well as statutory Health-and-Safety-at-work obligations.
- Avoid any action that might have potential hazard to themselves or others. They must demonstrate high Standards of commitment to health & safety and should never put a wrong example.
- They shall be an extension of Management's eyes and ears for observance of H&S Practices, bring to the notice of Managers, Engineers, Supervisors or concerned personnel of any potential health or safety hazard and any practices likely to cause an accident or any unsafe practice or act being followed.

RESPONSIBILITY OF SUB-CONTRACTORS SUPERVISOR

- Ensure that all personnel working at the site shall receive H&S induction training.
- Ensure that he has received copy of and / or understood 'Safety Guidelines for Sub-Contractors' and all instructions pertaining to his job before commencing work at site.
- Shall go through all safety measures, safe work procedures, understand properly and ensure that they are implemented by their work force effectively, if not shall be enforced strictly.
- Shall ensure that employees engaged in any job or operations is fully aware of hazards associated with and follows the safe

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method of working.

- Shall attend and participate in all safety committee meetings.
- Ensure that all personal protective equipment are provided, used and maintained properly by their employees.
- Ensure that full body double lanyard safety harnesses with suitable anchoring arrangement is provided to his employees engaged at working at height. No employee of his shall be permitted to work at height without the use if full body double lanyard safety harness. It should be borne in mind that a height of 2 Meters above ground is regarded as "height".
- Ensure that all accidents/incidents occurred on the site are reported immediately to the company's safety officer / Project Manager.
- Any unsafe / hazardous condition observed shall be corrected immediately or reported to concerned site engineer immediately or to the company's safety officer / safety representative.
- All lifting appliances including all parts and gears thereof, whether fixed or movable shall be thoroughly tested and examined by a competent person at least once in a year month.

SUB CONTRACTOR RESPONSIBILITY TOWARDS HEALTH & SAFETY

The sub-contractor must follow the following procedural aspects. The procedures laid down are important and must be followed strictly by the subcontractor. These procedures shall be reviewed with company's representative before commencement of the work at site and also as and when required.

- Each employee of the subcontractor must have his identity badge/card with him while entering and during the time he is at work site premises.
- All personnel working at the site shall receive an induction H&S training explaining the nature of the work, the hazards that may be encountered during the site work and the particular hazards attached to their own function within the operation.
- Employees below the age of 18 years will not be employed.
- Female employee will not be permitted to work at site between 6 p.m. to 8 a.m. i.e. during night hour, for any work.
- The sub-contractor must perform their work safely, so that they do not endanger themselves, other employee's life or property.
- The sub-contractor is responsible for conveying all pertinent safety information and requirements to his employees (including his sub-contractors) and should see that there is a strict adherence of the above.
- The sub-contractor must comply with and is responsible for his employees (including his sub-contractors) with all provisions of statutory regulations as in force and laid down by the authorities such as State Insurance body like ESIC, PF Office of Labor Commissioner, workmen compensation policy etc.
- The sub-contractor is required to maintain all registers such as employment register, wages register, leave register etc. as per statutory requirements as applicable.
- The sub-contractor supervisor / representative must be present at all times at the site when the work is being performed by their employees. The job must not be left only to the workers.
- The sub-contractor must submit the list of all the materials, tools and equipment they want to take in use. They must be certified and approved by competent person before taking in to use at the site and periodically as per Statutory norms.
- Additional safety rules or requirements may apply to specific work which are hazardous because of the location or the nature of process / activity, company's representative will advise the subcontractor of additional safety requirements.
- Special guidelines may need to be jointly established before work begins for the jobs requiring the use of scaffolding and/or ladders.
- The sub-contractor will be responsible for conducting their work in a manner that does not expose any employee and / or property to unsafe conditions, injury or damage.
- The sub-contractor will be responsible to ensure that their employees follow the safe practices, safe work procedures and safe provisions as per the company's safety rules and regulations.
- If sub-contractor fails to comply with any safety requirements or work performed by their employee is unsafe, company may stop the work and/or remove any non-complying employees, and direct the sub-contractor to immediately correct non-compliances.
- The sub-contractor shall abide by following general rules and specific rules intimated during the course of work.

6 GENERAL RULES

- The possession and use of alcohol and / or drugs at the project site is strictly prohibited. Any employee appearing to be under the influence of alcohol or drugs will not be permitted to enter or work at site.

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- Always obey instructions and comply with all safety rules, procedures and instructions.
- Work place to be kept neat and clean, wastage / scrap to be removed after the completion of day-to-day work.
- It is mandatory for everyone at site to wear safety helmets & safety shoes by all while at work site. Other site specific PPE, will be used appropriate to hazards at specific site / place of work.
- Always walk. Never run at site (except in emergency).
- Be alert and look where you are walking so that you don't slip or stumble. Use regular aisles and gangways. Do not take short cuts.
- It is must to hold railing while ascending or descending staircase ladder.
- Do not lift the load more than safe working load.
- All Lifting Tools & Tackles are to be tested once in a year by Competent Person. The Certificate of Testing in Prescribed Form should be available with user Section Head. Findings of Testing such as O.K. / Not O.K. / Rejected along with date of testing and next due date should be painted on Tools and Tackles immediately on Testing.
- Do not take undue risk or chance while at work.
- Do not work under suspended load. Keep clear. Do not lean on stacked material.
- No one except the driver (operator) is allowed to ride on the excavator, bulldozer, crane, etc. No one is to operate such equipment without proper authority.
- Never start, operate, adjust or repair any machine or equipment unless you are authorized to do so.
- Before starting any machine or equipment, ensure that no one is in danger zone and that safety devices are in place and functioning properly.
- Do not adjust, repair, clean or lubricate any machine or equipment in motion, or with engine running.
- Treat all electrical wires as live wires. Do not insert bare electrical wires inside the socket. Use three pin plugs.
- All electrical equipment used at site shall be of good quality and shall be fitted with sound cable and earthing. No electrical equipment is safe if it is misused.
- If you get injured, get first aid immediately however slight the injury may be report it.
- Report all accidents to your supervisors and the concerned engineer at site.
- If you are sick while at work, report immediately to your supervisor and take proper treatment / advice from the doctor.
- When working at height a suitable scaffold shall be provided for employees for all work that can't be done from ground and/or ladder. All platforms shall be provided with access ladder and guard-rails.
- No employee shall be permitted to work at height of 2 meters and above without the use of full body double lanyard safety harness and securely anchored to a life line or anchorage point.
- Rolling of gas cylinders is prohibited. For transferring gas cylinders from one place to another, a hand trolley shall be used.
- For unloading of cylinders from vehicle it shall never be dropped on ground or over rubber tyres.
- The gas welder shall examine his torch, valves and hoses etc. for any gas leakages every day. Defective torches and hoses etc. shall be replaced. Always use spark lighter to light your torch. Lighting torch with match-box is strictly prohibited.
- Always use oxygen and acetylene gas cylinders for gas welding and cutting operation.
- Compressed air shall not be used to clean clothing or a body parts etc.
- Report all unsafe acts / conditions observed to your supervisors.
- Scaffolds shall be tagged "Under Construction" while being erected or "Ready for use" when it is completely erected, inspected and okayed for use. It is mandatory to display the scaffolding checklist signed by experienced scaffold incharge before use of scaffolding.
- Obtain hot work permit before starting any cutting & welding work.

7 PROJECT HSE COMMITTEE

There shall be a HSE Committee at site chaired by the Project Manager.

The representative of the management of HSE committee shall include

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Chairman	Project Manager
Secretary	HSE Manager (In-charge)
Members	Labour Welfare Officer In charge of plant and machinery In charge of site electrical In charge of stores. Senior Managers/ Engineers heading different sub functions. Sub – contractor's representative Labour Contractor's representative Workers' representative SHE staffs

The worker's representatives of this committee shall be elected by the workers.

The HSE committee shall be constituted and notification regarding the same shall be communicated to the members and employees.

The tenure of the committee shall be two years. HSE committee shall meet as often as necessary but at least **once in a month**. The minutes of the meeting shall be recorded and circulated to all concerned. In every meeting the minutes of previous meeting shall be reviewed for the action completed.

Function and duties of the HSE committee shall include:

- Assisting and cooperating with the management in achieving the objectives outlined in the "Health Safety & Environment policy" of the occupier;
- Dealing with all matters concerning health, safety and environment and to arrive at practicable solutions to problems encounter.
- Creating safety awareness amongst all workers;
- Undertaking educational, training and promotional activities;
- Discussing reports on safety, environmental and occupational health surveys, safety audits, risk assessment, emergency plans and implementation of the recommendations made in the reports;
- Carrying out health and safety surveys and identifying causes of accidents;
- Looking into any complaint made on the likelihood of an imminent danger to the safety and health of the workers and suggesting corrective measures; and
- Reviewing the implementation of the recommendation made by it.

8 HEALTH & SAFETY TARGETS AND GOALS

The H&S targets, goals and aim for the Works are to achieve:

- Zero total recordable injuries.
- All personnel Health & Safety inducted.
- 100% incident reporting & investigation
- 100% adherence of usage of appropriate PPEs at work.
- Executing construction work with least disturbance to the environment, adjoining road users and traffic.

9 HSE TRAINING & COMPETENCE

9.1 ID CARD

All personnel shall be issued a photo identity card duly signed by the authorized representative of the company/subcontractor before they are engaged for any work.

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9.2 FIRST DAY TRAINING

All personnel working at the site shall receive HSE induction training at the first day of their joining explaining the nature of the work, the hazards that may be encountered during the site work and the particular hazards attached to their own function within the operation. In particular, the training shall cover in the following topics:

1. Hazard Identification Procedure
   Hazards on site:
   - Falls
   - Slip trip
   - Electricity
   - Working at height
   - Excavation
   - Drop objects
   - Machinery
   - Material handling (Manual & mechanical)
   - Transportation
   - Site housekeeping
   - Fire
   - Etc..
2. Personal Protective Equipment
   - What is available?
   - How to obtain it?
   - Correct use and care
3. Health
   - Site welfare facilities
   - Potential health hazards
   - First Aid/CPR
4. Duties of the contractor
   - Brief outline of the responsibilities of the Contractor by law
   - Details of accident prevention policy
   - Building and other Constructions Welfare Law
5. Employee's Duties
   - Brief outline of responsibilities of employee
   - Site safety rules

9.3 TRAINING REQUIREMENT

The behavior of people at all levels is critical for H&S performance.

Training requirements need to be analyzed for all the employees and initiate a training program to demonstrate that all persons employed, including subcontractors, are suitably qualified, competent and fit. This will include:

- Detailed Job descriptions for all personnel, to include their specific HSE responsibilities.
- Assessment and recording of training needs for all personnel, including subcontractors' employees in the workforce, vendor representatives and site visitors.
- A system for assessing new hirers e.g. previous training.
- A matrix and schedule of training requirements, covering general, task–specific and H&S-related training, showing the training frequency and interval between refresher courses.
- Timely, competent delivery of training courses.

A training Matrix shall be followed through a monthly training calendar.

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Types of training/ Occupation	SHE Orientation	SHE Plan	SHE Improvement Plan	Audit & Inspection	Emergency Response & Preparedness	Incident/Accident Investigation & Reporting	SHE Communication	SHE Promotion & Incentives	Traffic Management/ Driving Safety	Hazard Identification & Risk Analysis	Permit to work system	Confined space	Scaffold Erection/Dismantling	Waste Management/Best Environment Practices	Behavioural Based Safety Management (BBSM)	Industrial First Aid & CPR	Fire fighting	Electrical/Mechanical Isolation	Electrical Safety	Explosive Handling & Control	Heavy Lifting Operation	Welding, Cutting & Brazing	Steel erection work	Oil & Chemical storage	Material Data Sheet	Excavation Safety
Project Manager	•	•	•	•	•	•	•	•	•	•				•	•	•										
Construction Managers	•	•	•	•	•	•	•	•	•	•	•	•		•	•	•										•
Quality Manager	•	•	•	•	•	•	•		•	•	•	•	•	•	•	•	•								•	
Planning engineer	•	•		•	•	•	•			•		•		•	•	•	•									
Store Incharge	•	•		•	•	•	•			•				•	•	•	•			•				•	•	
Construction Manager/Supervisors	•	•	•	•	•	•	•	•	•	•	•		•	•	•	•	•	•	•	•	•	•	•	•	•	•
Machinery Incharge	•				•				•	•	•			•	•	•	•	•	•					•		•
Material Handlers /Riggers	•				•					•			•	•	•	•	•						•	•	•	
Mechanical workers	•				•									•	•	•	•	•	•		•	•		•		
Civil workers	•				•							•		•	•	•	•		•	•	•					•
Drivers /Operator	•				•				•					•	•	•	•									
Security Guards	•				•	•			•					•	•	•	•									
Clerical Staff	•				•									•	•	•	•									
Sr. SHE Managers					•					•	•	•	•	•	•	•	•		•	•		•	•	•	•	•
SHE Supervisors	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•

On the spot practical skill development training on height safety including scaffold safety, crane safety, welding safety, electrical safety, traffic safety shall be conducted to all foreman/workmen who are associated.

9.4 TOOL BOX MEETINGS

The toolbox meeting shall be organized by the Foreman/supervisor/engineer/safety officer to all high risk work activity and shall be documented. Tool Box Meetings shall be held at the start of each work shift and be conducted in the actual work area.

Key issues to be discussed at Daily Tool Box Meetings will include:

- The job to be done.
- Ensure every one aware of hazards, risks & control measures associated with specific activity. Review safe work practices.
- The crew should be actively involved in these meetings and should openly discuss any concerns they have as well as commit to working safely.

9.5 BEHAVIOUR MODIFICATION AND DISCIPLINARY ACTION

Non-conformance with HSE requirements can be focused on people, the supervisor, engineer & manager or the worker. The real or basic cause of non-conformance occurs because of either a lack of knowledge or skill or an improper motivation or attitude. It follows that the solution for lack of knowledge or skill is proper training and coaching. In the case of improper motivation or attitude, it is the duty of the person in charge of the offender to establish the cause by using counselling and coaching. When people are knowledgeable and counselling and coaching have not provided a solution then disciplinary action shall be taken. The team leader is responsible for implementation of coaching, counselling and formal discipline of subordinates.

9.6 POST-ACCIDENT OR NEAR MISS MEETING

After any serious Near-Miss, Lost Time Accident or any other serious Safety related Incident, a job-wide Mass Safety Meeting will be held to review the accident/incident. This meeting will be held as soon as possible, no later than the start of the next day's shift. This meeting will cover all the known facts of the accident and changes that have been made to prevent a reoccurrence of the problem.

10 HSE INSPECTIONS

The purpose of HSE inspection is to identify any variation in construction activities and operations, machineries, plant and equipment and

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processes against the H&S Plan and its supplementary procedures and programs.

Following H&S inspections program shall be adopted during execution of the project.

- Planned General Inspection
- Routine Inspection
- Specific Inspection
- Other Inspection

A documentary proof i.e. Daily, Weekly, Monthly, Half Yearly & Yearly checklists & guidance of inspection shall be ensured at project. Specific inspection of Equipment's, Plant & other machinery shall be performed randomly.

10.1 PLANNED GENERAL INSPECTION

Planned general inspections are performed at predetermined intervals and it usually involves the representation from both subcontractor and the Employer.

Inspections that will be classified under this inspection program are:

- Monthly Inspection by safety committee members.
- Weekly safety inspection/HSE Walkdown by HSE Manager/Engineer
- Daily safety inspection/observation by site HSE team.

10.2 ROUTINE INSPECTION

Routine inspections are often referring to the inspection of work site, equipment and temporary structures performed by site and equipment operators and temporary structure erectors.

Inspections that will be classified under this inspection program are:

- Daily Inspection of plant and equipment by operator
- Weekly Inspection of scaffold by scaffolding supervisor
- Monthly Inspection of electrical hand tools by competent electrical supervisor
- Quarterly Inspection of temporary electrical systems by competent electrical supervisor
- Yearly inspection of lifting machinery, lifting appliances, equipment and gears by Govt. approved competent person.
- Half yearly inspection of pressure vessels by Govt. approved competent person.

HSE Manager will ensure that a system of routine inspections are carried out periodically on all plants, equipment, powered tools and any other temporary structures that will pose a hazard to operators & workmen.

10.3 SPECIFIC INSPECTION

Specific inspections are performed on activities without a predetermined date. Competent supervisors usually perform inspections for ensuring an activity whether it is executed in accordance to a general set of rules; method statement submitted or developed procedures.

The following are examples that will be commonly performed as required on the construction site:

- Inspection performed before a heavy lifting operation.
- Inspection performed before and after the entry of person into a confined space.
- Inspection performed before and after a welding and gas cutting operation.
- Inspection of formwork before concreting by formwork erector.

10.4 OTHER INSPECTION

Other inspections include the following:

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- Inspections by Labour Department of Government.
- Client site HSE management team

All inspection records and reports will be properly kept and filed for audit purpose. Inspection reports of Planned General Inspection and Routine Inspection will be used for discussion during Safety Committee Meetings.

11 HSE COMMUNICATION

Every effort shall be made to communicate the Safety, Occupational health and environment management measures through posters campaigns / billboards /banners / glow signs being displayed around the work site as part of the effort to raise safety awareness amongst the work force. Posters should be in Hindi, English and other suitable language deemed appropriate. They should be eye catching, relevant to work and should be placed at head level.

Following important days shall be observed for creating HSE Awareness among construction zone workers.

DATE	EVENT
Week starting 1st Monday of January	Road Safety Week
4th March	National Safety Day
7th April	World Health Day
14th April	Fire Safety Day
5th June	World Environmental Day
1st December	World AIDS Day

11.1 MONTHLY HSE REPORT

Monthly HSE report (Balanced score card, Monthly Report, statistical accidents) shall be prepared consisting of the following and shall be submitted within 5th of next month to the Head Office & to the client as per their requirement:

- Monthly minor accident, serious incident details
- Average man-power details, Man-hours worked
- Lost time (no of working days)
- Number of training / Tool Box Talk
- Number of people trained
- HSE Committee Minutes of Meeting
- HSE Inspections etc..

11.2 HSE BULLETIN BOARD

The bulletin board is another method to increase employees' awareness on HSE and to communicate management's safety message. A safety bulletin board will be located on each project site office where it will be visible to all employees. The bulletin board will contain information such as:

- Safety promotions/awards
- Safety meeting dates and times
- Emergency phone numbers
- QHSE Policies
- Safety Alerts
- Additional items may be posted with the Project Manager approval.

12 ACCIDENT INCIDENT INVESTIGATION PROCEDURE

The purpose of this section is to describe the procedures deployed to ensure that all accidents/ Incidents, cases of occupation related illnesses; near misses are reported and investigated to prevent recurrence and improve risk control.

Note: The prime objectives of such an investigation are to analyze the causes and make recommendations to prevent recurrence of a similar incident. It is not to attribute blame.

12.1 DEFINITIONS

Incident: Incident will be defined as work-related event(s) in which an injury or ill health (regardless of severity) or fatality occurred or could have occurred. [1, 2, 3]

Accident: An incident that has given rise to an injury, deterioration of health or a fatality.

- **Accidents with sick leave/Minor Accident**: When a person takes leave due to work related injury for 24Hrs.
- **Accident without sick leave or First Aid Accidents**: When a person does not require any leave for recovery from the accident or a work related injury that requires one-time treatment and subsequent observation (for example minor scratches, burns, cuts, splinters which do not ordinarily require medical care). Such treatment and observation are considered first aid even if provided by a physician or registered medical professional.
- **Serious Accident / Reportable Accident / Loss Time Accident**: A work-related injury that causes the injured person to be away from work for at least 48 hrs or more immediately following the accident.

All such incidents shall be reported as per applicable law (Building and other construction & Regulation of employment and condition of services) Rule – 1998.

Ill health: Identifiable adverse physical or mental condition arising from and/or made worse by a work activity and/or work related situation.

12.2 INVESTIGATION

Investigations should be conducted in an open and positive atmosphere that encourages the witnesses to talk freely. The primary objective is to ascertain the facts with a view to prevent future and possibly more serious occurrences.

Accidents and Dangerous Occurrences which result in death, serious injury or serious damage must be investigated immediately to find out the cause of the accident/occurrence so that measures can be formulated to prevent any recurrence.

Near misses and minor accidents should also be investigated as soon as possible as they are signals that there are inadequacies in the safety management system.

It is important after any accident or dangerous occurrence that information relating to the incident is gathered in an organized way. The following steps shall be followed:

- Take photographs and make sketches.
- Examine involved equipment, work piece or material and the environmental conditions.
- Interview and record the statements of the injured, eye-witnesses and other involved parties.
- Consult expert opinion where necessary.
- Identify the specific contractor or sub-contractor involved.

Having gathered information, it is then necessary to make an analysis of incident:

- Establish the chain of events leading to the accident or incident.
- Find out at what stage the accident took place.
- Consider all possible causes and the interaction of different factors that led up to the accident, and identify the most probable cause. The cause of an accident should never be classified as carelessness. The specific act or omission that caused the accident

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[1] An accident is an incident which has given rise to injury, ill health or fatality.

[2] An incident where no injury, ill health, or fatality occurs may also be referred to as a "near-miss", "near-hit", "close call" or dangerous occurrences".

[3] An emergency situation is a particular type of incident. An obstruction / disruption in Company's operations will be an incident.

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must be identified.

The next stage is to proceed with the follow-up action:

- report the findings and conclusions in the form.
- formulate preventive measures to avoid recurrence.

12.3 REPORTING

Any personnel shall immediately inform about the occurrence of any near miss, accident & dangerous occurrences to the immediate Hierarchical Superior / HSE Officer / Site Administration / Project Manager by the quickest possible means like Telephone, personally, messenger etc.

All the accidents/incident of any nature whatsoever are immediately highlighted and reported to Head of HSE. The Project Manager shall be responsible for further communication with the client regarding the same.

Investigation reports of all near miss, accidents, and dangerous occurrences shall also be sent to the Head Office/ client within 24 hours as per the prescribed format. No near miss, accident & dangerous occurrences are exempted from reporting.

In addition to the above verbal and written reporting, as per Rule 210 of BOCWR, notice of any accident to a worker at the building or construction site that

- causes loss of life; or
- disables a worker from working for a period of 48 hours or more immediately following the accident;

shall forthwith be sent by telegram, telephone, fax, or similar other means including special messenger within **four hours** in case of fatal accidents or cases where amputation is likely and **72 hours** in case of other accidents, to:

- the Regional Labour Commissioner (central), wherein the contractor has registered the firm/work,
- the board with which the worker involved was registered as a beneficiary,
- Director General and
- the next of kin or other relative of the worker involved in the accident.

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

- causes loss of life; or
- disables the injured worker from work for more than 10 days

to:

- the officer-in-charge of the nearest police station;
- the District Magistrate or, if the District Magistrate by order so desires, to
- the Sub-Divisional Magistrate.

In case of an accident causing minor injury, first-aid shall be administered and the injured worker shall be immediately transferred to a hospital or other place for medical treatment.

The following classes of dangerous occurrences shall be reported to the Inspector having jurisdiction, whether or not any disablement or death caused to the worker, namely:

- collapse or failure of lifting appliances, or hoist, or conveyors, or similar equipment for handling of building or construction material or breakage or failure of rope, chain or loose gears; or overturning of cranes used in construction work;
- Collapse of excavation, Transmission;
- collapse or subsidence of soil, tunnel, pipe lines, any wall, floor, gallery, roof or any other part of any structure, launching girder, platform, staging, scaffolding or means of access including formwork;
- explosion of receiver or vessel used for storage of pressure greater than atmospheric pressure, of any gas or gases or any liquid or solid used as building material;
- fire and explosion causing damage to any place on construction site where building workers are employed;
- spillage or leakage of any hazardous substance and damage to their container;
- collapse, capsizing, toppling or collision of transport equipment;
- leakage or release of harmful toxic gases at the construction site;

Every notice given for fatal accidents or dangerous occurrences shall be followed by a written report to the concerned Authorities under

Section 39 of BOCWA and the Director General in the specified Form XIV of BOCWR.

13 EMERGENCY PROCEDURE

Potential hazards are involved at different activities at Project, it is essential to evolve a Project emergency preparedness & Response plan so that if situation demands, personnel at Project can effectively make use of the available resources to minimize the human suffering and property damage when unforeseen circumstances may lead to a major emergency at site.

Procedures to clearly define the action to be taken in the event of an emergency shall be drawn up and regularly reviewed and updated with Project Emergency preparedness & Response Plan. Procedures to clearly define the action to be taken in the event of an emergency shall be drawn up. The emergency procedures shall be regularly reviewed and updated.

All visitors arriving on site shall be instructed on the emergency arrangements prior to being allowed on site. Practice drills for identified emergency situations, including rescue operations shall be undertaken. The procedures shall integrate the emergency response plans of the Contractor and all other subcontractors as well.

Foreseeable emergencies would include, but not necessarily be limited to:

- Fire & Explosion
- Collapse of lifting appliances and transport equipment
- Collapse of building, sheds or structure etc.
- Gas leakage or spillage of dangerous goods or chemicals
- Bomb Threatening, criminal or Terrorist attack
- Persons injured/Snake bite
- Personal emergencies
- Fall from height
- Electrocution / Asphyxiation
- Earthquake, storms & other natural calamities

Arrangements shall be made for emergency medical treatment and evacuation of the victim in the event of an accident or dangerous incident occurring, the chain of command and the responsible persons with their telephone numbers for quick communication shall be adequately publicized and conspicuously displayed in the workplace.

It shall require to tie-up with the hospitals and fire stations located in the neighborhood for attending to the casualties promptly and mutual aid response group associated in neighborhood for emergency vehicle kept on standby duty during the working hours for the purpose.

Onsite emergency mock drill shall be conducted at least once in six months for checking the readiness to deal with the emergency.

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What should you do In the event of accident?

The eyewitness is the first link in the emergency Services chain

KEEP CALM

- Assess the situation
- Identify the dangers

ACT

- Get clear of the danger
- If possible, eliminate the danger
- Mark out the area in order to avoid any further accident

ALERT THE EMERGENCY SERVICES

- Specify the location and the nature of the accident
- Indicate the number of victims and their condition
- Arrange a meeting point
- Never hang up the phone first

PROVIDE ASSISTANCE

- Do not place yourself in danger
- Do not place third parties in danger
- Carry out the safety instructions
- Within the limits of your knowledge, provide first aid

INFORM

- In the event of serious incident, warn the Internal Emergency Numbers

What is a SERIOUS INCIDENT?

- A life- threatening accident with fatal consequences
- Serious injuries
- Major property and / or environment damages

A serious accident is characterized by the intervention of the police, emergency assistance services and / or the local authorities.

EMERGENCY NUMBERS

INTERNAL	EXTERNAL
Project Head:	Police:
Safety Officer:	Fire :
Administration:	Emergency services:

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14 RISK ASSESSMENT

Process of evaluating the risk(s) arising from a hazard(s), taking into account the adequacy of any existing controls, and deciding whether or not the risk(s) is acceptable.

14.1 IDENTIFICATION OF OHS HAZARDS

Ffollowing methods shall be adopted for identifying the OHS Hazards, as appropriate:

- Site visit, study of various activities.
- Interview of concerned personnel.
- Interaction with (sub) contractor's/ service providers
- Facilities at the workplace
- Review of Normal, Abnormal and Potential Emergency Situations
- Review of past health surveillance data, incident & accident data, monitoring & measurement data related with noise, illumination etc.
- Review of applicable legal, corporate, customer and other requirements
- Review of past OHS accidents, emergencies, audit results
- Suggestions

Identify Occupational Health and Safety Hazards as follows:

- Physical (operational, mechanical, heat, noise, electrical, slip and fall etc.)
- Chemical (fumes, gases, spills / leaks of chemicals, mist etc.)
- Biological (Bacteria, Virus, fungi, Snake / Dog / Reptile / Honey-Bee bites etc.)
- Ergonomic (push & pull, lifting, posture etc.)

14.2 EVALUATION OF OHS HAZARDS

Evaluate the Hazard / Concern and Indicate the:

- Severity explanation and severity rating
- Probability explanation and rating
- Existing risk controls
- Risk Level

Also consider the risk controls as per table below.

RISK LEVEL		DESCRIPTION
5	Inacceptable	Work should not be started or continued until the risk has been reduced. If it is not possible to reduce risk even with unlimited resources, work has to remain prohibited.
4	Substantial	Work should not be started until the risk has been reduced. Considerable resources may have to be allocated to reduce the risk. Where the risk involves work in progress, urgent action should be taken.
3	Moderate	Efforts should be made to reduce the risk, but the costs of prevention should be carefully measured and limited. Risk reduction measures should be implemented within a defined time period. Where the moderate risk is associated with extremely harmful consequences, further assessment may be necessary to establish more precisely the likelihood of harm as a basis for determining the need for improved control measures.
2	Acceptable	No additional controls are required. Consideration may be given to a more cost-effective solution or improvement that imposes no additional cost burden. Monitoring is required to ensure that the controls are maintained.
1	Trivial	No action is required and no documentary records need to be kept.

Following Hierarchy of Controls shall be considered:

- Eliminate: through Objectives, Targets and Improvement Management Programmes (IMP's)
- Substitute / Isolate: through Objectives, Targets and IMP's
- Engineering controls: through Objectives, Targets and IMP's
- Administrative Controls, Signages, Operational Controls: through Operational Control Procedures / Work Instructions, issue of Do's & Don'ts to external agencies in Purchase / Work Orders, Work Permits, Letters, Supervision of job, Issue of HSE Plans etc.
- PPE's: through Work Instructions, Displays etc.

14.3 SETTING OBJECTIVES, TARGETS & IMPs FOR SIGNIFICANT OCCUPATIONAL HEALTH & SAFETY RISK LEVELS

HSE Manager in consultation with the Project Manager shall prepares the Improvement Management Programs and it is ensured that the same are:

- SMART: Specific, Measureable (where possible), Achievable, Realistic, Time bound Objective
- Have Action plan to achieve the objective and target with individual steps, responsibility and time target.

14.4 SETTING METHOD STATEMENT FOR OPERATIONAL CONTROL OF SIGNIFICANT OCCUPATIONAL HEALTH & SAFETY RISK LEVELS

Concerned Engineers prepares the Method Statement, which includes:

- Method for the work / operation / activity including the person(s) responsible for the same
- Frequency
- Control method for the significant OHS Hazards and Risks; i.e., how to prevent occurrence and control method in case of occurrence
- Main operating criteria(s) to be followed
- PPE's to be used, if any
- Work Permit, Signage requirements – if any
- Any records to be maintained in Log books, Registers, Files, Formats, Software etc.

The monitoring of WI's whenever the operation / activity is carried out and record the operating criteria in Log Books, Registers, Formats, Files, Software etc. as mentioned in the WI.

14.5 UPDATING OF HIRA & REVIEW OF RISK CONTROL ACTIONS

The process of HIRA is performed at commencement of the activities. As these are dynamic processes this identification and evaluation must be updated, so that they are adapted to each moment in time. The identification and evaluation of the OHS Hazards identified are updated when changes occur in the features of these activities and especially under the following circumstances:

- Amendments / addition in legal and corporate requirements
- Change in process / product / activity
- While purchasing and erecting any new equipment / machinery / building / tower
- Planned or new developments; new or modified activities, products or services
- While planning for any change (i.e. management of change) in the activities, products, services, operating procedures & conditions etc.
- Internal and external audit results, including Corporate and Specialized Audits
- Occurrence of accident, emergency
- While initiating any corrective and preventive action
- Upon completion of Improvement Management Programs
- Or, once in a year

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15 OCCUPATIONAL HEALTH MEASURES

15.1 MEDICAL EXAMINATION

Medical examination of the employees/workmen shall be ensured as required under the law or under the contract provision and keep a record of the same.

No one shall be allowed to enter the work area under the influence of alcohol or any drugs.

Medical examination of employees including sub-contractor employees employed as drivers, operators of lifting appliances and transport equipment before employing, after illness or injury, if it appears that the illness or injury might have affected his fitness and, thereafter, **once in every two years up to the age of 40 and once in a year thereafter,** shall be ensured. Confidential records of medical examination shall be maintained.

The medical examination shall include:

a) Full medical and occupational history.

b) Clinical examination with particular reference to

I. General Physique;

II. Vision: Total visual performance using standard orthorator like Titmus Vision Tester should be estimated and suitability for placement ascertained in accordance with the prescribed job standards.

III. Hearing: Persons with normal must be able to hear a forced whisper at twenty-four feet. Persons using hearing aids must be able to hear a warning shout under noisy working conditions.

IV. Breathing: Peak flow rate using standard peak flow meter and the average peak flow rate determined out of these readings of the test performed. The results recorded at pre-placement medical examination could be used as a standard for the same individual at the same altitude for reference during subsequent examination.

V. Upper Limbs: Adequate arm function and grip

VI. Spine: Adequately flexible for the job concerned.

VII. Lower Limbs: Adequate leg and foot concerned.

VIII. General: Mental alertness and stability with good eye, hand and foot coordination.

IX. Any other tests which the examining doctor considers necessary

15.2 FIRST-AID BOXES

Each crew shall be equipped with First Aid Box. Every First-aid box is distinctly marked "First-aid" and is equipped with the articles specified in Schedule III of BOCWR.

- Sufficient number of eye wash bottles filled with distilled water suitable liquid clearly indicated by a distinctive sign which shall be visible at all times.
- 4 % xylocaine eye drops, and boric acid eye drops and soda by carbonate eye drops.
- 24 small sterilized dressings.
- 12 medium size sterilised dressings.
- 12 large size sterilised dressings.
- 12 large size sterilised burn dressings.
- 12 (15) packets of sterlised cotton wool.
- 1 (200 ml) bottle of certimide solution (1%) or suitable antiseptic solution.
- 1 (200 ml) bottle of mercurochrome (2 %) solution in water.
- 1 (120 ml) bottle of sal-volatile having the doses and mode of administration indicated on the label.
- 1 pair of scissors.
- 1 roll of adhesive plaster (6 cm x 1 m)
- 2 rolls of adhesive plaster (2 cm x 1 m)
- 12 pieces of sterilised eye pads in separate sealed packets.
- A bottle containing 100 tablets (each of 325 mg) of aspirin or any other analgesic.
- 12 roller bandages 10 cm wide.
- 12 roller bandages 5 cm wide.
- 1 tourniquet.
- A supply of suitable splints.
- 3 packets of safety pins.
- Kidney tray.
- A snake bite lancet.

- 1 (30 ml) bottle containing potassium permanganate crystals
- One copy of first-aid leaflet issued by the Directorate General.
- 6 triangular bandages.
- 2 pairs of suitable, sterilised, latex hand glove

16 WELFARE MEASURES FOR WORKERS

16.1 LATRINE AND URINAL ACCOMMODATION

Adequate number of latrine & urinal shall be provided e.g. one latrine seat for every 20 workers up to 100 workers and thereafter one for every additional 50 workers. In addition one urinal accommodation shall be provided for every 100 workers.

When women are employed, separate latrine and urinals accommodation shall be provided on the same scale as mentioned above.

Latrine and urinals shall be provided as per Section 33 of BOCWA and maintained as per Rule 243 of BOCWR and shall also comply with the requirements of public health authorities

16.2 DRINKING WATER

As per Section 32 of BOCWA the contractor shall make in every worksite, effective arrangements to provide sufficient supply of wholesome drinking water with minimum quantity of 5 litres per workman per day. Quality of the drinking water shall conform to the requirements of national standards on Public Health.

While locating these drinking water facilities due care shall be taken so that these are easily accessible within a distance of 200m from the place of work for all workers at all location of work sites.

All such points shall be legible marked "Drinking Water" in a language understood by a majority of the workmen employed in such place and such point shall be situated within six metres of any washing places, urinals or latrines.

16.3 LABOUR ACCOMMODATION (if required)

Adequate temporary living accommodation to all workers shall be provided conforming to provisions of Section 34 of BOCWA. These accommodations shall have cooking place, bathing, washing and lavatory facilities

The location of workers' housing shall not have affected by air pollution, surface run-off or sewage or other wastes & live traffic.

- Ensure provision for separate bed for each worker.
- Adequate natural light in each room during the day time and sufficient artificial light as required.
- Adequate ventilation in each room to ensure sufficient movement of air in all conditions of weather and climate.
- Adequate supply of safe potable water at labor camp and work site.
- Adequate drainage system shall be ensured in labour camp.
- Common dining rooms, canteen or mess rooms shall be located away from the sleeping areas.
- All temporary electrical connections shall be routed through ELCB/RCCB.
- Adequate IS Approved electrical fixtures shall be used. In each room electrical cable shall be routed through safest way by using conduit pipe.
- Living facility should be located within a reasonable distance from the worksite.
- Transport provides to work site safe and free. No workers shall be allowed to sit on bed of tractor trolley.
- Drinking water quality should regularly monitor.
- It should be ensure that the kitchen must be far from living area and separately.
- Separate sleeping, bathing and mess area for male and female workers.
- The toilet facility shall be convenient located and sufficient staff shall be deputed for maintaining the labour camp by means of cleaning & disposal of solid wastes.
- Sufficient quantity of Fire extinguisher should be made available at labour camp.
- Worker shall be trained of basic firefighting techniques.

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16.4 CRECHE

In every workplace where in more than 50 female workers are ordinarily employed, there shall be provided and maintained a suitable room for use of children under age of 6 years, conforming to the provisions of section 35 of BOCWA.

16.5 PREVENTION OF MOSQUITO BREEDING

Measures shall be taken to prevent mosquito breeding at site. The measures to be taken shall include:

- Empty cans, oil drums, packing and other receptacles, which may retain water shall be deposited at a central collection point and shall be removed from the site regularly.
- Still waters shall be treated at least once every week with oil in order to prevent mosquito breeding.
- Contractor's equipment and other items on the site, which may retain water, shall be stored, covered or treated in such a manner that water could not be retained.
- Water storage tanks shall be provided.

Posters in both Hindi and English, which draw attention to the dangers of permitting mosquito breeding, shall be displayed prominently on the site.

17 PERMIT TO WORK SYSTEM

Work Permit system is a formal written system used to control certain types of work that are potentially hazardous. A work permit is a document, which specifies the work to be done, and the precautions to be taken. Work Permits form an essential part of safe systems of work for many construction activities. They allow work to start only after safe procedures have been defined and they provide a clear record that all foreseeable hazards have been considered. Permits to Work are usually required in high-risk areas.

Examples of high-risk area, activities include but are not limited to:

- Entry into confined spaces
- Work in close proximity to overhead power lines and telecommunication cables.
- Hot work.
- To dig—where underground services may be located.
- Heavy lifting operations and lifting operations closer to live power line

18 PERSONAL PROTECTIVE EQUIPMENT

Personal protective equipment (PPE) must be provided & worn as required for each job in all operations where there is an exposure to hazardous conditions.

Safety helmet, safety shoe and high visibility clothing is mandatory for all employees including workmen, traffic marshal and other employees who are engaged for any work in this project.

18.1 HEAD PROTECTION

Safety Helmet shall be worn by all personal at all times at the project sites.

Color coding for helmets

Safety Helmet Colour Code (Every Helmet should have the LOGO[4] affixed /painted)	Person to use
White	Essel Infra
Blue	All Sub-contractors (Engineers / Supervisors)
Red	Electricians
Green	Safety Professionals
Yellow	All workmen
White (with "VISITOR" sticker)	Visitors

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18.2 HEARING PROTECTION

Hearing protection shall be worn by personnel involved in areas of high noise level or when working with equipment's that generate high noise. Whenever practicable, equipment generating high noise shall be located at the maximum possible distance from any work being performed.

18.3 EYE PROTECTION

Eye protection shall be worn where there is any potential of the following:

- Flying pieces of metal or steel, concrete, bricks, sand etc.
- While handling chemicals.
- While working in electrical lines.
- Where liquid & solid particles may be blown or splashed.

18.4 FOOT PROTECTION

Foot protection like safety shoes or gum boots with steel toe shall be worn by all personnel at work front. The footwear shall be confirmed to IS or equivalent marked.

Safety footwear shall be kept clean & inspected regularly for any defects such as torn, loose soles or cracked or torn toe protection.

18.5 FALL ARRESTING SYSTEM

All personnel working at height where it is impracticable to provide a working platform with hand rail, guard rails & toe board will use a full body safety harness (with double lanyard) secured to an adequate anchor point.

All workers using full body safety harness (with double lanyard) shall have the knowledge of safe use of such safety harnesses.

The responsible person for supervising the use of full body safety harness with double lanyard shall inspects & ensures that such safety harnesses are fit for use before taken into use at every time.

18.6 HAND PROTECTION

Hand protection is an important part as most of the work relies on use of hands. Appropriate hand protection (gloves) shall be selected when hands are exposed to hazards such as those from skin absorption of harmful substances; severe cuts or lacerations; severe abrasions; punctures; chemical burns; electrocution, thermal burns; and harmful temperature extremes.

18.7 RESPIRATORY PROTECTION

Respiratory protection must be capable of adequately controlling the exposure and be suitable for the purpose that it is intended. Respiratory personal protection must be used mainly where risks of hazardous substances and gases in the atmosphere present beyond permissible limits.

Respiratory protection is of three basic types:

- Oxygen or air fed (known as self-contained breathing apparatus)
- Filter respirators
- Disposable respirators

The specific class of respirators to be employed will depend upon the hazard e.g. dust, fumes, gases, mists, vapors, oxygen deficiency.

These hazards can affect the body in number of ways, some of which can be fatal.

With the exception of self-contained breathing apparatus, all forms of respiratory protection require that sufficient oxygen exists at the work place in order to support life.

Self-contained breathing apparatus consists of a full face mask with non-return exhaling valves, combined with a hose and source of fresh air, generally in the form of a tank of compressed air. Breathing apparatus should be employed where oxygen levels are low, however it may also be used for highly toxic hazards. It should be maintained in accordance with manufacturer's guidelines. Tank should be refilled to required pressure, standby tank should be available otherwise SCBA will not be available for use during refilling process time, which may be

up to a month at sites. It should be used ONLY by trained person.

Filter respirators are the system in which air to be inhaled is first drawn through filter. They should be used for filtration of air only and it should be ensured that sufficient oxygen is available in the atmosphere. In case of doubt, Oxygen level should be measured before entry in that area.

Disposable respirators should be used for protection against dust and nontoxic fumes.

18.8 OTHER PPE

In addition to the above any other PPE required for any specific jobs like, welding and cutting, tunneling etc shall also be provided to all workmen and also ensure that all workmen use the PPEs properly while on the job.

A minimum inventory of 10% spares PPEs & safety appliances shall be maintained at all the time.

All visitors shall be accompanied at all times by site personnel.

If site visit is planned adequate personal protective equipment (white helmet with visitor sticker, safety shoe, reflective jacket etc.) shall be provided to the visitors.

19 HOUSEKEEPING

Housekeeping is the act of keeping the working environment cleared of all unnecessary waste, thereby providing a first-line of defense against accidents and injuries.

Improper housekeeping is the primary hazard in any construction site and ensures that a high degree of housekeeping is always maintained. Indeed "Cleanliness is next to Godliness"

Housekeeping is the responsibility of all site personnel, and line management commitment shall be demonstrated by the continued efforts of supervising staff towards this activity.

The materials, tools equipment etc. should be placed at their designated places.

Nothing should be stacked/placed from where it may fall & hit anyone below causing injury.

Adequate numbers of suitable scrap/waste disposable bins should be provided at different locations.

The practice of throwing scrap, materials, equipment's, tools etc from elevated location to lower levels should be strictly forbidden. Suitable measure should be taken to lower such item safely.

Proper and safe stacking of material are of paramount importance at yards, stores and such locations where material would be unloaded for future use. The storage area shall be well laid out with easy access and material stored / stacked in an orderly and safe manner.

Flammable chemicals / compressed gas cylinders shall be safely stored.

Unused/surplus cables, steel items and steel scrap lying scattered at different places within the working areas shall be removed to identified locations(s).

All wooden scrap, empty wooden cable drums and other combustible packing materials, shall be removed from work place to identified location(s).

All surplus earth & debris are removed/disposed of from the working areas to designated dump sites. Trucks carrying earth & any pulverized material etc. in order to avoid dust or odor impact shall be covered while moving.

No parking of trucks/trolleys, cranes & trailers etc. shall be allowed on roads, which may obstruct the traffic movement.

Roads shall be kept clear and a material likes: pipes, steel, sand boulders, concrete chips & bricks etc. shall not be allowed on the roads to obstruct free movement of road traffic.

Empty cement bags & other packaging material shall be properly stacked & removed from the site on suitable intervals.

20 SAFE WORK METHOD FOR ANTICIPATED HAZARDS

20.1 WORKING AT HEIGHT

20.1.1. Definitions

Work at height:

- work in any place, including a place at or below ground level;

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- obtaining access to or egress from such place while at work, except by a staircase in a permanent workplace, where, if protective measures were not taken, a person could fall a distance liable to cause personal injury;

Work equipment: any machinery, appliance, apparatus, tool or installation for use at work (whether exclusively or not) and includes:

- a guard-rail, toe-board, barrier or similar collective means of protection
- a working platform
- a net or other collective safe guard for arresting falls.
- personal fall protection system
- ladders

Working platform:

- any platform used as a place of work or as a means of access to or egress from a place of work;
- Includes any scaffold, suspended scaffold, cradle, mobile platforms, trestle, gangway, gantry and stairway which are so used.

20.1.2. Organisation and planning

It shall ensure that work at height is:

- properly planned for any emergencies and rescue
- appropriately supervised; and
- Carried out in a manner, which is reasonably practicable safe.

Work at height is carried out only when the weather conditions do not jeopardize the health or safety of persons involved in the work.

20.1.3. Competence

It shall ensure that no person engages in any activity, including organization, planning and supervision, in relation to work at height or work equipment for use in such work unless he is competent to do so or, if being trained, is being supervised by an experienced person.

20.1.4. Avoidance of risks from work at height

It shall ensure that work is not carried out at height where it is reasonably practicable to carry out the work safely otherwise than at height. Where work is carried out at height, all suitable and sufficient measures shall be taken to prevent, so far as is reasonably practicable, any person falling a distance liable to cause personal injury.

20.1.5. Fragile surfaces

It shall ensure that no person at work passes across or near, or working on, from or near, a fragile surface where it is reasonably practicable to carry out work safely and under appropriate ergonomic conditions.

Where it is not reasonably practicable to carry out work safely and under appropriate ergonomic Conditions without passing across or near, or working on, from or near, a fragile surface, it shall,

a) ensure, so far as is reasonably practicable, that suitable and sufficient platforms, coverings, guard rails or similar means of support or protection are provided and used so that any foreseeable loading is supported by such supports or borne by such protection;

b) where a risk of a person at work falling remains despite the measures taken under the preceding provisions of this regulation, take suitable and sufficient measures to minimize the distances and consequences of his fall.

Where any person at work may pass across or near, or work on, from or near, a fragile surface, every contractor shall ensure that

a) prominent warning notices are so far as is reasonably practicable affixed at the approach to the place where the fragile surface is situated; or

b) Where that is not reasonably practicable, such persons are made aware of it by other means.

20.1.6. Falling objects

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It shall be ensured that where necessary to prevent injury to any person, take suitable and sufficient steps to prevent, so far as is reasonably practicable, the fall of any material or object.

It shall be ensured that no material or object is thrown or tipped from height in circumstances where it is liable to cause injury to any person.

Every employer shall ensure that materials and objects are stored in such a way as to prevent risk to any person arising from the collapse, overturning or unintended movement of such materials or objects.

20.1.7. Inspection of places of work at height

The concerned supervisor shall so far as is reasonably practicable ensure that the surface and every parapet, permanent rail or other such fall protection measure of every place of work at height are checked on each occasion before the place is used.

Any workmen shall report to the supervisor about any defect relating to work at height which he knows is likely to endanger the safety of himself or another person.

20.1.8. Requirements for guardrails, toe-boards, barriers and similar collective means of protection

Means of protection shall:

a) be of sufficient dimensions, of sufficient strength and rigidity for the purposes for which they are being used, and otherwise suitable;

b) be so placed, secured and used as to ensure, so far as is reasonably practicable, that they do not become accidentally displaced; and

c) be so placed as to prevent, so far as is practicable, the fall of any person, or of any material or object, from any place of work.

In relation to work at height involved in construction work a) the top guard-rail or other similar means of protection shall be at least 950 millimeters above the edge from which any person is liable to fall;

a) toe-boards shall be suitable and sufficient to prevent the fall of any person, or any material or object, from any place of work; and

b) any intermediate guardrail or similar means of protection shall be positioned so that any gap between it and other means of protection does not exceed 470 millimeters.

20.1.9. Requirements for personal fall protection systems

A personal fall protection system shall be used only if:

- the work can so far as is reasonably practicable be performed safely while using that system; and
- the use of other safer work equipment is not reasonably practicable; and
- the user and a sufficient number of available persons have received adequate training specific to the operations envisaged, including rescue procedures.

A personal fall protection system shall:

- be suitable and of sufficient strength for the purposes for which it is being used having regard to the work being carried out and any foreseeable loading;
- where necessary, fit the user;
- be correctly fitted;
- be designed to minimize injury to the user and, where necessary, be adjusted to prevent the user falling or slipping from it, and
- be so designed, installed and used as to prevent unplanned or uncontrolled movement of the user.

A personal fall protection system designed for use with an anchor shall be securely attached to at least one anchor, and each anchor and the means of attachment thereto shall be suitable and of sufficient strength and stability for the purpose of supporting any foreseeable loading.

Suitable and sufficient steps shall be taken to prevent any person falling or slipping from a personal fall protection system.

20.2 SCAFFOLDING

Scaffolds are intended to provide safe working positions at elevations. To eliminate fall exposures, scaffolds must have complete handrails,

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mid rails, and decking. Do not use fall arrest equipment as a substitute for handrails, mid rails, or a complete deck.

Before erecting scaffolds, consider all nearby or overhead hazardous energy sources such as electrical, mechanical, pneumatic, thermal, and chemical.

Welded-frame scaffolds are made of basic prefabricated end frames, cross-bracing, and frame-connecting devices to hold the parts firmly in place. Tube-and-coupler and system scaffolds are made of various lengths of tubing clamped together by special patented couplers to support working platforms of various shapes.

Do not intermix scaffold components manufactured by different manufacturers unless the component parts fit together without force or modification.

20.2.1. Erecting Scaffolds

Only employees who have been trained by and are under the supervision of an experienced person shall erect scaffolds. The site manager must approve scaffolds higher than 50 feet (15 meters) above the base plates.

Where fall hazards cannot be eliminated, use fall-arrest systems while erecting, modifying, and dismantling scaffolds. It is the responsibility of the experienced person to determine the feasibility and type of fall-arrest system to be used.

Set scaffold legs on base plates placed on foundations or firmed surface that are adequate for supporting the maximum intended loads. Scaffold boards and masonry blocks are not appropriate scaffold foundations. The total load on a scaffold consists of the sum of the weight of the workers and materials on a scaffold plus the weight of the scaffold.

Install adjusting screws only between the base plate and the vertical frame section. Never use adjusting screws together with casters. Do not extend adjusting screws beyond 12 inches (30 centimeters).

The position and number of braces used on a scaffold not only restricts the amount of side movement, but also determines the strength of the scaffold. Never use cross-braces as substitutes for handrails or mid rails.

When the height of a scaffold exceeds three times the smallest width of the base, secure it to the building or structure at every other lift and every 30 feet (9 meters) horizontally. The scaffold should be secured by both ties and braces to prevent movement Equip scaffold working platforms with handrails approximately 42 inches (one meter) high, mid rails, and toe boards, all secured rigidly. Working platforms should be completely decked with safety planks, manufactured scaffold decking, or laminated wooden planks.

When portable straight or extension ladders are used for access to tube-and-coupler scaffolds, the 4-to-1 slope should be maintained to avoid a horizontal tube interfering with the use of the ladder.

Scaffold users should be able to step off the scaffold access ladder directly onto the working platform. Provide entry gates for scaffolds to eliminate the need for users to climb over handrails.

Tag or otherwise identify scaffolds that should not be occupied or that require particular safety precautions. The tag should indicate special requirements, the date of erection, and the signature of the competent person.

Scaffolds and their components must be capable of supporting, without failure, at least four times the maximum intended load. Materials should be evenly distributed on platforms and not concentrated in one small area.

20.2.2. Scaffold Inspection

A experienced person shall visually inspect all components of the scaffold for defects prior to use in each day and following any occurrence that could affect the scaffold's structural integrity. Defective components will be immediately discarded.

Before erecting and while dismantling scaffolds, inspect all components. Scaffold components should be straight and free from bends, kinks, dents, and severe rusting. Immediately discard defective components. Inspections should include an evaluation of the following components:

Handrails, mid rails, cross-bracing and steel tubing for nick and other damage, especially near the center span, Casters for rough rolling surfaces, "sticky" swivels, and defective locking mechanisms.

20.2.3. Training

Employees involved in the erection, dismantling, moving, repairing, etc., of scaffolding shall receive training from an experienced person. The purpose of the training is to recognize any hazards associated with the work. Training shall consist of:

- The nature of scaffold hazards
- The correct procedures for erecting, disassembling, moving, operating, repairing, inspecting, and maintaining the type of scaffold.
- The design criteria, maximum intended load-carrying capacity, and intended use of the scaffold.

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Employees who perform work on a scaffold shall be trained by a qualified person so they will recognize hazards associated with the type of scaffold being used and understand the procedures to control those hazards. Training will cover the following topics as necessary:

- The nature of any electrical hazards, fall hazards, and falling object hazards in the work area.
- The correct procedures for dealing with electrical hazards and for erecting, maintaining, and disassembling the fall protection systems and falling object protection systems used.
- The proper use of the scaffold and the proper handling of materials on the scaffold.
- The maximum intended load and the load-carrying capacities of the scaffolds used.

20.3 USE OF LADDER

Ladder shall not be used as a platform

Ladder shall be of adequate strength for its intended use.

Ladder shall be secured at the top and the base. Rise at each step will be same.

Ladder shall be erected on level and firm ground at an angle not exceeding 75° or a 4 (heights): 1 (base ratio)

If possible, hand rail shall be provided with ladder.

Ladder shall protrude 1m above the level of landing.

Metal ladder shall not be used near or adjacent to overhead power lines unless they have been certified dead under a permit to work system.

Ladder shall not be used for any other purpose than to provide access.

20.4 LIFTING APPLIANCES AND GEAR

Lifting appliances means a crane, hoist machinery, derrick, winch, gin pole, sheer legs, jack, hoist drum, slewing machinery, slewing bearing fasteners, loffing machinery sheaves, pulley blocks, hooks or other equipment used for lifting materials, objects or building workers and lifting gears means ropes, chain slings, shackles, hooks, lifting lugs, wire ropes, lifting eyebolts and eye nuts and other accessories of a lifting appliance.

No machine shall be selected to do any lifting on a specific job until its size and characteristics are considered against:

- the weights, dimensions and lift radii of the heaviest and largest loads.
- the maximum lift height, the maximum lift radius and the weight of the loads that must be handled at each lift.
- The number of frequency of lifts to be made.
- Whether loads have to be walked or carried.
- Whether loads will have to be suspended for lengthy periods, wind velocity at the height at which load will be lifted.
- The type of lifting to be done (for example, is precision placement of loads important?)
- The type of carrier required (this depends on ground conditions and machine capacity in its operating quadrants) capacity is normally greatest over the rear, less over the side, and non-existent over the front
- The site conditions, including the ground where the machine will be set up, access roads and ramps it must travel, space for erection and any obstacles that might impede access or operation.

All lifting appliances including all parts and gears thereof, whether fixed or movable shall be thoroughly tested and examined by a certified competent person at least **once in a Year**.

The laminated photocopies of fitness certificate issued by competent person & manufacturer's load chart shall always be either kept in the operator cabin or pasted on the visible surface of the lifting appliances (but not on wind screen).

All lifting appliances and loose gears shall be clearly marked for its safe working load and identification by stamping or other suitable means.

A separate Lifting tools & tackles register shall also be maintained containing record of all and a system of identification of all tools and tackles, safe working load, competent person date of examination, Next due date for testing etc.

20.4.1. Test and periodical examination of lifting appliances and gears

All lifting appliances including all parts and gears thereof, whether fixed or movable shall be thoroughly tested and examined by a competent person at least **once in every year** or after it has undergone any alterations or repairs liable to affect its strength or stability. Within the validity, if the lifting appliances are shifted to a new site, re-examination by the same competent person for ensuring its safety shall also be

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done.

All alarms and signals like automatic safe load indicators (SLI), boom angle indicators, boom extension indicators, over lift boom alarm, swing alarm, hydraulic safety valves, mechanical radius indicators, load moment indicators etc. shall be periodically examined and maintained always in working condition.

20.4.2. Automatic safe load indicators

As stipulated in Rule 57 of DBOCW Rules, every lifting appliances and gears like cranes, hydras etc, if so constructed that the safe working load may be varied by raising or lowering of the jib or otherwise shall be attached with an automatic indicator of safe working loads approved by Bureau of Indian standards/ International certifying bodies which gives a warning to the operator and arrests further movements of the lifting parts.

20.4.3. Qualification of operator of lifting appliances and of signaller etc

The subcontractor shall not employ any person to drive or operate a lifting machine like crane, hydra etc whether driven by mechanical power or otherwise or to give signals to work as a operator of a rigger or derricks unless he:

- is above twenty-one years of age and possesses a valid heavy transport vehicle driving license as per Motor Vehicle Act and Rules.
- is absolutely competent and reliable
- possesses the knowledge of the inherent risks involved in the operation of lifting appliances
- is medically examined periodically as specified in schedule VII of BOCW Rules.

20.4.4. General requirements of appliances

Out of fit level

One of the most severe effects of being out-of fit level is that side loads develop in the boom. Because of side loads all mobile cranes lose capacity rapidly as the degree of out-of-level increases and therefore

Boom

The boom is one of the more critical elements of the crane and must be in perfect condition at all time. No boom section with a bent lattice member shall be allowed.

All welds shall be crack and corrosion free.

No member of the boom shall be bent.

All telescopic boom shall be free from cracks, rust, flaking or cracked paint, bulges, greases or varnishes.

The sweep area (work area) of the construction machinery shall be always free from obstructions.

All hydraulic piping and fittings shall be maintained leak proof.

The operator cab shall possess good and safe:

- Structure, windows and windshield wipers
- Drivers chair and foot rest
- Control handles
- Cab instrumentation
- Telecommunication
- Cab out fitting
- Wind indicator with an adjustable set point shall be in a position representative for the wind on the crane. The indicator shall give continuous information regarding constant speeds and gusts.

20.4.5. Rigging

Rigging shall be done under experienced and qualified rigger only.

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The primary requirement in rigging shall be to assess the weight of load before attempting any lift.

All hooks shall be fitted with Master Rings having certificate of fitness from the competent person, so that the hooks are subjected to balance vertical loading only.

Only four legged slings shall be allowed which includes master link (ring), intermediate master link (ring) if necessary, chain / wire rope sling, sling hook or other terminal fitting.

No load shall be slewed over public areas without stopping the pedestrians and road traffic first.

The affected area shall be barricaded for avoiding unauthorized entry.

Requirement of Outriggers

All outriggers shall be fully extended & kept on firm level surface and at all tyres are clear of the ground.

Heavy duty blocking having large bearing area shall be necessary to prevent sinking of floats

All loads shall have tag-lines attached in order to ensure that the load can be controlled at all times.

20.5 CONTRUCTION MACHINERY

20.5.1. Reverse Horn

All Vehicles shall be fitted with audible reverse alarms and maintained in good working condition. Reversing shall be done only when there is adequate rear view visibility or under the directions of a banks man.

20.5.2. Other Requirement

No close working to any live overhead power line is permitted without the operation of a strict Permit to Work.

Minimum lighting is to be ensured at all lifting operations.

Every construction equipment shall be in sound mechanical working condition & certified by the Plant & Machinery & safety department before deployment to any side.

GENERAL OPERATING PROCEDURES

- Drivers entering site shall be instructed to follow the safe system of work adopted on site. These shall be verbal instructions or, preferably, written instructions showing the relevant site rules, the site layout, delivery areas, speed limits etc.
- No passengers shall be carried, unless specific seating has been provided in accordance with the manufacturer's recommendations.
- Working on gradients beyond any equipment's capability shall not be allowed.
- Prevention of dumper and dump truck accidents should be managed by providing wheel stops at a sufficient distance from the edges of excavations, spoil heaps, pits, etc.

20.6 MACHINE AND GENERAL AREA GUARDING

All motors, cogwheels, chains and friction gearing, flywheels, shafting, dangerous and moving parts of machinery shall be securely fenced & regularly examined to prevent contact with the worker. The fencing of dangerous part of machinery shall not be removed while such machinery is in motion or in use.

Provision of suitable devices shall be made available for cutting off power in emergencies from running machinery.

Safe working speed of revolving machinery should not be exceeded.

20.7 MANUAL LIFTING AND CARRYING OF EXCESSIVE WEIGHT

No building worker shall lift by hand or carries overhead or over his back or shoulders any material, article, tool or appliances exceeding in weight as said below as per Rule 38 of BOCWR, unless aided by another building worker or device.

PERSON	MAXIMUM WEIGHT IN KG

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Adult Man	55
Adult woman	30

No building worker aided by other building worker shall lift or carry weight higher than or exceeding the sum of total of maximum limits set out for each building worker separately as mentioned in the table above.

20.8 ELECTRICITY

20.8.1. Competency of Electrical personnel

Only qualified and competent electrical personnel shall be deployed at site.

20.8.2. Strength and capability of electrical equipment

No electrical equipment shall be put into use where its strength and capability may be exceeded in such a way as may give rise to danger.

20.8.3. Work on site

A single line diagram, schematic diagram and the details of the equipment for all temporary electrical installation and these diagrams together with the temporary electrical equipment shall be made available at site.

20.8.4. Adverse or hazardous environments

Electrical equipment, which may reasonably foreseeably be exposed to-

a) mechanical damage;

b) the effects of the weather, natural hazards, temperature or pressure;

c) the effects of wet, dirty, dusty or corrosive conditions; or

d) any flammable or explosive substance, including dusts, vapors or gases, shall be of such construction or as necessary protected as to prevent, so far as is reasonably practicable, danger arising from such exposure.

Appropriate electrical protection shall be provided for all circuits against over load, short circuit and earth fault current.

20.8.5. Electrical protection circuits

Precautions shall be taken, either by earthing or by other suitable means, to prevent danger arising when any conductor (other than a circuit conductor) which may reasonably foreseeable become charged as a result of either the use of a system, or a fault in a system, becomes so charged. A conductor shall be regarded as earthed when conductors of sufficient strength and current-carrying capability to discharge electrical energy to earth connect it to the general mass of earth.

If a circuit conductor is connected to earth or to any other reference point, nothing which might reasonably be expected to give rise to danger by breaking the electrical continuity or introducing high impedance shall be placed in that conductor unless suitable precautions are taken to prevent that danger.

Appropriate electrical protection shall be provided for all circuits, against over load, short circuit and earth fault current.

Sufficient no of ELCBs (maintain sensitivity 30 mA) / RCCBs shall be provide for all the equipment's (including Potable equipment's), electrical switchboards, distribution panels etc. to prevent electrical shocks to the workers.

All protection devices shall be capable of interrupting the circuit without damage to any equipment's and circuits in case of any fault may occur.

Rating of fuses and circuit breakers used for the protection of circuits should be coordinate with equipment power ratings.

Protection against lightning shall be ensured to all equipment kept in open at sites.

20.8.6. Cables

Cables shall be selected after full consideration of the condition to which they shall be exposed and the duties for which they are required. Supply cable up to 3.3 k V shall be in accordance with BS 6346.

Cabling passing under the walk way and across way for transport & mobile equipment shall be laid in ducts at a minimum depth of 0.6 meters.

Cables that need to cross open areas a catenary wire on poles or other supports shall be provided for convenient means of suspension. Minimum height shall be 6 k above ground.

20.8.7. Plugs, socket-outlets and couplers:

Ensure all plugs, socket-outlets, and couplers available in the construction site as "splash proof" type. The minimum degree of Ingress Protection should be of IP44 in accordance with BS EN 60529.

Only plugs and fittings of the weatherproof type shall be used and they should be color coded in accordance with the internationally recognized standards for example as detailed as follows:

- 110 volts: Yellow.
- 240 volts: Blue.
- 415 volts: Red.

20.8.8. Connections

Every joint and connection in a system shall be mechanically and electrically suitable for use to prevent danger. Proper cable connectors as per national/international standards shall only be used to connect cables.

No loose connections or tapped joints shall be allowed anywhere in the work site, office area, stores and other areas.

20.8.9. Portable and hand-held equipment

Double insulated or all-insulated portable electrical hand equipment may be used without earthing (i.e. two core cables), but they shall still be used only on 110V because of the risk of damage to trailing leads.

20.8.10. Other equipment

All equipment shall have the provision for major switch/cut-off switch in the equipment itself.

All non-current carrying metal parts of electrical equipment shall be earthed through insulated cable

Isolate exposed high-voltage (over 415 Volts) equipment, such as transformer banks, open switches, and similar equipment with exposed energized parts and prevent unauthorized access.

Approved perimeter markings shall be used to isolate restricted areas from designated work areas and entryways and shall be erected before work begins and maintained for entire duration of work. Approved perimeter marking shall be installed with either red barrier tape printed with the words "DANGER—HIGH VOLTAGE" or a barrier of yellow or orange synthetic rope, approximately 1 to 1.5 meter above the floor or work surface apart from that suitable warning signs shall be pasted at the conspicuous location.

20.8.11. Work on or near live conductors

No person shall be engaged in any work activity on or so near any live conductor (other than one suitably covered with insulating material so as to prevent danger) that danger may arise unless:

- It is unreasonable in all the circumstances for it to be dead; and
- It is reasonable in all the circumstances for him to be at work on or near it while it is live; and
- Suitable precautions (including where necessary the provision of suitable protective equipment) are taken to prevent injury.

20.8.12. Inspection and Maintenance

All electrical equipment should be permanently numbered and a record kept of the date of issue, date of last inspection and recommended inspection period.

Fixed installations shall be inspected at least at three monthly intervals; routine maintenance being carried out in accordance with equipment manufactures recommendations.

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20.9 LIGHTING

Electrical Installation work shall be as per standard requirement. A schematic diagram shall be developed with details of all temporary and permanent electrical equipment's. All electrical cable shall be selected as per site requirement and run in a safe manner with required height or in underground to avoid any damage during vehicular movement. Distribution of electrical supply shall be in a manner to avoid any overloading. Danger sign and warning shall be provided at all required area.

Earthing and bonding shall be provided for all electrical installation and equipment to prevent the possibility of dangerous voltage rises and to ensure that faults are rapidly cleared by installed circuit.

Sufficient illumination at all-times shall be ensured for maintaining safe working conditions at a site of a building or other construction work, where building workers are required to work or pass and for passageways, stairways & landings. Such illumination should not less than that provided in the relevant standard.

20.10 LOCK OUT TAG OUT

"Lockout/Tagout (LOTO)" refers to specific practices and procedures to safeguard employees from the unexpected energization or startup of machinery and equipment, or the release of hazardous energy during service or maintenance activities. This requires that an authorized individual turns off and disconnects the machinery or equipment from its energy source(s) before performing service or maintenance and that the authorized employee(s) lock and tag the energy-isolating device(s) to prevent the release of hazardous energy and take steps to verify that the energy has been isolated effectively.

Note: Where it is not physically possible to apply a lock or locking device, it shall be tagged out with an appropriate warning tag and other appropriate measures shall be implemented to ensure that the equipment is NOT energized while work is being carried out on it.

20.11 HAND TOOLS & POWER TOOLS

Use of short / damaged hand tools shall be avoided and the contractor shall ensure all his hand tools used at his worksite are safe to work with or stored and shall also train his employees (including his sub-contractors) for proper use thereby.

All hand tools and power tools shall be duly inspected before use for safe operation.

All hand tools and power tools shall have sufficient grip and the design specification on par with national/international standards on anthropometrics.

20.11.1. Hand tools

Hand tools shall include saws, chisels, axes and hatches, hammers, hand lanes, screw drivers, crow bars, nail pullers.

All hand tools and power tools shall be duly inspected before use for safe operation.

Mushroom headed chisels shall not be used in the worksite where the fragments of the head may cause injury.

Each and every hand tool shall be used only for it's designed purpose.

Usage of proper PPEs is mandatory.

20.11.2. Power tools

Power tools include drills, planes, routers, saws, jackhammers, grinders, sprayers, chipping hammers, air nozzles and drills. Extra caution is necessary for use of power tools.

Electric tools are properly grounded or / and double insulated.

GFCIs/ RCCBs shall be used with all portable electric tool operated especially outdoors or in wet condition.

Before making any adjustments or changing attachments, power tool needs to be disconnected from the power source.

When operating power tool for prolonged periods, hearing protection shall be required. The same shall also apply to working with equipment's, which gives out more noise.

Tool is held firmly and the material is properly secured before turning on the tool. Hands should never be used as a vice to hold material.

Size of the drill shall be determined by the maximum opening of the chuck n case of drill bit.

Workers shall never stand on the top of the ladder to drill holes in walls / ceilings, which can be hazardous, instead standing on the fourth or

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fifth rung shall be recommended.

Safety guards used on right angle head or vertical portable grinders must cover a minimum of 1800 of the wheel and the spindle / wheel specifications shall be checked.

All power tools / hand tools shall have guards at their nip points.

Low profile safety chain shall be used in case of wood working machines and the saw shall run at high rpm when cutting and also correct chain tension shall be ensured to avoid "kickback".

Leather aprons and gloves shall be used as an additional personal protection auxiliary to withstand kickback.

Push sticks shall be provided and properly used to hold the job down on the table while the heels moves the stock forward and thus preventing kickbacks.

Air pressure is set at a suitable level for air actuated tool or equipment being used. Before changing or adjusting pneumatic tools, air pressure shall be turned off.

Only trained employees shall use explosive actuated tools and the tool shall also be unloaded when not in use.

Usage of such explosive actuated tools shall be avoided in case of places where explosive/flammable vapors or gases may be present.

Explosive actuated tools and their explosives shall be stored separately and be taken out and loaded only before the time of immediate use.

Misfired cartridges of explosive actuated tools must be placed in a container of water and be removed safely from the project.

No worker shall point any power operated / hand tool to any other person especially during loading / unloading.

20.12 WELDING, GOUGING AND CUTTING

Gas cylinders in use shall be kept upright on a custom-built stand or trolley fitted with a bracket to accommodate the hoses and equipment or otherwise secured. The metal cap shall be kept in place to protect the valve when the cylinder is not connected for use.

Cylinders shall be kept away from any source of heat and shielded from direct sunlight. If not stored outdoors, the store must be in well ventilated place.

Hose clamp or clip shall be used to connect hoses firmly in both sides of cylinders and torches.

All gas cylinders shall be fixed with pressure regulator and dial gauges.

Non-return valve and Flashback arrester shall be fixed at both end of cylinder and torch on both cylinders.

Domestic LPG cylinders shall not be used for Gas cutting & welding purposes.

DCP or CO2 type Fire Extinguisher not less than 5 kg shall be fixed at or near to welding process zone in an easily accessible location. Fire Extinguisher should be maintained confirming to IS 2190: 1992.

Use firewatchers if there is a possibility of ignition unobserved by the operator (e.g. on the other side of bulkheads). He shall remain at spot of work minimum for a period of half hour after stopping of work.

Oxygen cylinders and flammable gas cylinders shall be stored separately, at least 6.6meters (20 feet) apart or separated by a fire proof, 1.6 meters (5 feet) high partition. Flammable substances shall not be stored within 50 feet of cylinder storage areas.

Transformer used for electrical arc welding shall be fixed with Ammeter and Voltmeter and also fixed with separate main power switch.

Welding grounds and returns should be securely attached to the work by cable lugs, by clamps in the case of stranded conductors, or by bolts for strip conductors. The ground cable will not be attached to equipment or existing installations or apparatus.

Take precautions against the risk of increased fume hazards when welding with chrome containing fluxed consumables or high current metal inert gas (MIG) or tungsten inert gas (TIG) processes.

Avoid being in contact with water or wet floors when welding. Use duckboards or rubber protection.

All electrical installations shall meet the IS: 5571: 1997 and NFPA 70 for gas cylinder storage area and other hazardous areas.

The current for Electric arc welding shall not exceed 300 A on a hand welding operation.

20.13 FIRE PREVENTION PROTECTION AND FIGHTING SYSTEM

Fire extinguishing equipment sufficient to extinguish any probable fire at site need to be ensured.

Recharging of fire extinguishers and their proper maintenance should be ensured and as a minimum should meet Indian National Standards.

All drivers of vehicles, foreman, supervisors and managers shall be trained on operating the fire extinguishers and firefighting equipment.

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As per the BOCW Rules 2002, Rule 63(a)(vii), all lifting appliances' driver cabin should be provided with a suitable portable fire extinguisher.

Every fire, including those extinguished by contractor personnel, shall be reported.

Emergency plans and Fire Evacuation plans shall be prepared and issued. Mock drills should be held on a regular basis to ensure the effectiveness of the arrangements and as a part of the programme, the Telephone Number of the local fire brigade should be prominently displayed on site.

20.14 CORROSIVE SUBSTANCES

As per BOCWR Rule 44, corrosive substances including alkalis and acids shall be stored and used by a person dealing with such substances at a building / construction site in a manner that it does not endanger the building worker and suitable PPE shall be provided to the worker during such handling and work.

20.15 TRANSPORT OF MATERIAL

Vehicles used to transport materials must comply exactly with the provisions of the traffic code, paying particular attention to the following points:

- Materials must be perfectly secured to the vehicle box or chassis, by means of straps and slings, to prevent them from slipping or falling.
- Sharp corners on loads shall be avoided when employing ropes for securing.
- They should not protrude from the box in excess of the legally stipulated distance.
- Load shall be checked before moving off and after travelling a suitable distance.
- Driver must have adequate driving license.
- Speed limit at work site/store yard shall be restricted to 20 KMPH.
- Regular maintenance and upkeep of vehicle shall be ensured.
- Drivers entering site shall be instructed to follow the safe system of work adopted on site. These shall be verbal instructions or preferably written instructions showing the relevant site rules, the site layout, delivery areas, speed limit etc.
- No passengers shall be carried, unless specific seating has been provided in accordance with the manufacturer's recommendations.
- Prevention of dumper & dump truck accidents should be managed by providing wheel stops at a sufficient distance from the edge of excavations pits etc.

20.16 MATERIAL HANDLING

During pole hauling operation, all loads shall be secured to prevent displacement and a red flag shall be displayed at the trailing end of the longest pole.

Prior to unloading steel, poles, cross arms, and similar material the load shall be thoroughly examined to ascertain if the load has shifted, binder or stakes have broken, or the load is otherwise hazardous to employees.

Precautions shall be exercised to prevent the blocking of roadways or the endangering of other traffic.

When hauling poles during the hours of darkness, illuminated warning devices shall be attached to the trailing end of the longest pole.

Materials or equipment shall not be stored under energized bus, energized lines, or near energized equipment.

When materials or equipment are stored under energized lines or near energized equipment, applicable clearances shall be maintained as stated and extraordinary caution shall be exercised when moving materials near such energized equipment.

Tag lines or other suitable devices shall be used to control loads being handled by hoisting equipment.

No One shall stand under suspended load.

All material shall be stacked adequately.

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20.17 ALCOHOL AND DRUGS

No employee shall be allowed to work under the influence of alcohol / drugs which are punishable under Govt. regulations.

Smoking at public worksites by any employee is also prohibited as per Govt.regulations.

20.18 TRAFFIC SAFETY

The guiding principles for safety in road construction zones are to:

- Warn the road user clearly and sufficiently in advance;
- Provide safe and clearly marking lanes for guiding road users;
- Provide safe and clearly marked buffer and work zones;
- Provide adequate measures that control driver behavior through construction zones. b. Roads with construction sites have higher accident rate, when compared with similar sections of road without construction sites.

20.18.1. Phases of Traffic Control

There are five phases of traffic control for major projects:

Planning Phase: - To identify and include traffic control requirements in the contract specification, work program & method of construction.

Design Phase: - To design the Traffic Control Plan in detail, with regards to types, location and layout of traffic control devices for submission to the authority for approval.

Implementation: - To install the temporary traffic control devices safely in accordance with the approved traffic control Plan. Operation and

Maintenance Phase: - To inspect the Traffic Control Plan and devices regularly by day and night to ensure that they are effective and absolutely safe.

Close out Phase: - To remove all the traffic control devices safely and reinstate the permanent traffic scheme.

20.18.2. Components of Construction Zone

Before starting the construction work, which will influence traffic, permission shall be taken from the road traffic authority and local police about the means and extent of securing the construction zone. The traffic management strategies to be used at construction zones shall ensure that traffic safety is an integral and high priority element of the project. This can be ensured by avoiding inconvenience to traffic control elements and traffic operations must be carried out so that care and attention to roadside safety is never slack during the progress of project.

20.18.3. Traffic Control Zone

The Traffic Control Zone can be divided into three components, that is, the Advance Warning Zone, the Transitions Zone and Working Zone. All construction zones will have a working zone, which is flanked, by a transition zone for each direction of approaching traffic and an advanced warning zone will precede these in turn.

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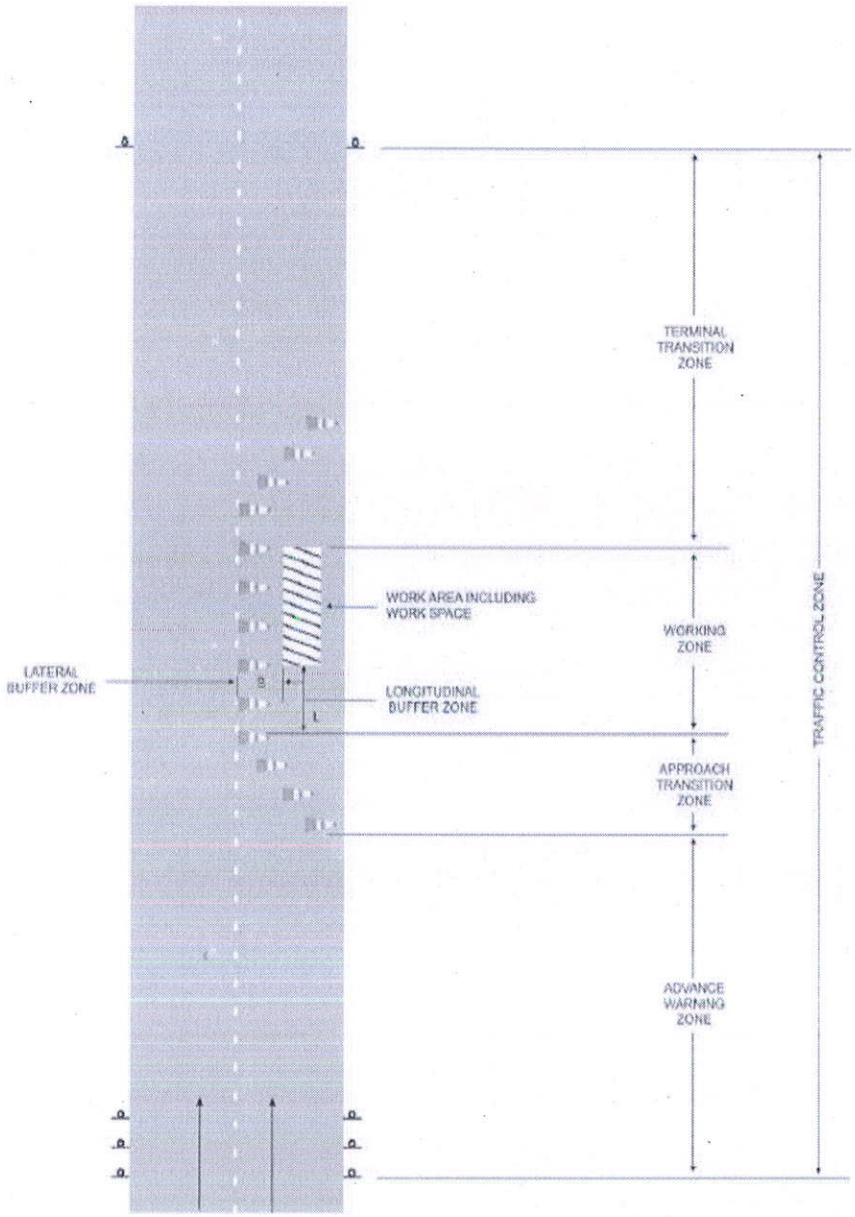

Advance Warning Zone a. The "Advance Warning Zone", is the area to warn the road user of the approaching hazard and to prepare them for the change in driving conditions. It is essential for traffic control in the construction zone. It should provide information on: (i) the presence of the hazard through the "Road Work Ahead" sign, accompanied by the distance to the hazard; (ii) (ii) any change affecting traffic arrangements (such as a reduction in the number of lanes and/or in the speed limit) within the traffic control zones; (iii) extent of the hazard (for example; the length of restriction); and for general information; (iv) the type of hazard. b. The advance warning zone is also where the reduction in speed of vehicles should be notified. The drivers should be advised to reduce their speed so as to achieve the desired approach transition zone. The information in this zone is conveyed through a series of traffic signs along the length of the zone. Actual signs to be used are discussed in later paragraphs.

Approach Transition Zone

a) The transition zone is the area in which the traffic is guided into the altered traffic flow pattern around the working zone. This is one of the most crucial zones as far as safety aspects are concerned because most of the movements involved are merging/turning movements. The transition zone has two components: The Approach Transition Zone and Terminal Transition Zone.

b) The initial part of the transition zone called Approach Transition Zone should further reduce the approach speed of vehicles and channel them into the narrower and/or restricted number of lanes, if this is necessary.

c) At other construction zones, it may be necessary to divert traffic away from the original carriageway and the design of the temporary road geometry through the transition zone should take into account the following factors: i. the turning radius of the longest vehicle that generally uses the road should be the ruling radius for curves; ii. where changes in vertical profiles are required these should enough to allow safe passage of animal drawn vehicles (if these are present in significant numbers); iii. the zone should have good drainage to avoid any ponding on the road surface; iv. Sources of dust should be minimized. This is not only essential for good visibility but also for clearance maintenance of signs and barricades in the zone.

d) The traffic is taken across the transition zone mostly with the help of signs, barricades, channelisers and pavement marking. The various types of barricades and channelisers are discussed in detail in later paragraphs. The guiding principle for their design is that they should convey the message clarify and unambiguously. The colour and shape of the signs should also be as the standards noted in later paragraphs to eliminate the conclusion caused by use of different signs for the same purpose.

e) All the signs/barricades are too maintained properly and kept clean of dust at all times. Sufficient stock of these should be maintained at the site so as to replace the damaged or vandalized signs/barricades. Proper lighting arrangements for illuminating these signs must be made during the night hours. Most of the accidents at nights involve collision between vehicles and objects rather than vehicle to vehicle collision. Reflective paints/sheets must therefore be used for the signs/barricaded so that these are visible at all times.

f) Very often the road width available through the transition and working zones is quite insufficient for simultaneous passage of both the up and down traffic signals. In both the cases a waiting area with a properly demarcated stop line has to be provided for the vehicles.

Working Zone

a) The working zone is where the actual construction is being undertaken. It contains the work area and a working space, as well as lateral and longitudinal buffer zones to create the safety zone to protect both the workforce from wayward vehicles entering the area of actual work and the road users from construction equipment.

b) Speeds should continue to be controlled in this zone because of the close proximity of moving construction plant and site operatives.

c) The path of the traffic must be very clearly delineated through the traffic control zone to avoid vehicle intruding into the work area. Delineators and channelisers discussed below must be used effectively for this purpose. Where the work site uses machinery with revolving booms like cranes or excavators the intrusion of moving parts must be taken into account when determining the lateral clearances for the buffer or safety zone.

Terminal Transition Zone

a) The terminal Transition Zone (TTZ) provides a short distance to clear the work area and to return to normal traffic lanes. It extends from the downstream end of the work area to the sign indicating the end of works.

b) A downstream or closing taper may be placed in the TTZ. It may be useful in smoothening the flow of traffic. However, it may not be advisable when the trucks carrying material move into the work area by reversing from the downstream end of working zone. The length of the downstream taper may be 25-30m.

c) There may be occasions when TTZ could include a transition. For example, as in fig 5.20 if a taper is used to shift traffic into opposing lanes around the work area, then the TTZ should have a taper to shift back to its normal path. This taper would then be in the TTZ for the opposing direction of traffic.

d) If the construction zone is situated on a divided-carriageway, there will need to be a smaller length transition zone to return the traffic to the original lanes.

20.19 TRAFFIC CONTROL DEVICES

Traffic control devices are the equipment and installations over and on the road, which individually and collectively perform the following tasks.

- Warn the road user
- Inform the road user
- Guide the road user
- Modify road user behavior

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- Protect the road user and the vehicle
- Ensure safe passage to the road user and
- Provide a safe working area.

A traffic control device in order to be effective should

- Fulfill the intended need
- Convey the message in a simple & clear manner
- Allow adequate time for proper response from road users : and
- Have adequate visibility both in day & night.

The primary traffic control devices used in work zones are signs, delineators, barricades, cones, pavement markings & flashing lights. The following general rules should apply to all traffic control devices with the traffic control zone.

(i) Comprehension: All traffic control devices should be capable of being easily understood. A particular device must convey one & only one meaning. Good & clean condition of the device helps understanding.

(ii) Visibility and Stability: Devices should be within the cone of vision of the driver and be placed such that it allows adequate response time at the average speed or the desired speed through the traffic control zone. All traffic control devices should be clearly visible by day and night, at these speeds and under the usually prevailing climatic conditions. They should be kept properly aligned and legible at all times. Vegetation or any other obstruction should not be allowed to obstruct the view of these devices. The traffic control device must be able to resist the local wind pressure, rain & the vibration etc, of the passing traffic but these should not act as rigid obstacles in the event of collision.

20.20 SIGN PLACEMENT

The road construction and maintenance signs fall into the same three major categories as do other traffic signs, that is Regulatory signs, warning signs and Direction (or Guidance/Informatory) signs.

The correct positioning and size of signs shall ensure that it can observed and recognized, thereby providing the driver with more time to react and take action. The following principles should govern the positioning of signs:

a) Their location should have clear visibility.

b) They should be so placed that driver would have adequate time for responses.

c) As a general rule, signs should be placed on the left-hand side of the road. Where special emphasis is required, duplicate signs should be installed on the left and right side of roadway. In case of hill roads, the sign shall generally be fixed on the valley side of the road unless traffic and road conditions warrant these to be placed on the hill side.

d) Roll up signs mounted on portable supports may be placed within the roadway itself.

e) Roll up signs may also be mounted on or above the barricades.

f) The signs should be covered or removed when they are not required.

20.21 EXCAVATION

All underground/above ground utilities must be identified & adequate safety measures must be taken care (e.g. isolation) before carrying out any excavation work.

No employee shall be permitted to enter any excavated area unless sheet piling, shoring, benching, sloping as appropriate is provided that may be necessary for the protection.

Where any employee in an excavation is exposed to the hazard of falling or sliding material from any bank or side more than 1.5 m height above his footing, adequate sloping, benching, shoring as appropriate shall be provided against the bank or side to eliminate such hazard.

An experienced supervisor must inspect the excavation and its vicinity before employees enter. The inspection will include evaluation of the protective systems and excavation atmosphere:

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- Excavated material shall not be placed within 1.5 meters of the edge of any trench or half the depth of the trench, whichever is more.
- Excavation shall be made from the top to the bottom. Under no circumstances shall undermining or undercutting be done.
- Heavy equipment restricted to minimum distance equivalent to depth of trench / pit.
- No one should work or watch the works within the radius of action of the arm of an earth moving machine. Working radius of earth moving equipment must be barricaded.
- All safety elements of subcontracted or rented machinery shall be revised before being used on site.
- The maximum load specified for each vehicle must not be exceeded.
- Vehicles must not carry persons outside the driver's cab or carry more persons than the number of seats of the vehicle.
- Wear proper PPEs when working in excavations.
- All operators/drivers must have valid driving license as per the local legislation for the type of machine/vehicle they operate.
- All trenches/ excavated pits shall be provided with suitable access/ egress by means of adequate ladder or ramp.
- Ladders shall be extended from the bottom of the trench to at least 1 meter above the surface of the ground.
- Where explosives are to be used, the same shall be used under the direct control & supervision of an expert, experienced, qualified & competent person strictly in accordance with code of practice/rules framed under local legislation.
- Excavations carried out at any place to which the public have or might gain access must be guarded to avoid danger to people. A fence 1 m high or a combination of signs, barriers, flash lights necessary to provide adequate barrier / protection for the public and employees. These safety devices must be properly maintained until the excavation is normalized or when there is no longer any danger.
- All fossils, coins, articles of value of antiquity, structures and other remains or things of geological or archaeological interest if discovered on the site shall be the property of the Government and shall be dealt with as per provisions of the relevant legislation.
- Reasonable precautions will be taken to prevent workmen or any other persons from removing and damaging any such article or thing. Essel Infra shall, immediately upon discovery thereof and before removal acquaint shall inform to the Project Engineer Jal Nigam of such discovery and carry out the instructions as given for dealing with the same, waiting which all work should be stopped.

A. PILING

- Ensure that all lifting equipment shall be tested by accredited independent testing agency at least once in a year as per the requirement of local legislation.
- All the moving parts of the machinery should be well guarded.
- Ensure placing of guards over moving parts after maintenance of the equipment.
- All persons working on the Piling Operation must wear Safety Helmets, reflective jackets & safety shoes/gum.
- There is a risk of fracturing of the rope due to shock loading. The ropes used should be examined at least once in months.
- Swing area of the piling rig shall be barricaded for restricting unauthorized entry.
- Maintenance/ lubrication shall be done after stopping the machine.
- Ensure that all pile bores are covered with grating.
- All excavated areas to be barricaded with caution tape.

20.22 BITUMEN

Hazards associated with Bitumen: When handling & using bitumen the main hazards arise from:

- The high handling temperature generally necessary
- Persistent skin contact, particularly when in solution
- Vapor emission associated with the product when heated.
- The combustible nature of the product
- Contact in piping, tankage or other vessels by hot bitumen with water, with violent expansion of steam of more than 1600 times its volume this can give rise to dangerous froth-over & may cause boil over & rupture of the tank roof.

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20.22.1. Health Hazards

- An ambient temperature bitumen are solid & do not present any health hazards other than from manual handling.
- Bitumen is normally manufactured, stored distributed & handled hot, in a molten state & this result in the following potential hazards.
    - Thermal burns on contact
    - Release of fumes that can cause respiratory tract & eye irritation
    - Release of Hydrogen Sulphide (accumulation of Hydrogen sulphide to reach concentration that are hazardous will only occur in confined spaces e.g. in tanks where bitumen is or has been stored and not during product handling & use.

At ambient temperatures, bitumen is normally solid & immobilizes and so doesn't give rise to any acute or chronic health hazards. Bitumen emulsions can be irritating to the skin & eyes and can also produce allergic responses in some people. Such effects arise mainly from the emulsifying agents, acids & bases used.

At high temperature, the main acute health hazards are burns and irritation of the respiratory system.

20.22.2. Burns

Bitumen is handled as a heated liquid at temperatures above 100C at some stage during processing and distribution, and when it is being incorporated in a mix or preparation or used in its final application. In its heated form, it will adhere readily to any exposed part of the body, usually causing burns before it cools. The mechanism of a bitumen burn is:

- When hot bitumen comes into contact with the skin, it immediately adheres and forms an occlusive covering.
- As the bitumen cannot be easily removed, it continues to burn the skin until it has sufficiently cooled.
- As the bitumen cools, it contracts and as the underlying tissues are burnt, they begin sell.

20.22.3. Inhalation

Heated bitumen evolves bitumen fumes which can cause irritation to the respiratory system and, particularly in higher temperature greater than 100 C, can evolve hydrogen sulphide, which can create a significant health hazard in confined spaces. The rate of evolution increases rapidly when the product is heated to unnecessarily high temperatures. There is not normally sufficient hydrogen sulphide to cause harm near open – air work with bitumen.

20.22.4. Personal Hygiene Precautions

Good personal hygiene in respect of hands and inner clothing should always be maintained in the course of work. Under no circumstances should a person who has been handling bituminous products eat, drink, smoke or go he toilet without first washing their hands.

20.22.5. Personal Protective Equipment

The objective in providing PPE is to prevent exposure. Personnel should be trained in the correct use of all prescribed PPE and arrangements should be put in place for its routine inspection and maintenance. In addition, adequate facilities for storage of PPE should be ensured.

PPE requirement for bitumen workers should comprise:

- Protective clothing: this should shed splashes & spills away from the body by means of close fitting cuffs and trouser leg ends capable of overlapping footwear.
- Eye protection: an approved face & eye shield
- Hand Protection: Heat resistant gloves with close fitting cuffs.
- Foot protection: Heat resistant heavy duty boots.

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20.23 BATCHING PLANT & CASTING YARD LAYOUT

- The batching plant / casting yard shall be effectively planned for smooth flow of unloading and stacking the aggregates reinforcements and cement, batching plant, transport of concrete, casting the girder or segment, stacking the girder or segment and loading the segments or girders to the trucks. As far as possible the conflicts should be avoided.
- The batching plant / casting yard shall be barricaded and made as a compulsory PPE zone
- Electrical system shall also be suitably planned so that location of diesel generator, if any, location of DBs, routing of cables and positioning of area lighting poles/masts does not infringe on any other utility and pose danger.
- Drainage shall be effectively provided and waste water shall be disposed after proper treatment.
- Time office, canteen, drinking water, toilet and rest place shall be suitably located for the easy access to workers. All the facilities shall be properly cleaned and maintained during the entire period of operation.
- Manual handling of cement shall be avoided to a larger extent. Whenever it is absolutely necessary the workmen shall be given full body protection, hand protection and respiratory protection as a basic measure of ensuring better health.
- The PPEs provided to cement handling workmen shall conform to national or international standards.
- Access roads and internal circulation roads shall be well laid and maintained properly at all time.

20.24 WORK OVER WATER

- Warning sign of deep water shall display at appropriate locations.
- To ensure suitable rescue equipment's at site & provide training to the team regarding how to use them.
- Standby person continuously manned while working over water.
- Experienced boatman, trained first aiders should be made available on this area and not to be used for other purposes.
- Safety lines & harnesses to be used in conjunction with temporary ladder access over water.

A RESCUE EQUIPMENT

- Life buoys with rescue lines should be provided at intervals along the site & positioned conveniently for use in an emergency.
- Personnel must wear life jackets, or buoyance aid equipped with a whistle & lights (during darkness)
- All rescue equipment must be checked by a competent person on periodical intervals to ensure it is present & in good conditions.
- Enough personnel should be made available who are trained in the use of rescue equipment & emergency procedures.
- Rescue boat shall be made available near to the work site.

20.25 PETROLIUM PRODUCT

No one shall store more than the below mentioned quantity of petroleum except under and in accordance with a license granted for storage.

- Class A petroleum (Flash Point below 230C): 30 liters
- Class B petroleum (Flash Point 230C & above upto 650C): 2500 liters provided nothing of it is contained in a single container of 1000 litres or more
- Class C petroleum (Flash Point 650C & above but below 930C): 45000 liters
- No person shall smoke in any installation or storage shed except in places specially authorized by the licensing authority for the purpose.
- No person shall carry matches, fuses or other appliances capable of producing ignition or explosion in any installation or storage shed which is used for the storage of petroleum.
- No fire, furnace or other source of heat or light capable of igniting inflammable vapor shall be allowed in any installation or storage shed
- An adequate number of portable fire extinguishers capable of extinguishing oil fires shall always be kept in every installation/storage shed, at strategic point and all persons employed in such installation/storage shed shall be conversant with the use of such fire extinguisher.
- All operations within a storage shed shall be conducted under the supervision of an experienced responsible supervisor who is conversant with the terms and conditions of the license.
- The ground in the interior of an installation or storage shed and the protected areas surrounding any installation or storage shed shall be kept clean and free from all vegetation, waste material and rubbish.
- The capacity in liters of every above ground tank in an installation shall be conspicuously marked on the tank.
- The storage shed shall have prominently marked thereon the number of the license held for it.

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- No person shall smoke and no matches, fires, lights or articles or substances capable of causing ignition of petroleum shall be allowed, at any time in proximity to a place where petroleum is stored or handled.
- All empty tanks which had petroleum Class A or Class B shall except when they are opened for the purpose of filling or cleaning and rendering them free from petroleum vapor, be kept securely closed until they have been thoroughly cleaned and freed from petroleum vapors.

21 VISITORS AND SECURITY ARRANGEMENT

21.1 MEANS OF ACCESS

- Means of access will be maintained in a safe condition.
- Where special safe means of access to or work places are provided, workers will use them for going to and from work places.
- As far as reasonably practicable, adequate and safe means of access will be provided for all work places.
- Construction sites in built-up areas and alongside main traffic routes will be barricaded.
- Unauthorized persons will not be allowed to access construction sites.

21.2 ACCESS CONTROL

Access to the site is restricted to authorized people and visitors. The authorized people are:

- Personnel of Essel Infra & its entity that have attended the compulsory safety induction.
- Personnel of the Sub-Contractor that have attended the compulsory safety induction.
- Visitors, when accompanied by personnel that have attended the compulsory safety induction.

21.3 VISITORS PLAN

In order to avoid possible risks due to the presence of strange persons at any point where works are being executed based on this Site HSE plan, authorized visitors should subject themselves to the following rules:

- No visitor is allowed to enter the site without permission. All authorized visitors will report at the site office. Essel Infra will provide visitor's helmet (White helmet with visitor sticker) and other PPEs like Safety Shoe, reflective jacket, respiratory protection etc. as per requirement of the site.
- All Visitors will be accompanied at all times by a responsible member of the site personnel.
- Contractor will be fully responsible for all visitors' safety and health within the site.
- Visitors to ongoing works are only authorized by prior arrangement with the Project manager. The request for site visit should clearly indicate the motive.
- During the visit, the visitor is made to follow all the rules and regulations applicable in this plan as well as those relayed by the guide. The non-compliance thereof means the immediate termination of the visit.

22 LEGAL REQUIREMENT

The Essel infra & its subcontractors shall comply with Applicable Laws, including all relevant statutory requirements of Government of India including, but not limited to the following –

- The Air (Prevention and Control of Pollution) Act, 1981 amended 1987
- The Water (Prevention and Control of Pollution) Act, 1974 amended 1988
- The Water (Prevention and Control of Pollution) Rules, 1975
- The Environment (Protection) Act, 1986, amended 1991
- The Environmental (Protection) Rules, 1986 (Amendments in 1999, 2001, 2002, 2002, 2002, 2003, 2004)
- The Hazardous Waste (Management and Handling) Rules, 1989 amended 2000 and 2003

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- The Manufacture Storage and Import of Hazardous Chemicals Rules, 1989 amended 2000
- The Chemical Accidents (Emergency Planning, Preparedness and Response) Rules, 1996
- The Batteries (Management and Handling) Rules, 2001.
- The Petroleum Act, 1934
- The Petroleum Rules, 2002
- The Motor Vehicle Act, 1988
- The Central Motor Vehicle Rules, 1989
- Public Liability Insurance Act, 1991 amended 1992
- Public Liability Insurance Rules, 1991 amended 1993
- The Factories Act, 1948
- The Uttar Pradesh Factory Rules 1950
- The Workmen's Compensation Act 1923
- The Contract Labor (Regulation and Abolition) Act, 1970
- The Minimum Wages Act, 1948
- Payment of Wages Act, 1936
- Equal Remuneration Act, 1979
- The Child Labour (Prohibition and Regulation) Act, 1986
- Inter-State Migrant Workmen's (Regulation of Employment and Conditions of Service) Act, 1979
- The Building and Other Construction Workers (Regulation of Employment and Conditions of Service) Act, 1996 and the Cess Act of 1996
- The Antiquities and Art Treasures Act 1972 and the Ancient Monuments and Archeological sites and Remain Act, 1958 (and its amendment) to protect the cultural heritage of the nation.

23 ENVIRONMENTAL MANAGEMENT

23.1 AIR QUALITY

All necessary precautions shall be taken to minimize fugitive dust emissions from operations involving excavation, grading, and clearing of land and disposal of waste.

The trucks carrying construction material shall be adequately covered to avoid dust emissions and material spillage.

Unpaved haul roads near work area to be watered when necessary especially during dry season for dust suppression.

Area for storage of sand, gravels, stone dust, cement store etc. shall be finalized in consultation with client.

Construction material shall be stored in such a way so that fugitive emission shall be controlled.

The heights from which materials are dropped shall be the minimum practical height to limit fugitive dust generation.

During dry weather, dust control methods such as water sprinkling shall be done to prevent any dust from blowing.

Transport vehicles and other equipment shall conform to emission standards fixed by Statutory Agencies of Government of India or the State Government from time to time. Periodical maintenance of vehicles shall be done for ensuring that vehicles must operate within permissible norms. Record of routine & periodical maintenance shall be kept updated.

23.2 WATER QUALITY

All applicable legislation shall be complied with water pollution control & monitoring. A drainage system shall be constructed at the commencement of the Works, to drain off all surface water from the work site into suitable drain outlet.

Adequate precautions shall be ensure that no spoil or debris of any kind is pushed, washed, falls or deposited on land adjacent to the site perimeter including public roads or existing stream courses and drains within or adjacent to the site. In the event of any spoil or debris from construction works being deposited or any silt washed down to any area, then all such spoil, debris or material and silt shall be immediately removed and the affected land and areas restored to their natural state.

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All water and waste products (surface runoff and wastewater) arising on the site shall be collected and removed from the site via a suitable and properly designed temporary drainage system and disposed off at a location and in a manner that will cause neither pollution nor nuisance.

Wastewater arising out of site office, canteen or toilet facilities shall be discharge into sewers after obtaining prior approval of agency controlling the system. A wastewater drainage system shall be provided to drain wastewater into the sewerage system.

Adequate measures shall be taken to prevent discharge of oil and grease during spillage from reaching drainage system or any water body.

23.3 WASTE

All waste shall be handle in a manner that ensures they are held securely without loss or leakage thus minimizing potential for pollution. Waste storage areas shall be cleaned on regular basis.

Burning of wastes is prohibited.

Necessary arrangement shall be made to dispose of metal scrap and other saleable waste to dealer.

23.4 HAZARDOUS WASTE

Hazardous waste means any waste which by reason of any of its physical, chemical, reactive, toxic, flammable, explosive or corrosive characteristics causes danger or in likely to cause danger to health or environment, whether alone or when in contact with or wastes or substances.

Hazardous waste shall be stored under shed on paved surface under dyke wall.

Outside the storage area, 'display board' shall be place, which will display quantity and nature of hazardous waste, on date. Hazardous Waste needs to be stored in a secure place.

Hazardous wastes shall be stored, based on the composition, in a manner suitable for handling, storage and transport. The labeling and packaging is required to be easily visible and be able to withstand physical conditions and climatic factors.

Only Authorized Recyclers shall be approach of Hazardous Waste for disposal of Hazardous Waste, under intimation to the Employer.

23.5 ENERGY MANAGEMENT

The equipment shall be maintained in such a way so as to conserve energy.

Measures to conserve energy include but not limited to the following:

- Use of energy efficient motors and pumps.
- Use of energy efficient lighting, which uses energy efficient luminaries.
- Adequate and uniform illumination level at construction sites suitable for the task.
- Proper size and length of cables and wires to match the rating of equipment.
- Use of energy efficient air conditioners.

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ANNEX: 01. WORK PERMIT SYSTEM

OBJECTIVE

This procedure describes the 'Permit to Work' system, which is used to provide the controls necessary in achieving the safe performance of a specified range of potentially hazardous tasks.

Note: All personnel should be aware that the Permit to Work system is not an absolute safeguard in itself. It is the responsibility of each individual to be alert to hazardous situations that may arise during the operation.

SCOPE

This procedure applies to all activities which are directly managed by Essel Infra.

RESPONSIBILITIES

Project Manager Or Delegate

The Project Manager (or delegate) is responsible for ensuring:

- the Permit to Work system is operated in accordance with this procedure
- a thorough investigation is carried out for any accidents or incidents which may be attributable to a breakdown in the Permit to Work system or associated controls
- a self-regulatory review and/or audit of operation of the Permit to Work system is carried out on a regular basis.

Site Managers

Each Site Manager is responsible for:

- the safety of all personnel on the site and for the safe execution of all work carried out on the site
- ensuring that the Permit to Work system is subject to active assurance, acting upon all recommendations and proposing system improvements
- ensuring that the personnel appointed under this procedure are competent to carry out the task for which they are authorized
- communicating the responsibilities of key participants within the Permit to Work and Isolations procedures, to those personnel under his direction
- auditing compliance with this procedure

Issuing Authority

Is the person who signs a Work Permit and authorizes the work to start, provided that all the prescribed special conditions have been complied with? He shall ensure that all supporting documentation has been obtained and is properly completed before the Work Permit is signed.

Affected Area Authority

An Affected Area authority is an area authority whose area of responsibility will be affected by work being undertaken principally in another area and under the control of the Issuing Authority.

The Affected area authority is required to be aware of, and in agreement with, work activities taking place, which have a potential impact on his area of responsibility and control.

Performing Authority

The Performing Authority is the person who requires the work to be done (or who will do the work) and is the senior person in charge of the work controlled by a permit.

He shall ensure that he, and all the members of the operation team involved, understands the conditions, limitations, and precautions necessary as stipulated in the Work Permit, and that these are complied with.

Note: The same person shall not have the role of both Issuing authority and Performing Authority for the same Permit to Work.

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Confined Space Attendant

The attendant must be properly trained to carry out his duties. He must remain outside the confined space, in a safe atmosphere, at all times during a confined entry operation and perform the assigned duties under this procedure. He must also:

- maintain an accurate count of all persons in the space by.
- using a tally board on which the name, entry and exit times for all personnel entering or leaving the confined space shall be recorded
- be aware of the hazards that may be faced during entry, including the mode, signs or symptoms, and consequences of any exposure
- monitor conditions and activities inside and outside the space to determine if it is safe for entrants
- remain outside the confined space during entry operations until relieved by another attendant
- maintain effective and continuous communication with authorized entrants during entry
- order authorized entrants to evacuate the confined space immediately if:
- a condition is observed that is not allowed
- behavioral effects of hazard exposure are detected
- a situation occurs outside the confined space that could endanger the entrants
- an uncontrolled hazard is detected inside the confined space
- summon rescue and other emergency services in emergencies.
- take necessary actions when unauthorized persons approach or enter a confined space while entry is underway.

The Site Health & Safety Manager

The Health and Safety Manager is responsible for:

- Enforcing & ensuring the implementation of Permit to Work System.
- Provide training to all concerned on Permit to Work System.
- Check the onsite compliances of prescribed special conditions mention in permit to work.
- Cancel the permit in case of non-compliances of the prescribed special conditions mention in permit to work.
- Keep a record of issued permits.

TYPES OF PERMIT TO WORK

In the Permit to Work System tasks are allocated to one of the following categories:

Hot Work Permit	This permit is used for tasks involving the use of a naked flame or ignition source, including: • welding / flame cutting • electrical induction pre-heating / stress relieving • use of heat shrink blowers • grinding Note:A Hot Work Permit is not required for operations involving permanently mounted plant using an enclosed flame (boilers, inert gas generators, etc).
Cold Work Permit	This permit shall be used for a task, which does not involve hot work but has a high risk potential. For example: • Any work affecting the integrity or availability of safety or emergency systems e.g., fire pumps, fire mains, shutdown systems, fire and gas detection • Pressure testing of plant and equipment • Person(s) working in exposed locations e.g., outboard of handrails, or where persons may fall from 2 meters or more if unprotected This permit shall be used for tasks, which do not fall into the preceding categories of Permit to Work but still require to be covered by a permit. For example: • Mechanical Lifting / Radiographic works • Chemical Handling • Erection and dismantling of scaffolds
Electrical Work Permit	30% of electrical accidents are resulting in fatalities. So electrical works must be carried out under the control of this permit as they stand for high risk tasks. These tasks can be;

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	• Work on isolated / live electrical equipment. • During Conductor tapping. • Working near overhead/underground electrical line. • Working on switch yard/transformer yard.
Excavations Work Permit *(not applicable in this Project)*	The permit covers works listed below; • Excavations • Trenches • An Excavation permit shall be used where any excavation is planned, at any site.
Confined Space Work Permit *(not applicable in this Project)*	A Confined Space Permit shall be raised when it is necessary for personnel to enter confined spaces. Confined space means any enclosed or partially enclosed space or trench having restricted access or egress, a potential for a hazardous atmosphere and which due to its nature may form a trap and become a life threatening environment. Such spaces are usually not designed or intended for human occupancy. They include large pipelines, tanks, vessels, separators, silos, ducts, sewers, pits, holes, flues, manholes and voids. They also include any space in which dangerous contaminants can accumulate and ventilation is restricted e.g. excavations, trenches (normally deeper than 1.2 meters or 4 feet), sumps, draw pits and culverts and any other poorly ventilated areas This permit provides the means of: • Declaring that the confined space is isolated so that gas test carried out subject to any special conditions. • Recording the gas test and re-test results • Declaring the confined space safe for entry under a Permit to Work • Specifying whether or not Breathing Apparatus is required A Hazard and Risk Assessment must be completed before any entry into a confined space, and if necessary adjacent work permits must also be used.

WORK PERMIT AUTHORIZATION

Work Permit authorization form shall be completed with the maximum duration period not exceeding 12 hours.

A copy of each Permit To Work shall be displayed, during its validity, in a conspicuous location in close proximity to the actual works location to which it applies.

NO PERMIT REQUIRED

The Issuing authority may allow certain specific, routine, non-hazardous tasks to be performed in his area without the issue of a permit or a formal procedure provided that the tasks do not impact on another area.

The Issuing authority shall satisfy himself that the risks are as low as reasonably practicable and that the tasks are performed by suitably competent personnel.

Many of the tasks that do not require a permit or the use of a formal procedure are themselves the subject of written procedures that have been risk assessed when originally produced. Such routines include:

- Routine crane operations using fixed cranes, excluding heavy lifts and maintenance
- General cold work in workshops
- Routine work in offices, and domestic activities
- Visual inspections, excluding Confined Spaces

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1. WORK DESCRIPTION

START WORK DATE:..... Valid from:...../ Hrs to.....

WORK TO CARRY OUT (detailed description):.....

.....

.....

.....

Name of the personnel required for the job:

WORK PERMIT

Ref...

- ☐ Cold Work
- ☐ hot works
- ☐ Excavation
- ☐ confined space
- ☐ electrical

2. PERSONAL PROTECTIVE EQUIPMENTS (PPEs)

- ☐ safety helmet
- ☐ safety glasses
- ☐ safety shoes
- ☐ coverall
- ☐ goggles
- ☐ face shield
- ☐ welder face shield
- ☐ dust mask
- ☐ ear protection
- ☐ leather gloves
- ☐ Electrical gloves
- ☐ chemical gloves
- ☐ Gum boots
- ☐ rope grab fall arrestor
- ☐ full body safety harness with double lanyard
- ☐ full face mask with filter cartridge
- ☐ self contained breathing apparatus
- ☐ fire extinguisher
- ☐ escape type breathing apparatus
- ☐ others:

3. MATERIAL REQUIRED FOR THE WORK

- ☐ hand tools
- ☐ compressor
- ☐ scaffolding
- ☐ tractor
- ☐ welding machine
- ☐ blowtorch
- ☐ multi gas detector
- ☐ crane
- ☐ lifting tools & tackles
- ☐ Excavator/ JCB
- ☐ cutting set
- ☐ derrick pole
- ☐ forced ventilation
- ☐ Insulated tools
- ☐ tripod / hoist
- ☐ lock out & Tag Out
- ☐ 24 Volt lamp
- ☐ ATEX lighting
- ☐ walkie-talkie
- ☐ others :

4. HAZARDS DURING THIS WORK:

- ☐ fall of material
- ☐ Cave-in
- ☐ asphyxia / intoxication
- ☐ moving machinery
- ☐ fall from height
- ☐ fire / explosion
- ☐ flying particles
- ☐ suspended load
- ☐ underground/ utilities
- ☐ above ground utilities
- ☐ Contact with chemical
- ☐ X-Rays
- ☐ electric shock/Hitting overhead electrical cable
- ☐ failure of lifting tools & tackles
- ☐ Hitting by vehicle/machines
- ☐ inadequate illumination
- ☐ others :

5. CERTIFICATE / DOCUMENT REQUIRED FOR THIS AUTHORIZATION

- ☐ mechanical isolation
- ☐ electrical isolation
- ☐ Third party certification of lifting tools & tackles
- ☐ material safety data sheet
- ☐ Risk Assessment
- ☐ method statement / H&S Manual/SOP
- ☐ Permission from local authorities if required
- ☐ Lift Plan
- ☐ others:

6. GAS MONITORING

Permissible limit	Actual	Permissible limit	Actual
☐ Methane - 10% LEL ☐ H2S - 10 PPM		☐ CO - 35 PPM ☐ O2- 19.5% TO 21.5%	

6. Performing Authority (PA)
Name:
Company:
Date..... Hour.....

Signature.

I understood and accept all the conditions for this work

7. Issuing Authority(IA)
Name:
Company:
Date..... Hour.....

Signature.

The content of this permit has been explained to the holder and work may Proceed.

8. verifying authority
Name:
Company:
Date..... Hour.....
Signature:

9.The Permit is cancelled
Reason:
Name: Signature: Date: Time:

10. STATUS OF THE WORK

Performing Authority (PA)
Work complete? ☐ YES ☐ NO
All persons under my control have left the area.
The work is incomplete and in the following status.
Name:
Company:
Date..... Hour.....

Issuing Authority
Work complete? ☐ YES ☐ NO
Work is accepted and I personally checked location status
Name:
Company:
Date..... Hour.....
Signature:

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ANNEX- 02 CHECKLISTS.

	CHECK LIST FOR WELDING & CUTTING	
Frequency : Once in a week		
Equipment / Tool	**Model No.**	**Company**
Inspection Date	**Next Inspection**	**Location**

Sr.	Description	Observation Yes/ No	Remarks
ARC WELDING			
1	Are arc-welding machine frames or cases electrically grounded?		
2	Are electrode cables free from splices within 10 feet from holders & the joints are adequately insulated?		
3	Appropriate personnel protective equipment's like face shield, hand gloves, apron and safety shoes provided and used?		
4	Are the personnel involved in the welding and cutting operation properly trained and authorized to do the work?		
6	Is metal pan provided for collection of hot welding buds?		
GAS WELDING / GAS CUTTING			
7	Is trolley provided for Gas Cylinders?		
8	Is there approved lighter provided for ignition of gas torch?		
9	Whether empty and full cylinders are labeled and stored separately?		
10	Is combustible material removed from hot work are.		
11	Are all safety devices (flash back arrestor) are mounted with Gas cutting set		
12	Is any leakage found with Gas cylinders, Regulators, Guage, Hoses and Torch Joints/connections		
13	Is firefighting arrangement available with/near gas cutting set.		
14	Are required PPEs are available with worker ?		
15	Is soap liquid bottle available with gas cutting set to check leakage?		

Observation if any :

Inspected and signed by:

Safety Officer **Site In-Charge**

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	CHECKLIST - COMPRESSOR	
Frequency : Once in a week		
Equipment / Tool	**Model No.**	**Company**
Inspection Date	**Next Inspection**	**Location**

Sr.	Description	Observation Yes/ No	Remarks
1	Whether the pressure vessels has been tested and certified by third party once in a six month?		
2	All rotating & dangerous parts adequately guarded?		
3	Is the pressure bled off and the system locked-out during any repair work?		
4	Whether pressure gauge & safety valve are provided and monitored?		
5	Whether plate/tag showing last date of inspection and results mantioned?		
6	Whether the compressed air line has been checked for clean/good condition?		
7	Is it strictly prohibited to use of direct compressed air for other than intended purpose?		
8	Noncurrent-carrying, metal parts of compressor are effectively grounded?		

Observation if any :

Inspected and signed by:

Safety Officer **Site Incharge**

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	CHECKLIST - VEHICLES	
Frequency : Once in a week		
Vehicle No. :	**Model No.**	**Company**
Inspection Date	**Next Inspection**	**Location**

Srl.	Description	Observation Yes/ No	Remarks
A	**Vehicle Requirements**		
1	Valid registration certificate?		
2	Valid Pollution under control certificate?		
3	Condition of Brakes, Horn, Front and rear lights, back mirrors?		
4	Availability of Portable fire extinguisher?		
5	Availability of First Aid kit?		
B	**Driver Requirements**		
1	Valid driving license?		
2	Trained for defensive driving?		
3	Experienced and technical knowledge about vehicle handled?		
C	**Operational Requirements**		
1	Whether the vehicle is used for intended design purpose?		
2	Whether the vehicle loaded within designed capacity?		
3	Whether the safety systems of vehicle (emergency brakes etc) are properly worked?		
4	Whether the signalmen provided for movement of heavy vehicle?		

Observation if any :

Inspected and signed by:

Safety Officer **Site Incharge**

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	CHECKLIST - HAND TOOLS & POWER TOOLS	
Frequency : Once in a week		
Equipment / Tool	**Model No.**	**Company**
Inspection Date	**Next Inspection**	**Location**

Sr.	Description	Observation Yes/ No	Remarks
1	Are all tools and equipment used by employees at their workplace are in good condition?		
2	Are hand tools such as chisels and punches, which develop mushroomed heads during use, reconditioned or replaced as necessary?		
3	Are broken or fractured handles on hammers, axes and similar equipment replaced promptly?		
4	Are worn or bent wrenches replaced regularly?		
5	Are appropriate handles used on files and similar tools?		
6	Are employees made aware of the hazards caused by faulty or improperly used hand tools?		
7	Are appropriate safety glasses, face shields, etc. used while using hand tools or equipment which might produce flying materials or be subject to breakage?		
8	Are jacks checked periodically to ensure they are in good operating condition?		
9	Are tool handles wedged tightly in the head of all tools?		
10	Are tools stored in dry, secure locations where they won't be tampered with?		
11	Are grinders, saws and similar equipment provided with appropriate safety guards?		
12	Are power tools used with the correct shield, guard, or attachment, recommended by the manufacturer?		
13	Are rotating or moving parts of equipment guarded to prevent physical contact?		
14	Are all cord-connected, electrically operated tools and equipment effectively grounded or of the approved double insulated type?		
15	Are effective guards in place over belts, pulleys, chains, sprockets, on equipment such as concrete mixers, and air compressors?		
16	Are ground-fault circuit interrupters/ELCB provided on all temporary electrical circuits?		

Observation if any :

Inspected and signed by:

Safety Officer **Site Incharge**

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	CHECKLIST - CHEMICAL HAZARDS	

Frequency : Once in a week

Equipment / Tool	**Model No.**	**Company**
Inspection Date	**Next Inspection**	**Location**

Sr.	Description	Observation Yes/ No	Remarks
1	Employees trained in the safe use of hazardous chemicals and materials?		
2	Employees knowledgeable of potential workplace chemical hazards?		
3	Containers labeled indicating their hazards?		
4	Flammable and toxic chemicals kept in closed containers when not in use?		
5	Adequate means readily available for containing spills or overflows properly and safely?		
6	Employees prevented from eating in areas where hazardous chemicals are present?		
7	Personal Protective Equipment provided, used and maintained where needed?		
8	Materials which give off toxic asphyxiate, suffocating or anesthetic fumes, stored in remote or isolated locations when not in use?		
9	Are Material Safety Data Sheets maintained at sites?		
10	Is Material Safety Data Sheet (MSDS) displayed near to the storage of the chemicals		
11	Is MSDS easily understandable to the workmen		

Observation if any :

Inspected and signed by:

Safety Officer **Site Incharge**

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CHECKLIST - SCAFFOLD

Frequency : Immediately after erection or after any alteration, subsequently once in a week

Location: Date:

Srl.	Description	Observation Yes/ No	Remarks
A	CHECK THE BASE OF THE STRUCTURE		
1	Has the scaffold been constructed in accordance with the design of a qualified person?		
2	Are base plate provided?		
3	Has the maximum load capacity of the scaffold been communicated to all affected employees?		
4	Is the ground level firm, or have proper supports have been placed under the structure?		
5	Is the base away from all excavations, drain covers, manholes etc?		
B	CHECK THE STRUCTURE		
1	Are the vertical tubes in plumb and correctly spaced?		
2	Are the standards joints staggered?		
3	Are adequate bracing provided?		
4	Is the structure securely tied back?		
C	CHECK THE WORKING PLATFORM		
1	Is the working platform closely boarded, I.e. no gaps between the boards?		
2	Is the working platform at least 450 mm wide?		
3	Is a guard-rail, hand-rail and toe board provided above the platform and securely fixed?		
4	Are all the materials stored on the platforms properly secured or not?		
5	Are openings in working platform kept safely covered/ fenced?		
6	Is there a provision of anchoring safety belts lanyards to be tied to guy ropes?		
D	CHECK THE ACCESS		
1	Are existing access ways (stairs, walkways, ladders) etc. left clear?		
2	Are scaffolds checked by the experienced person & tagged for knowing the safe for use, Not Safe for use or under construction.		

Observation if any :

Inspected and signed by:

Safety Officer	Site Incharge

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	CHECKLIST - ELECTRICAL INSTALATION		
Frequency : Once in a week			
Location:		Date:	
Sr.	Description	Observation Yes/ No	Remarks
A	Cables		
1	Is equipment provided with main switch & emergency stop switch?		
2	Welding Cables routed properly above the Ground?		
3	Improper jointing of Cable wires prevailing at Site?		
B	Distribution Boards / Secondary DBs		
1	Locking and Tagging procedures are used when the equipment is shut down for maintenance?		
2	Whether safety warning signs are displayed properly at the workplace.(High Voltage)?		
3	DBs & extension boards are protected from rain / water (weather protection)?		
C	Earth Leakage Circuit Breakers		
1	The connections are routed through ELCB?		
2	The ELCB numbered & tested periodically & test results recorded in a logbook counter signed by P&M Incharge?		
3	Are all earth pits identified & resistance are being checked & recorded on suitable intervals.		
D	Grounding		
1	Neutral earthing ensured at the source of power (Main DB at Gen. Or Transformer)?		
2	The continuity & tightness of earth conductors are checked?		
E	Electrically operated machines/accessories		
1	The plug top provided everywhere?		
2	All metal parts of electrical equipment's & light fittings / accessories grounded?		
Observation if any :			
Inspected and signed by:			
Safety Officer		Site Incharge	

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	CHECKLIST - HOUSEKEEPING		
Frequency : Once in a week			
Location:	Next date of Inspection:	Date of Inspection:	
Sr.	Description	Observation Yes/ No	Remarks
A	General		
1	Whether separate scrap yard is allocated at the site for collection of scrap?		
2	Approaches to workstations, offices, time offices, stores, are well laid and demarcated?		
3	Site roads are kept clear of stacked material for free & safe vehicular movement?		
B	Structural Fabrication / Erection Site		
1	Area and roads kept clear for maneuvering of cranes and material handling equipment?		
2	Scrap, cut-pieces, welding electrode stubs, hand-tools kept tidy in work area and disposed suitably.		
3	Welding cables, power cables routed properly to avoid run-over by vehicle or tripping hazards and obstruction to personnel movement?		
4	Compressed gas hoses routed properly in the site?		
5	Floor kept clear of water, oil spillage/ accumulation.		
C	Civil Work Area		
1	All approach, aisle, ingress/egress to/from site, ramps, walkways kept clear of material debris tools etc.		
2	Scaffolding material, shuttering boards, across pans etc. are stacked properly at site.		
3	Stacking of bricks, hollow blocks are done in safe manner.		
4	Nails removed from wooden planks / timber and not protruding out.		
5	Debris from demolition and excavated earth cleared from site and accesses.		
D	Electrical Installations & Booths		
1	Approach to Panels, Switches kept clear.		
2	Fire extinguishers installed at an easy accessible location.		
3	Welding cables and power cables are routed separately.		
E	Stores		
1	Walkways, entry and exits kept clear.		
2	Materials placed on racks are safely accessible.		
3	Vertically stored cylinders are secured / chained to avoid toppling and horizontal cylinders guarded against rolling down.		
4	Cement bags are stacked in proper gradient and height safely.		
5	Corrosive materials (e.g. Acids, alkalis) are stored away from other material and kept on collection trays to safeguard against accidental leakage.		
6	Easy accessibility to installed fire extinguishers ensured in store.		
Observation if any :			
Inspected and signed by:			
Safety Officer		Site Incharge	

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	CHECKLIST - WORK AT HEIGHT		
Frequency : Daily before starting of activity			
Location:		Date:	
Sr.	Description	Observation Yes/ No	Remarks
1	Are ladders properly secured at the top and bottom to prevent slipping, sliding or falling?		
2	Do side-rails extend one meter above top of landing?		
3	Ladders placed at right slope (less than or equal to 75 degree)?		
4	Are landings platform provided with handrails & guard rails etc?		
5	Whether ramp is provided with proper slope (Not more than 2 in 3)?		
6	Are working platform provided with adequate width, proper handrails & guard rails as per work instruction.		
7	Whether use of safety helmets, fall arrest system (full body safety harness with double lanyard) is ensured for all workers?		
8	Is safety nets (personnel and material) are in use and maintained clean where height is more than 6 meter?		
9	Net is extended 1.5 mt beyond the edge of the work surface?		
10	When work is going at height & ground level adequately barricaded for the restricted entry.		
Observation if any :			
Inspected and signed by:			
Safety Officer		Site Incharge	

VARANASI STP PROJECT PVT. LTD.

	CHECKLIST - EXCAVATION		
Frequency : Once in a week			
Location:		**Date of Inspection:**	
Sr.	**Description**	**Observation Yes/ No**	**Remarks**
1	Prior to start, whether all existing utilities has been identified & removed / isolated / protected?		
2	Whether the excavation sides adequately supported by sloping, benching and shoring as appropriate.?		
3	Did all excavated or other materials store or retain at least 1.5 m or more from the edges of the excavation?		
4	Barricades have been provided to all excavations?		
5	Are employees equipped with adequate PPE's i.e. reflective jacket, safety helmet, safety shoes etc?		
6	Are excavations inspected by a competent person after every rainstorm or other hazard increasing occurrences?		
7	Is heavy equipment restricted to minimum distance equivalent to depth of trench / pit.		
8	Are portable mixer kept at least two meter away from the edge of the excavated pit & properly secured.		
9	Whether adequate access has been provided to excavated pit i.e.ramp, ladder etc?		
Observation if any :			
Inspected and signed by:			
Safety Officer		**Site Incharge**	

VARANASI STP PROJECT PVT. LTD.

	CHECKLIST - CRANE SAFETY		
Frequency : Once in a fifteen days & before crane operation			
Location:		**Date of Inspection:**	
Sr.	**Description**	**Observation Yes/ No**	**Remarks**
1	Whether the crane along with lifting tools and tackles has been tested by competent person at least once in a year for load carrying capacity?		
2	Whether automatic load indicator provided with crane?		
3	Whether the load chart available with the operator cabin?		
4	Whether overload limit switches are provided and working properly?		
5	Whether colour coding system for lifting tackles and slings provided?		
6	Whether the crane operator is experienced and have valid certificate for crane operation?		
7	Whether the trained signalman provided with reflective jackets?		
8	Whether proper access provided to operator cabin?		
9	Is there one portable fire extinguisher in operator cabin?		
10	Whether first aid kit provided in operator cabin?		
11	Is lift plan available for heavy load lifting		
Observation if any :			
Inspected and signed by:			
Safety Officer		**Site Incharge**	

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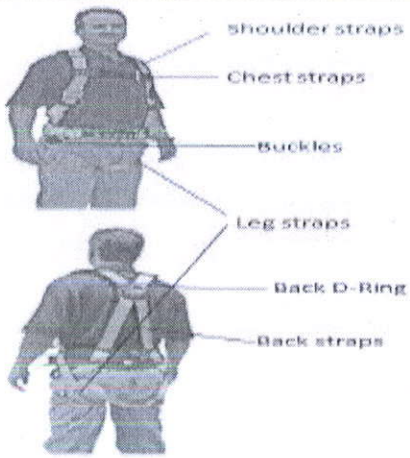
	CHECKLIST – FULL BODY SAFETY HARNESS		
Frequency : Once in a week			
Area/Location: **Type of Harness:** **Make:** **Sr. Number:**		**Date of Inspection:**	
Sr.	**Description**	**Observation Yes/ No**	**Remarks**
Webbing: Check for cuts, frayed edges, burn, chemical deterioration, holes or excessive dirtying			
1	Shoulder strap condition		
2	Chest strap condition		
3	leg strap condition		
4	Back strap condition		
5	Life line double lanyard conditions		
Stitching: Check for cut or pulled stitching			
1	Shoulder straps		
2	Chest straps		
3	Leg straps		
4	Back straps		
Hardware: Check for sharp edges, burns, cracks, bending or corrosion			
1	Back D ring		
2	Front D ring if present		
3	Buckles		
4	Snap hooks, carabineer's at double lanyard		
5	Energy Absorbing Component: Inspect for elongation (stretch), tears and excessive soiling		
Labels & Tags: Check to make sure that all labels have appropriate EN/CE/ISI Marking, are legible & securely attached. Note: Half body & single lanyard belt shall be discarded.			
1	Tags & Labels		
OVERALL CONDITION:			



VARANASI STP PROJECT PVT. LTD.

ANNEX- 03 TRAINING ATTENDANCE SHEET.

ESSEL INFRA PROJECTS LIMITED						
PROGRAM TITLE:						
					Format No. EPC/HR/R/010, Rev. 00 Dt. 01.08.2016	
Date and Time:						
Venue:						
SPOC:						
S.N.	Emp. No.	Name of Participant	Department/Function	Grade	Contact Number	Signature
1.						
2.						
3.						
4.						
5.						
6.						
7.						
8.						
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11.						
12.						
13.						
14.						
15.						

VARANASI STP PROJECT PVT. LTD.

ANNEX- 03 MONTHLY HSE REPORTING.

Monthly Health, Safety & Environment Report

PLANT/ PROJECT :

Process for reporting of Accidents & Incident (Annex-I)

Report Period From :

DATE:

S.NO	REQUIRED DATA		(A) ESSEL INFRA STATISTICS JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	YTD*	(B) SUB - CONTRACTORS STATISTICS JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	YTD*	TOTAL
1	Average No. of Employees														0													0	0
2	Man-hours worked														0													0	0
3	ACCIDENTS (Attach Report for all categories A - E)	A) Nearmisses/ Incidents (Including environment)													0													0	0
		B) Fatal Accident													0													0	0
		C) Number of work relevated accident with sick leave													0													0	0
		D) Number of work relevated accident without sick leave/ First Aid													0													0	0
		E) Reportable Accidents (LTI)													0													0	0
4	Man Days Lost due to accident														0													0	0
	a) Frequency Rate (FR)		#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
	b) Severity Rate (SR)		#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
5	Statutory Inspections														0													0	0
	Statutory non-conformities (Attach Action Plan, if applicable)														0													0	0
6	HSE Trainings (Internal & External)														0													0	0
7	Tool Box Talk														0													0	0
8	Mock Drill														0													0	0
9	Promotional Activities														0													0	0
10	HSE Committee Meetings														0													0	0

PREPARED BY :

SIGN :

DATE:

EHS/ MR / Ver 1.0 / 1st Sept 2016/ Page 1 Of 1 (Annex-I)

VARANASI STP PROJECT PVT. LTD.

MONTHLY HSE REPORT (Annex-2)

Month:				
Project Name:				
DETAILS:				
HSE Staff details:	Manager:	HSE Officer:	Supervisors :	Workers:
Initiated Corporate Social Responsible activities (with pictures)				
Summary of Serious Unsafe Acts & Conditions / Non conformities				
Brief Description of Serious incidents or accidents				
Details of training activities (with pictures)				
Summary of any external inspection / Audit				
Brief description of Mock Drill (Must be conducted at least twice in a year)				
Details of Environmental Monitoring				
Any Critical Site HSE Issue				
Major Activities (Site)				
Site Photographs- Good & Bad Practices (Minimum 8)				
1.		2.		

VARANASI SMART PROJECT PVT. LTD.

ANNEX- 04 TOOL BOX TALK FORMAT.

	10-MINUTE WORKS COMMENCEMENT TALKS/ TOOLBOX MEETING	
PROJECT:		DATE:
Site:		TIME:
PERSON RESPONSIBLE:		

RISKS					
Falls from a height		Becoming trapped by or between objects		Explosions	
Falls on the same level		Becoming trapped due to machines or vehicles overturning		Fire due to ignition factors	
Objects falling due to collapsing or demolition		Extreme environmental temperatures (outdoors)		Exposure to noise	
Objects falling when being handled		Thermal contact		Exposure to vibrations	
Fall of loose objects		Direct electrical contact		Exposure to ionizing radiation	
Stepping on objects		Indirect electrical contact		Exposure to non-ionizing radiation	
Blows and cuts caused by knocking against immobile objects		Exposure to chemical agents or noxious or toxic substances		Atmospheric pressure and decompression	
Blows and cuts caused by moving objects		Accidents due to contact with irritants		Exposure to biological agents	
Blows and cuts caused by objects or tools		Contact with caustic and/or corrosive substances		Others	
Projection of fragments or particles		Back Ache – Improper manual handling			
Being run over or hit by a vehicle					

ACTIVITIES TO BE CARRIED OUT IN THE DAY

PREVENTIVE MEASURES

COLLECTIVE PROTECTION			
FIRST-AID KIT		FIRE EXTINGUISHER	
OTHERS (indicate protection systems to be used)			

PPE					
SAFETY HELMET		RESPIRATORY PROTECTION		GLOVES	
HIGH VISIBILITY JACKET		Nose Masks		Mechanical hazard gloves	
SAFETY SHOES		Self-Contained Breathing Apparatus		Chemical hazard gloves	
HEARING PROTECTORS		FALL PREVENTION SYSTEMS		Electrical hazard gloves	
FACIAL PROTECTION		Ear plug		Fire resistant gloves	
Safety Goggles		PROTECTIVE CLOTHING		Welding gloves	
Face Screens		Chemical resistant apron/ Cover all		**OTHERS** (apron, gaiters, etc.)	

VARANASI STP PROJECT PVT. LTD.

	10-MINUTE WORKS COMMENCEMENT TALKS/ TOOLBOX MEETING	
PROJECT:		DATE:
Site:		TIME:
PERSON RESPONSIBLE:		

NAME AND SURNAME	ID	COMPANY	SIGNATURE

COMMENTS

VARANASI STP PROJECT PVT. LTD.