

ENVIRONMENTAL
SOCIAL HEALTH
AND
SAFETY MANAGEMENT
PLAN

PROJECT

POLLUTION ABATEMENT (INTERCEPTION AND DIVERSION WITH STP) WORKS FOR RIVER GANGA AT HOWRAH, BALLY AND BARANAGAR - KAMARAHATI MUNICIPAL TOWN IN WEST BENGAL INCLUDING 15 YEARS O&M BASED ON HYBRID ANNUITY BASED PPP MODE

IMPLEMENTING AGENCY

NATIONAL MISSION FOR CLEAN GANGA (NMCG)

PROJECT NO. & TENDER NO.

KMDA/WS/GAP/SE(N)/NIT-6/18-19 & 28 / SE (N)/GAP/W&S/KMDA of 2018-2019

CLIENT

KOLKATA METROPOLITAN DEVELOPMENT AUTHORITY (KMDA)

PROJECT ENGINEER

CONCESSIONAIRE

GANGA STP PROJECTS PRIVATE LIMITED

DOCUMENT TITLE

Environment Social Health & Safety Management Plan

SEWAGE TREATMENT PLANT: ARAPURA, BARANAGAR & BALLY

DOC. NUMBER

10P153/ KMDA/ESHSM/001

REV

0

DISCIPLINE

PROCESS

STAMPING AREA

REV. NO	DATE	DESCRIPTION	PREPARED	CHECKED	APPROVED
0	2-Jul-19	Submitted for Approval			

REVISION HISTORY

TOTAL NO. OF SHEETS (INCLUDING THIS COVER)= XX Nos.

THIS DOCUMENT IS THE PROPERTY OF M/S VA TECH WABAG LIMITED AND MUST NOT BE COPIED IN WHOLE OR PART OR LENT OUT WITHOUT THEIR WRITTEN PERMISSION







ENVIRONMENT SOCIAL, HEALTH AND SAFETY MANAGEMENT PLAN

Kolkata Metropolitan Development Authority

Doc No: 10P153/ KMDA/ESHSM/001

Prepared By	Reviewed By	Approved By
QHSE Team	Head QHSE	Head QHSE



Contents

1.0	Introduction.....	7
1.1	Project scope	7
1.2	ESHS Objectives.....	9
1.3	Objectives of the ESHSMP.....	10
1.4	Terms of definitions	10
2.0	IMS Management System	11
3.0	Leadership and Commitment.....	12
3.1	VA Tech Wabag OHSE Policy	13
3.2	QHSE Organisation	14
3.3	Code of Conduct.....	18
4.0	Determination and Monitoring of Legal Compliances	20
4.1.1	Legal requirements.....	20
4.1.2	International Standards.....	21
4.1.3	Applicable permits.....	22
4.1.4	BIS Standards.....	24
5.0	Risk Assessment & Management.....	26
5.1	Hazard Identification and Assessment of Risk	44
5.2	Aspect Impact.....	44
5.3	Job Safety Analysis	44
6.0	Site Activity Plan.....	44
7.0	Social Management.....	45
7.1	Resources	45
7.1.1	Human Resource	45
7.2	Consultation, Participation & Management of Workers	46
7.2.1	Equipment, Tools and Machinery	48
7.2.2	Competence	48
7.2.3	Awareness	49
7.2.4	Trainings	50
7.2.5	Communication	51
7.2.6	External Communication.....	51
7.2.7	Internal Communication	52



7.3	Documented Information.....	53
8.0	EHS Planning and Control Procedures.....	54
8.1	Operational Planning and Control Procedure.....	54
8.2	Job safety analysis.....	56
9.0	Environment Management.....	56
9.1	Water resource protection and management.....	57
9.1.1	Water resource protection plan to prevent drinking water contamination.....	57
9.1.2	Water Monitoring and Management.....	58
9.1.3	Management actions for water resource protection to prevent contamination of drinking water.....	59
9.2	Air Pollution Control.....	63
9.2.1	Dust.....	63
9.2.2	Emissions from Equipment.....	63
9.3	Noise Monitoring & Control.....	64
9.4	Spillage Control.....	64
9.5	Waste Management.....	64
10.0	Occupational Health and Hygiene.....	64
10.1	Workers Welfare Measures and Social Responsibilities.....	65
10.2	Camp Facilities.....	65
11.0	Operational Safety Requirements – Mandatory Compliance.....	66
11.1	Health and Safety Procedures.....	66
11.2	PPE.....	67
11.3	Lighting.....	67
11.4	Safety Committee and Near Miss Committee.....	68
11.5	Tool box talk & Awareness Sessions.....	68
11.5.1	Awareness Sessions for High Risk Activities.....	69
11.5.2	Awareness building for positive EHS culture.....	69
11.6	Traffic management plan.....	70
11.6.1.1	Purpose.....	70
11.6.1.2	Scope.....	70
11.6.1.3	Documentation requirements.....	70
11.6.1.4	Common road transport hazards.....	70
11.6.1.5	Risk reduction measures.....	71



11.6.1.6	Designated Pathways for Pedestrians / Vehicle movement	73
11.6.1.7	Vehicle parking, reversing and Traffic marshals	73
11.6.1.9	Roles and responsibilities.....	75
11.6.1.10	Emergency response	76
11.6.1.11	Safe Loading and Unloading.....	77
11.6.1.12	Excavation and sewer laying over public roads	78
11.7	Permit to work.....	81
11.8	Fire prevention	81
11.9	Barricade	81
11.10	Signage	82
11.10.1	Boundary Marking and Protection Strategy.....	83
11.10.1.1	Offsite risk management.....	83
11.10.1.2	Security.....	83
11.11	Sub-Contractor	85
11.12	Health Management	85
12.0	Incidents, Non-conformances, Corrective & Preventive Action	85
12.1	Incident Investigation – Responsibility & Reporting	85
12.2	Incident Analysis and Corrective Actions	86
13.0	Emergency Preparedness and Response	86
13.1.1	Emergency response plan	86
13.1.2	Emergency Mock Drills.....	87
13.1.3	First Aid and Life-saving Apparatus on Site.....	87
14.0	Records.....	87
15.0	Performance Evaluation	87
15.1	OHS Monitoring and Measurement.....	87
15.2	Internal Audits.....	88
15.3	Safety Inspection	88
15.4	HSE Index.....	88
15.5	Management Review: QRM (Quarterly Review Meeting)	88
16.0	Improvements	89
16.1	Internal Audit Report	89
16.2	Management Review Outputs	89





**Environment, Social, Health and Safety Management
Plan**

Doc No:
10P153/ KMDA/ESHSM/001

Revision Number: 00

Date: 22/11/2019



Annexure

Annexure I: Consultation, participation, grievance redressal of workers

Annexure II: F-540-002 Worker Feedback form: QHSE Review

Annexure III: F-840-003 Worker Feedback form: Complaints and Improvement

Annexure IV: HIRA Procedure & HIRA Document

Annexure V: Aspect Impact Document

Annexure VI: JSA Procedure and Documents

Annexure VII: Site activity plan

Annexure VIII: Project Training Plan

Annexure IX: HSE Project training

Annexure X: Operational Control Procedures

Annexure XI: Personal protective equipment

Annexure XII: Tool box talk manual

Annexure XIII: OCP-24 MoU

Annexure XIV: Internal audit procedure

Annexure XV: HSE Index checklist

Annexure XVI: Labour influx and worker management plan





1.0 Introduction

1.1 Introduction

VA TECH WABAG an Indian Multinational provides Water Technology solution having presence in more than 23 countries. Being one of the world's leading suppliers of water and wastewater treatment plant, VA Tech Wabag offers sustainable solutions that can serve as the economic basis for a region and provide enhanced quality of life for the local population. The health, safety and welfare of its stakeholders form the basis of the value system of VA Tech Wabag.

The KMDA Project being a prestigious project for VA Tech Wabag the, ESHSM plan and procedures have been established for promoting and enforcing a safe working environment. The plan which is detailed below covers all areas of ESHS which are critical during the construction phase of the project. We commit safety of Client, contractor employees, work-men, suppliers, VA Tech Wabag employees and all associated with the project.

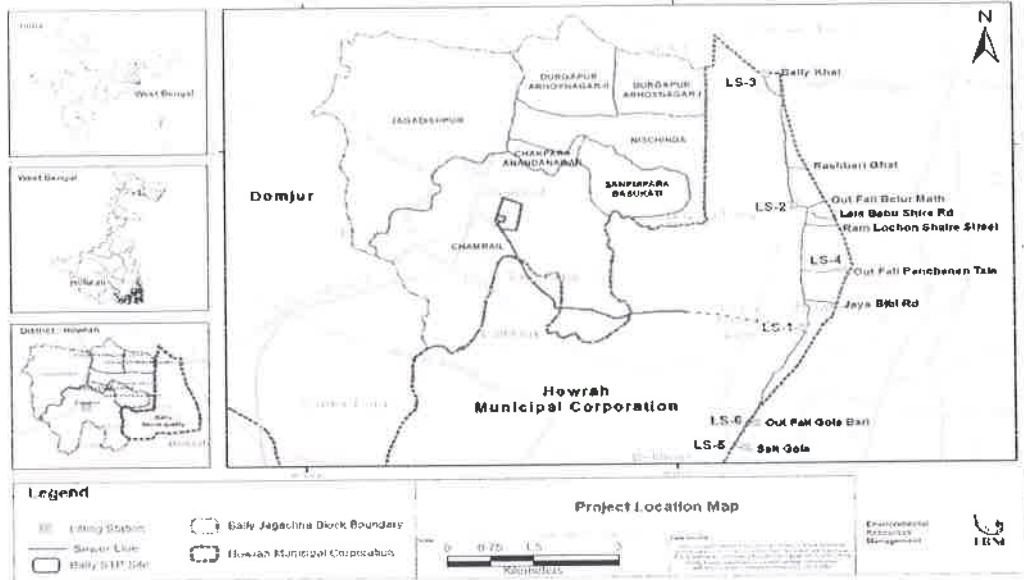
1.1 Project scope

The general Scope of work for the project involves Designing, financing, rehabilitating, restoring, upgrading, supplying, constructing, erecting, installing, testing, commissioning and completing the sewerage infrastructure works and facilities by the scheduled construction completion date and operating and maintaining the facilities and the associated infrastructure for 15 years from the date of COD, in compliance to applicable laws, applicable permits, technical specifications, designs and drawings, the construction plan, the EHS plan, the resource plan, Mobilization plan of manpower, material & machinery, QA/QC plan and good industry practices to ensure compliance with the key performance indicators(KPIs).

Bally

The Bally STP sub-project includes development of a new STP of 40 MLD capacity in Bally. It also includes rehabilitation of the existing 22 MLD WSP in Bally, laying of 11.324 kms of sewerage network, rehabilitation of associated sewerage infrastructure (including trunk sewer lines, interception and diversion (I&D) structures, rising main, lift stations, main pumping station) and operation and maintenance of the entire assets for a period of 15 years.

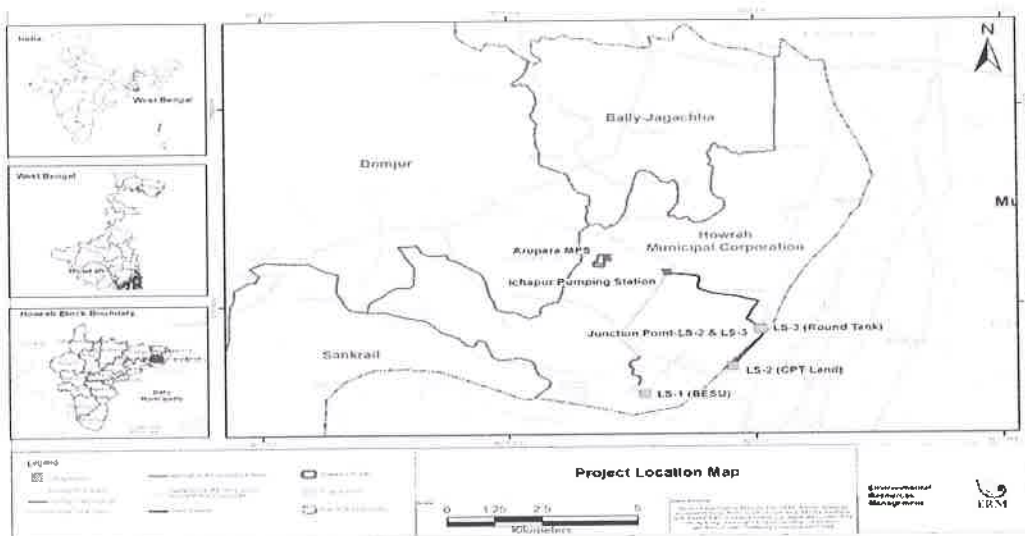




Bally STP Project Area Map

Arupara

The Arupara STP sub-project includes development of a new STP of 65 MLD capacity in Arupara. It also includes laying of 3.307 kms of sewerage network, rehabilitation of associated sewerage infrastructure (including trunk sewer lines, interception and diversion (I&D) structures, rising main, lift stations, main pumping station) and operation and maintenance of the entire assets for a period of 15 years.

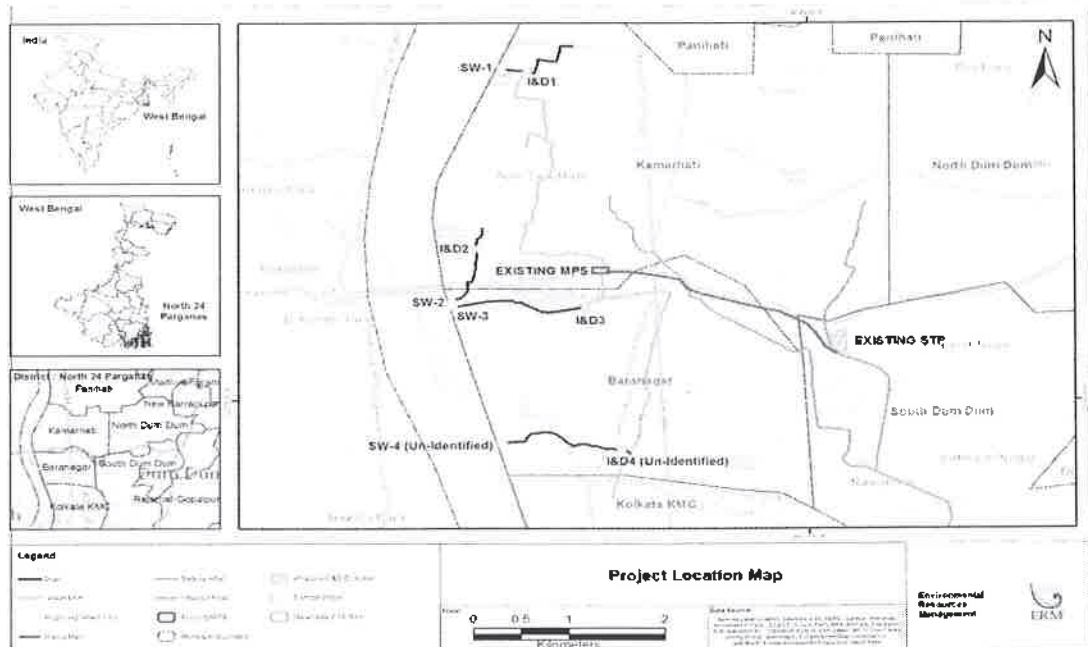


Arupara STP Project Area Map

Baranagar



The Baranagar STP sub-project includes development of the new STP of 62 MLD capacity in Mathkal. The project also includes decommissioning of the existing structure (here the new STP will be constructed), rehabilitation and replacement of 8.3 kms sewer network, laying of 2.7 km of rising main and 0.42 km of new sewer network. The proposed project also involves rehabilitation of associated sewerage infrastructure (including trunk sewer lines, interception and diversion (I&D) structures, rising main, main pumping station) and operation and maintenance of the entire assets for a period of 15 years.



Baranagar STP Project Area Map

This ESHS Plan is applicable to all the construction and rehabilitation activities pertaining to these Projects. The process and procedures defined in this plan is applicable to client, contractors, VA Tech Wabag employees and all the suppliers associated with the project. All aspects of the execution carried out during planning, construction, pre-commissioning and commissioning are covered in this plan.

1.2 ESHS Objectives

The objective is to ensure safe execution of the project by complying with statutory and legal requirements, adopting best in class process and procedures, thereby achieving

- Zero Fatal incidents and less than 1% LTI
- Compliance to all statutory and legal requirements
- Minimize environmental damage by conforming to the applicable norms of the CPCB/SPCB
- Protect personnel from any occupational health hazards
- Effective resource utilization to minimize wastage
- Ensuring physical and mental well-being of all personnel associated with the project
- Protecting communities from any negative impact due to the nature of works carried out



1.3 Objectives of the ESHSMP

- Planning for implementation of ESHS requirements
- The ESHS requirements are communicated to all stakeholders
- Executing the scope of work without endangering lives of all involved
- Designate roles and responsibilities
- Identify training and communication requirements
- Provides a monitoring, auditing and reporting mechanism

1.4 Terms of definitions

- **Safety** – Safety is the state of being "safe", the condition of being protected from harm or other non-desirable outcomes. Safety can also refer to the control of recognized hazards in order to achieve an acceptable level of risk.
- **Authorized Operator** – A qualified and properly trained person assigned by the contractor's supervisor to operate a given vehicle, piece of equipment, or tool.
- **Fall Prevention** – The elimination of fall hazard. Fall prevention where achievable is always preferred over fall protection techniques.
- **Fall Protection** – A series of steps taken to minimize exposure to a fall hazard such as reducing fall distance and exposure time in conjunction with the fall arresting equipment.
- **MSDS** – Material Safety Data Sheet – A publication, required by labour law, which describes the safe handling, storage, and disposal of a hazardous material.
- **Protective Barricades** - Barricade that alert personnel from exposure of any hazard.
- **Qualified Person** – An experienced and trained person designated to inspect tools, equipment, safety equipment and methods of use and certify the same for safe use
- **Risk**: Consequence(s) X Likelihood.
- Consequence can be measured as High (H), Medium (M), and Low (L) in terms of the impact on Health, Environment and loss to the property whereas Likelihood can be measured as High (H), Medium (M), and Low (L) in terms of the chances of occurrence.
- **Risk Assessment** – A detail study regarding the hazards potential and methods for eliminating or minimizing the potentiality of hazards for safe execution of work.
- **P P E** – Personal Protective Equipment – the items used to protect the parts of human body from exposure to hazards like Hard hats , Steel toe shoes, goggles, harness, gloves etc.,.
- **Incident**: A work related event in which injury or ill health or fatality occurred or could have occurred.
- **Lost Time Incident (LTI) / Days Away from Work Cases (DAWC) / Disabling Injuries**: An injury causing disablement extending beyond the day of shift on which the accident occurred. An injury



resulting disablement of any person to resume in his job within 24 hours (excluding Sunday and holiday) from its occurrence and should be certified by the Registered Medical Practitioner.

- **First Aid Cases:** An injury which requires the attention of First Aid Providers or Registered Medical Practitioner for medical treatment only, without causing any disablement whether temporary or permanent type. The person should be brought back into the work within the shift in which the injury occurred.
- **Man Hours Worked:** The total number of employee-hours worked by all employees working in the site premises. It includes managerial, supervisory, professional, technical, clerical and other workers including the contract labour.
- **Frequency Rate (F.R.):** $\frac{\text{Number of Lost Time Injury} \times 1\,000\,000}{\text{Man Hours Worked}}$
- **Severity Ratio (S.R.):** $\frac{\text{Man days lost due to Lost Time Injury} \times 1\,000\,000}{\text{Man Hours Worked}}$
- **Incident Rate (I.R.):** $\frac{\text{Number of Lost Time Injuries} \times 1\,000}{\text{Total no. of persons employed}}$
- **Near Miss:** An unplanned and uncontrolled event that had the potential of ill health, injury, damage or other loss but resulted in no damage to life or property.
- **Hazard:** Sources or situation with a potential to cause harm in terms of human injury or ill health, damage to property, damage to the workplace environment, or a combination of these.
- **Non-Conformance:** Any deviation from work standards, practices, procedures, regulations, management system performance etc.
- **Unsafe Act:** The acts, behavior, omission by individual or by a group, which may lead to an incident.
- **Unsafe Conditions:** A situation, system, equipment or any other attribute that may cause an incident.

2.0 IMS Management System

The occupational health and safety management system has been developed keeping in mind the ISO 45001:2018 standard. The environmental management system is as per the ISO 14001:2015 standard. They are based on the PDCA cycle (Plan, do check and act) for ensuring effective implementation. The contractual requirements of the project are integrated into Wabag's integrated management system. Based on the scope and requirements the plan is prepared to ensure that the risks and environmental impacts have been assessed and the necessary prevention and mitigation plans are in place. These are then measured for effectiveness through audits and assessments. The results of which are communicated to all the levels of the organization for necessary action.




3.0 Leadership and Commitment

VA Tech Wabag Top management is committed to the OH&S by:


- Taking overall responsibility and accountability for the prevention of work-related injury and ill health and providing safe and healthy workplaces
- Ensuring that the OHSE policy and ESHS objectives are established and are compatible with the Project requirements.
- Protecting workers from reprisals when reporting incidents, hazards, risks, and opportunities
- Leading, and promoting a culture that supports the implementation of OHS programs in project execution.
- Ensuring a process for worker consultation and participation
- The management is submitted a consolidated report on the project performance. This includes the areas of improvement, incidents and corrective actions, near misses, ESHS initiatives implemented.



3.1 VA Tech Wabag OHSE Policy



OCCUPATIONAL HEALTH, SAFETY AND ENVIRONMENTAL POLICY




VA TECH WABAG LTD. as a market leader in the Indian water technology offers portfolio in the areas of municipal, industrial water and wastewater treatment, besides offering a full fledged state-of-the-art engineering services in line with global standards both in terms of quality and delivery.

VA TECH WABAG LTD will undertake every reasonable effort to eliminate the hazards that cause incidents and injuries and aim to control or reduce wastage of natural resources, energy, materials and chemicals.

We shall strive to continually improve our Occupational Health, Safety and Environmental performance in our activities, products and services by implementing and maintaining the HSE Management Systems and by,

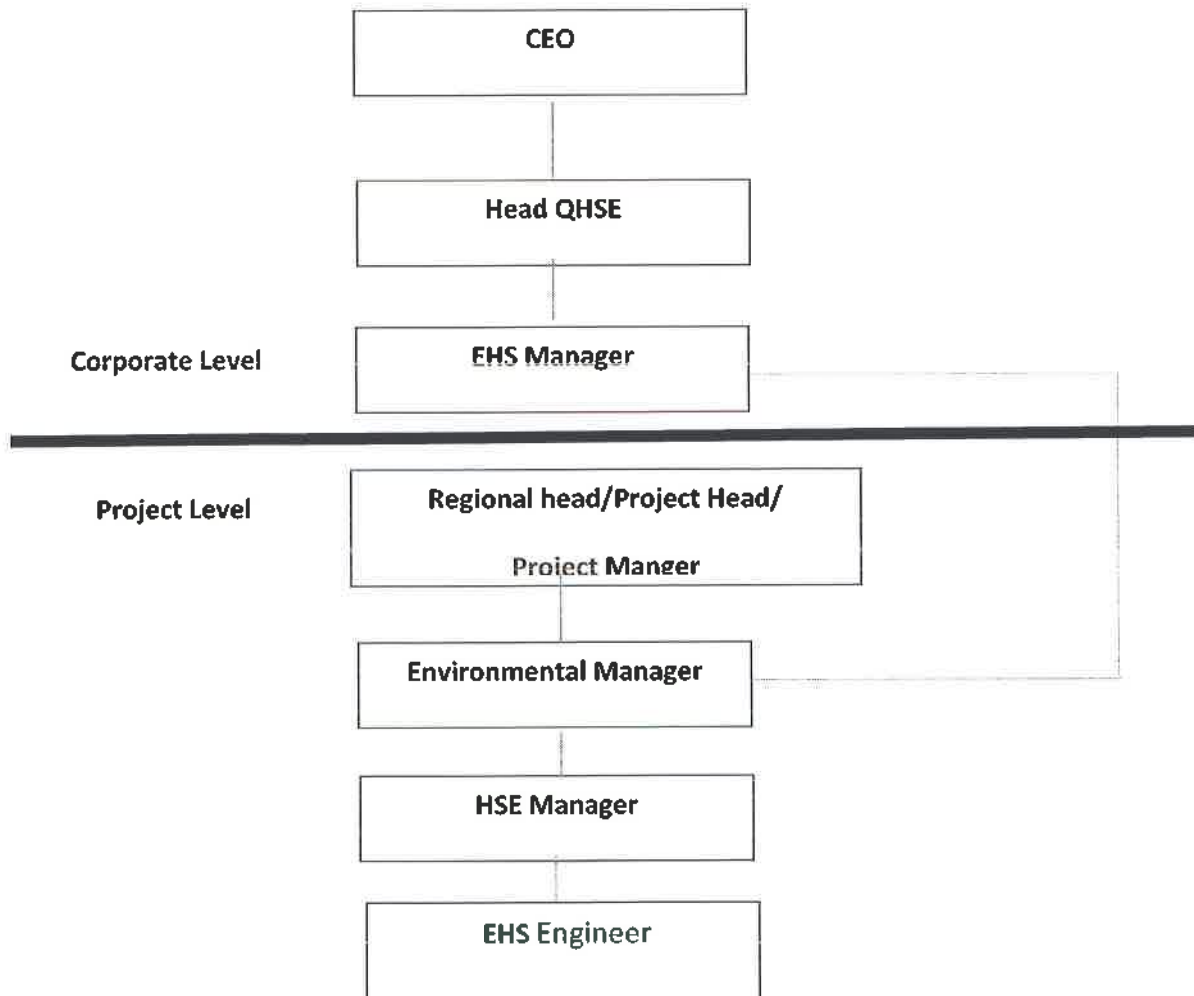
- ❖ Ensuring compliance with applicable legal and other requirements.
- ❖ Avoidance of incidents through prevention and Safety awareness.
- ❖ Promotion of activities that could minimise environmental pollution.
- ❖ Optimising the utilisation of natural resources like energy, construction materials and reducing the waste generation.
- ❖ Promotion of measures aimed at enhancing the physical and emotional health of the people who work with or for our company.
- ❖ Creating awareness amongst our employees and stake holders by proactive communication, training and felicitation.
- ❖ Increasing green cover in and around the operational sites.

Date : 23.08.2010


RAJIV MITTAL



3.2 QHSE Organization



Note:

- QHSE Head will provide leadership to ensure compliance to the Project Safety requirements through assessments, audits and review all the site operational activities.
- QHSE Team will co-ordinate, monitor and support the operational functions of the project to ensure compliance.
- Audit Team will follow up with all the audit related activities and report findings to the top management.

3.2.1 ESHS Responsibilities

Leadership



- Directing the project management team to achieve ESHS objectives.
- Ensuring OHS policy and objectives are established and communicated.
- Communicating the importance of effective OHS requirements.
- Protecting workers from reprisals when reporting incidents, hazards, risks and opportunities.
- Supporting health and safety committees.
- Review of ESHS Performance and provide direction for improvement and compliance.

Project Head

- Implementing the VA Tech Wabag ESHS policy across the projects.
- Understand the legal requirements and implement of the same.
- Ensuring the implementation of the ESHS Plan.
- Ensuring the site specific Risk Assessments on activities are conducted and safe working methods are implemented across the site.
- Ensure accident and near-miss reporting procedures are understood and complied with, and assist with accident investigations where appropriate.
- Establish a clear communication with the site specific project manager and construction manager to strictly implement site safety.
- Ensure the Statutory Notices, the Safety Policy, Insurance Certificate and the names of appointed First Aiders are displayed and maintained in prominent locations.
- Reprimand any employee for failing to discharge their health and safety responsibilities.
- Set a personal example with regard to health and safety matters.

Project Manager

The project manager is accountable and responsible for implementation, management and compliance of health & safety for the project. He will ensure:

- Overall implementation of the project safety management system
- Assign tasks to senior managers and safety personnel to achieve specified activities and tasks of the project objectives.
- Ensuring legal and statutory health and safety standards are implemented at the project site.
- Ensuring the site team is adequately trained and competent to implement the ESHS Plan.
- Ensuring each sub-contractor has developed and implemented a detailed safety management system in line with project requirements.
- Facilitate in internal and external audit programs, closing of any non-conformities, implementing any corrective actions.
- Participate in site walkthrough, safety committee meetings and mass tool box talks.



- Reviewing overall project health & safety performance and take necessary actions where deviation from the planned processes and procedures are found.

Resident Construction Manager

Resident construction manager will lead the safety and health initiatives at project site. He will be:

- Accountable for implementing safety process and procedures across all construction activities at site.
- Ensure sub-contractor complies with the HSE policy and procedure.
- Lead the project team in design and preparation and implementation of HIRA and JSA.
- Responsible for the implementation of site processes like Work permit.
- Facilitate the labors with the basic amenities and facilities like clean drinking water, sanitation, hygienic living conditions, protection from pests, etc.
- Provide & maintain safe system of work for all personnel working at project site..
- Make available resources to enable execution of safety activities.
- Ensure participation and involvement of employees in the safety program.
- Ensuring appropriate health and safety standard are developed & implemented.
- Participating in internal inspections, audits and incident investigations
- Submit a detailed report on Site ESHS to client/consultant
- Constitute and chair the site safety committee monthly, and organize meetings and programs and monitoring compliance with safe work methods.
- Stimulating high level of safety awareness at all times & identifying safety-training needs.
- Reviewing audit and inspection reports and implementation of preventive and corrective action plan.
- Perform regular Safety walkthroughs along with the HSE Engineer to inspect the site for its compliance to the ESHS requirements.
- Lead mass tool box talks to the workers weekly, to discuss critical ESHS issues and increase awareness.
- Organize and conduct regular health camps.

Safety Engineer

The Safety Engineer has the following roles and responsibilities:

- Implementation of the project specific ESHS Plan.
- Preparation, implementation, review and update of Aspect/Impact study/HIRA/JSA for all activities before start of the project in coordination with project execution team.
- Ensure ESHS regulatory and statutory requirements are enforced and complied to.
- Inspection of work area, work method, Men, Machine, materials, tools and Tackles.



- Creating HSE awareness through tool box talks, on the spot training, awareness programs.
- Inspection of labor camps to verify the hygienic condition and take suitable corrective action
- Record all unsafe acts /unsafe conditions/near miss/violations (document/photo evidences), recommend and ensure corrective action is implemented and preventive action are taken.
- Maintaining and following checklists for all activities and close the punch points.
- Generate and maintain reports on: Daily HSE report, Monthly report, Safety committee meetings MOM, Near miss committee meetings MOM, training details, induction etc.
- Conduct investigation of all Near Miss cases/ LTI/ Fatal/ Dangerous occurrences and recommend appropriate corrective measures and inform client within 24 hours. The project office and the corporate office shall be informed immediately.
- Ensuring the Work permit system is strictly followed, inspection of the high risk work areas requiring permit and closure of the permit to be followed upon.
- Conduct weekly safety walk through with client/Resident Construction Manager/Discipline lead/Project Manager and implement the findings.
- Safety signage are displayed at various work locations so that the workers get the right information about the best practices to be followed at site.
- Communicating incident and near misses from all sites to the site engineers and the workmen through LTI alerts.
- Conduct safety induction training to all the workmen/new workmen/visitors and maintain records.
- Conduct job specific trainings and trainings on work instruction to all the workmen.
- Organize campaigns, competitions, and other special emphasis programs to promote ESHS in work place.
- Develop an emergency response and preparedness plan and ensure that it is displayed and communicated to all the people in the site.
- Conduct periodic emergency response preparedness mock drills to ensure that the emergency evacuation plan is effective. The same is to be documented.
- Ensuring that workers interests are safeguarded.

Lead Engineer

Site Engineers are frontline functionaries and they are accountable for safety and regulatory compliance in their functions. It includes:

- Participating in the design and implementation of site specific HIRA/JSA.
- Responsible for the implementation of OCPs.
- Providing daily 'Tool box talk' and stimulating high level of ESHS awareness at all times.
- Identification of high risk work areas requiring permit to work system and ensuring the work only start after getting a work permit.



- Compliance to the applicable Acts, Rules, Regulations and Standards affecting occupational health and safety.
- Contributing in implementing all ESHS requirements and ensuring that all works are performed in a manner, which is safe, and without any risk to health & safety of staff & workmen.
- Participating in and adhere to all safety instructions, procedures and activities.
- Ensuring all the necessary controls are in place before the start of work.
- Ensuring the all the workers wear PPE as per the job requirements.
- Providing advice and assistance on ESHS to all employees and sub-contractors.
- Enforcing good housekeeping & rectify all the unsafe conditions at work place
- Reporting & investigating all incidents and pay particular attention to those having caused injury to an employee.
- Supervising and ensuring compliance with safe work procedures under 'permit system'
- Communicating with the HSE Engineer regarding the near miss, incidents, work related hazards of work being carried out.

3.3 Code of Conduct

The code of conduct will be enforced at the project site to ensure a positive and safe working environment. These are based on Wabag OHSE Policy and ESHS Procedures. It will help minimize any negative impact that could be produced as a result of poor health & hygiene, discrimination and abuse, illicit behavior and crime, lack of safety awareness etc. the following are will be communicated and enforced at the site for safe working:

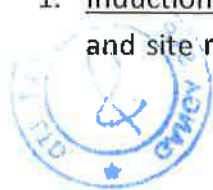
1. All Workers shall comply with all applicable laws, rules and regulations.
2. The working staff must respect the local belief, and sentiments and must behave accordingly.
3. All workers shall avoid any discriminatory conduct based on gender, age, disability, race, language, culture, political affiliations, philosophy, religion, or any other illegal basis.
4. Smoking will be strictly prohibited within the work area. Open fires are strictly prohibited in the project area.
5. All workers must understand the risks of works undertaken and the precautions required before the start of the activity. This will be ensured through regular training and awareness programs.
6. The workers must comply with all site safety rules and all non-compliances will be considered as safety violation.
7. All workers must comply with, at all times, with all applicable environmental rules and regulations, including complying with the social and environmental responsibilities as per the contract.
8. All Workers are required to show at all times a transparent and honest behaviour, and a high level of personal responsibility and professionalism, either in or out of the Project Area.



9. Workers shall immediately the EHS Engineer about any kind of sickness or symptom that may affect their ability to carry out their work related obligations properly.
10. All shall participate in identification of hazards, determination of controls, implementation of policies, standards, procedures, schemes & strategies for achieving the objectives.
11. Intervene when any unsafe practice / condition is encountered within the team activities.
12. Report their concerns / feedback, if any without fear of repercussions.
13. No one shall enter any part of the construction area without valid work permit, identity card, safety shoes and hard hat.
14. The workmen shall remain in the construction site only during working hours.
15. Contractor personnel inside the work premises shall not be under the influence of alcohol, drugs or other intoxicating substances.
16. Alcoholic liquor or drugs shall not be imported, sold, given, bartered or otherwise disposed. There must be no importation, selling, gifting of alcoholic liquor or banned substances by the staff.
17. Carrying arms and ammunition into the site is strictly prohibited. No person shall give, barter or otherwise dispose of, to any person, any arms or ammunition of any kind, or allow any sub-contractor staff to do so.
18. No personnel shall indulge in fighting, horseplay or practical jokes within the site or its perimeter.
19. All conflicts of interest must be reported to the HSE Engineer/RCM in writing.
20. Offensive or inappropriate language and provocative gestures are not allowed
21. Gambling is prohibited in the site premises
22. Workers shall not receive or hand over money, goods or other objects of value in order to obtain benefits, receive favours or influence decisions benefiting Wabag, third parties, or themselves.
23. Housekeeping and good hygiene practices will be given the highest priorities in preventing the spread of communicable diseases and the protection of the health of all personnel.
24. Workers must carry a photo identification while coming to site at all times.
25. Any person responsible for the destruction or misuse of company property will be reprimanded for their actions.
26. Treat each other with cultural and religious sensitivity and rest their well-being.

Communication of code of conduct will done during:

1. Induction training: Workers and employees will be made aware of the code of conduct and site rules during the induction training. They will also be informed of their rights



and responsibilities in ensuring a safe working environment. The grievance and redressal procedure will also be communicated during induction.

2. Visitor induction: Visitors will be communicated the Code of conduct during the induction. Basic site rules and the visitor feedback procedure will be shared.
3. Tool box talk: The code of conduct will be re-communicated to the workers through daily TBT.
4. Trainings: Trainings will be conducted for building a positive work culture through behavioural based safety. Through these the code of conduct will be communicated to the workers. The violation system and the consequences of non-compliance will also be communicated. These trainings will be on
 - a. Sexual harassment & gender based violence
 - b. Occupational Health and hygiene
 - c. Worker feedback and grievance system
 - d. Alcohol and drug abuse
 - e. Wabag violation system: Code of conduct
 - f. Legal rights & requirements

4.0 Determination and Monitoring of Legal Compliances

The legal department identifies the applicable statutory and regulatory requirements which will be implemented at the project sites. The Project Manager will be responsible for the implementation and compliance of the legal requirements. The compliances are monitored by HR Legal and HSE Engineer. The compliances are reviewed by the management through QRM and Monthly HSE audit report. Immediate corrective action are taken for any non-compliance noted in this regard. Legal register will be maintained at site.

4.1.1 Legal requirements

The following are the legal requirements which may be applicable and shall be be complied during all phases of construction of this project. The applicable legal requirements are:

- The Building & other Construction Workers (Regulation, Employment and Conditions of Service) Act, 1996.
- Employees Provident Fund Scheme, 1952
- Employees State Insurance Act, 1948
- The Minimum Wages Act, 1948



- Building and Other Construction Workers (Regulation of Employment and Conditions of Service) Central Rules, 1998 (BOCWR)
- Static & Mobile Pressure Vessels (Unfired) Rules, 1981 (SMPVR)
- Electricity Act, 2003 (EA)
- Indian Electricity Rules, 1956 (ER)
- Motor Vehicles Act, 1988 (MVA)
- Central Motor Vehicles Rules, 1989 (CMVR)
- The Environment (Protection) Act, 1986 (Amended 1991) 29
- The Environment Protection Rules, 1986 (Amended 2006)
- The Hazardous Wastes (Management and Handling) Rules, 1989 (Amended 2003)
- The Air (Prevention and Control of Pollution) Act, 1981
- The Noise Pollution (Regulation and Control) Rules, 2000
- Municipal Solid Waste (Management and Handling) Rules, 2000
- Recycled Plastics Manufacturing and Usage Rules, 1999
- Workmen's Compensation Act 1923
- Payment of Gratuity Act, 1972
- Minimum Wages Act, 1948
- Payment of Wages Act, 1936
- Equal Remuneration Act, 1979
- Child Labour (Prohibition and Regulation) Act, 1986
- Inter-State Migrant Workmen's (Regulation of Employment and Conditions of Service) Act, 1979
- The Public Liability Insurance Act, 1991
- Batteries (Management and Handling) Rules, 2001
- The Forest (Conservation) Act, 1980
- Ancient Monuments & Archaeological Sites and Remains Act, 1958
- Employees PF and Miscellaneous Provision Act 1952
- The Explosives Act, 1884 and The Explosives Rules, 1983
- The Water (Prevention and Control of Pollution) Act, 1974

4.1.2 International Standards

❖ International Performance Standards:

IFC's Performance Standards offer a framework for understanding and managing environmental and social risks for projects. The IFC Performance Standards help manage and improve their environmental and social performance through an outcomes-based approach and also provide a solid base from which clients may increase the sustainability of their business operations. It sets out the policy objectives, scope, risk management and principles for key Environmental and Social Sustainability areas such as:



- PS 1: Risk Management
- PS 2: Labour and working conditions
- PS 3: Working efficiency
- PS 4: Community HSE
- PS 6: Biodiversity
- PS 8: Cultural Heritage

❖ **IFC General EHS Guidelines (2007) & IFC Performance Standards on Social and Environmental Sustainability, 2012**

This is a technical reference document with general and industry- specific examples of Good International Industry Practice (GIIP).

❖ **ADB Safeguard Policy Statement (SPS), 2009**

The objectives of the Safeguard Policy Statement (SPS) are to avoid adverse impacts of projects on the environment and affected people, where possible; minimize mitigate and/or compensate for adverse project impacts on the environment and affected people when avoidances is not possible; and help borrowers/clients to strengthen their safeguard systems and develop capacity to manage environmental and social risks.

4.1.3 Applicable permits

FOR FINANCE CLOSURE				
SI No	Applicable Permit	Issuing Authority	Action By	Current status
1	Temporary Electric Connection / Construction Power	WB State Electricity Board / KMDA	Wabag/ GSPPL	Applied
2	Consent to Establish	WB State Pollution Control Board	KMDA	Applied
3	Tree cutting	Forest Dept.	KMDA	Not Applicable



4	Road crossing for Baranagar Facility	NHAI	KMDA	Existing passage will be used for road crossing. Permit will be applied to NHAI 01 month prior to start the work.
5	Railway Crossing at Baranagar Facility	Indian Railway	KMDA	Existing passage will be used for road crossing. Permit will be applied to Indian Railway 01 month prior to start the work.
DURING CONSTRUCTION AND PRIOR TO COMMISSIONING				
6	Road Excavation for sewer line replacement.	PWD/CMC	KMDA	Permit will be applied during Construction phase, after identify the stretches by the local authority prior to start the job.
7	Consent to Operate for Existing Facilities and New STPs	WBPCB	KMDA	To be applied after Completion of Construction activities prior to start the plant commissioning.
8	Electricity Board approval during various stages – request for load sanction, remittance of deposit, installation of incomings, etc.	WB State Electricity Board	KMDA	To be applied during Construction Phase prior to commissioning the substation.
9	Certification of Electrical Installation by Chief Electrical Inspector'	WB State Electricity Board/Chief Electrical Inspector	Wabag/ GSPPL	To be applied during Construction Phase prior to commissioning the substation.
10	Storage of Hazardous Chemicals/Materials (For Chlorination System)	PESO	Wabag/ GSPPL	Initial Construction Drawing approval for Chlorine Storage building will be applied prior to start to the Construction and Storage Permit will be obtained prior to storage the Chlorine cylinder.
11	Fire Fighting NOC	Department of Fire & Emergency	Wabag/ GSPPL	To be applied after Completion of Construction



4.1.4 BIS Standards

IS 3696(Part 1):1987	Safety code of scaffolds and ladders: Part 1 Scaffolds
IS 3696(Part 2):1991	Safety code of scaffolds and ladders: Part 2 Ladders
IS: 2750:1964	Specification of steel scaffolding
IS 3764:1992	Code of safety for excavation work (first revision)
IS 4014(Part 2):1967	Code of practice for steel tubular scaffolding: Part 2 Safety regulations for scaffolding
IS 4081:1986	Safety code for blasting and related drilling operations (First Revision)
IS 4082:1996	Recommendation on stocking and storage of construction materials at site (First revision)
IS 4130:1991	Safety code for demolition of buildings (second revision)
IS 4138:1977	Safety code for working in compressed air (first revision)
IS 4756:1978	Safety code for tunnelling work (first revision)
IS 4912:1978	Safety requirements for floor and wall openings, railings and toe boards (first revision)
IS 5121:1969	Safety code for piling and other deep foundations
IS 5916:1970	Safety code for construction involving use of hot bituminous Materials
IS 5916:1970	Construction involving use of hot bituminous materials
IS 7205:1974	Safety code for erection of structural steel work
IS 7293:1974	Safety code for working with construction machinery
IS 7969:1975	Safety code for handling and storage of building materials
IS 818:1968	Safety and health requirements in electric and gas welding and cutting operation
IS 3016:1982	Fire protections in welding and cutting operations (First revision)
IS 10500	Drinking water standard
IS 4138:1977	Working in compressed air (First revision)
IS: 4435 -1967	Trestles and Ladders (Part II)
IS8324:1988	Practice for Safe use and Maintenance on Non-Calibrated Round Steel Link Lifting Chains and Chin Slings (First Revision).



IS: 8216 – 1976	Inspection of Lift Wire Ropes.
IS: 9944 – 1992	Recommendations on safe working loads for natural and man-made fibre rope slings
IS: 13416 (part-I to V)	Recommendations for falling material, hazard prevention, fall preventions, disposal of debris, timber structures, fire protection
IS 8989:1978	Safety code for erection of concrete framed structures
IS 10067:1982	Material constants in building works
IS 10291:1982	Safety code for dress divers in civil engineering works
IS 13367:1974	Safe use of cranes
IS 13415:1992	Code of safety for protective barriers in and around
IS 13416(Part 1): 1992	Recommendations for preventive measures against hazards at workplaces: Part 1 Falling material hazards prevention
IS 13416(Part 2): 1992	Recommendations for preventive measures against hazards at workplaces: Part 2 Fall prevention
IS 13416(Part 3): 1994	Recommendations for preventive measures against hazards at workplaces: Part 3 Disposal of debris
IS 13416(Part 4): 1994	Recommendations for preventive measures against hazards at workplaces: Part 4 Timber structure
IS 13416(Part 5): 1994	Recommendations for preventive measures against hazards at workplaces: Part 5 Fire protection
IS 13430:1992	Code of practice for safety during additional construction and alteration to existing buildings
IS 15883 (Part 5)	Construction Project Management - Guidelines: Part 5 Health and Safety Management
IS: 11972-1987 -	Safety precautions to be taken when entering a sewerage system
IS 9474:1980	Specification for principles of Mechanical Guarding of Machinery



5.0 Risk Assessment & Management

The following is a table detailing the major EHS impact due to the project activities and the proposed mitigation measures which are to be implemented at site.

Project Stage / Affected Aspect	Project Activity	Potential Impacts	Impact Significance	Proposed Mitigation Measures
Drainage	Soil stripping and limited cutting, filling and levelling activities to make the site topography suitable for setting up of the STP. The removal of vegetation cover and top soil can increase the potential for soil erosion during a short period of time till the site is levelled and then stabilized with fill materials like gravel, and sand.	Surface runoff from the construction site may contain eroded earth, sand, aggregate, spilled oil, lubricant, paint residues etc., however the potential to reach drainage channel near and affecting the water quality	Minor	Planned disposal and storage
Visual and Odour	Grading and cleaning of land for demolition activity Emptying of existing structures Demolition of existing structures Storage and disposal of demolition waste Storage and disposal of sludge/silt from decommissioned	Loss of topsoil producing an offensive odour and visual impact	Minor	Stacking of demolition waste, soil heaps and sludge/silt to be done away from settlements with provision of covers so that odour and fugitive emissions are restricted. All the construction activities will be restricted within the designated site On completion of work, all temporary structures, surplus materials and wastes will be





W A B A G

Sustainable Solutions for a Better life.

Environment, Social, Health and Safety Management Plan

Doc No:
10P153/ KMDA/ESHSM/001

Date: 22/11/2019

Revision Number: 00

structure				completely removed from the site and disposed of at a designated facility.
Visual and Odour	<p>On-Site storage of excavated and construction materials;</p> <p>On-Site storage of construction waste;</p> <p>Off-Site disposal of construction waste;</p> <p>Earth work along the sewer pipeline route;</p> <p>De-silting of sewer pipelines;</p> <p>On-Site storage and Off-Site disposal of silt/sludge from sewer pipeline; and</p> <p>Renovation work at associated facilities.</p>	<p>The disposal of MSW in open area around the site can create odour nuisance.</p>	Minor	<p>Provision of storage facility for construction materials within the site;</p> <p>Provision of temporary storage of wastes and collection will also be made at the site Sections excavated for pipeline route will be barricaded with tin sheets;</p> <p>Stacking of sections of pipeline to be done away from settlements with provision of wedges to ensure that rolling or movement of pipeline do not pose risks to passers-by;</p> <p>All the construction activities will be restricted within the designated site;</p> <p>On completion of work, all temporary structures, surplus materials and wastes will be completely removed from the site and disposed of at a designated facility; Construction and municipal solid waste temporarily stored at the site will be transported to the designated disposal facility</p> <p>at regular intervals;</p>
Soil Quality	<p>Site clearing and preparation</p>	<p>Soil compaction</p>	Minor	<p>Demarcation of routes for movement of heavy vehicles;</p> <p>Stripping and placing soils when dry, and not when wet.</p>





WABAG
Water & Air Pollution Control
for a better life

Environment, Social, Health and Safety Management Plan

Doc No:
10P153/ KMDA/ESHSM/001

Date: 22/11/2019

Revision Number: 00

Soil Quality	Fuelling and operation of heavy machinery and transport vehicles	Soil contamination through spills and leaks	Minor	Preparation of guidelines and procedures for immediate clean-up actions following any spillages of oil, fuel or chemicals; Storage areas for oil, fuel and chemicals to be surrounded by bunds or other containment devices to prevent any spilled oil, fuel or chemicals from contaminating soils, water or groundwater;
Soil Quality	Storage and handling of chemicals	Soil contamination through spills and leaks	Minor	Use of spill or drip trays to contain spills and leaks, and use of spill control kits to clean small spills and leaks; and Installation of oil/water separators to treat surface run-off from bounded areas prior to discharge to the storm water system.
Soil Quality	Storage, handling and disposal of construction waste	Soil contamination	Minor	Designated storage area with proper area arrangements
Soil Quality	Storage, handling and disposal of construction waste	Soil contamination	Minor	Design processes to prevent/ minimize quantities of wastes generated and hazards associated with the waste generated; Implement a construction materials inventory management system to minimize over-supply of the construction materials, which may lead to disposal of the surplus materials at the end of the construction period; Segregate hazardous and non-hazardous waste





WABAG
Water & Power
for a better life.

Environment, Social, Health and Safety Management Plan

Doc No:

10P153/KMDA/ESHSM/001

Revision Number: 00

Date: 22/11/2019

Soil Quality	Generation of sanitary effluent	Soil contamination	Minor	<p>and provide appropriate containers for the waste types generated (e.g. enclosed bins for putrescible materials to avoid attracting pests and vermin and to minimize odour nuisance);</p> <p>Store wastes in closed containers away from direct sunlight, wind and rain;</p> <p>Ensure storage area has an impermeable floor and containment, of capacity to accommodate 110% of the volume of the largest waste container;</p> <p>Dispose of waste by authorised vendor.</p>
Surface Water Quality	Erosion from excavation, levelling, filling and other activities	Increased sediment content of surface water	Minor	<p>Adequate sanitary facilities, i.e. toilets and showers, will be provided for the construction workforce;</p> <p>Septic tank and soak pit will be provided to treat domestic waste water.</p> <p>Provision of channels, earth bunds or sand bag barriers on site to direct storm water to silt removal facilities;</p> <p>Protection of stockpiles by plastic sheeting to ensure that they are suitably secured against the wind at the end of each working day if rain is forecasted;</p> <p>Appropriate surface drainage will be designed and provided where necessary;</p>





WABAG
Water & Power Solutions for a better life.

Environment, Social, Health and Safety Management Plan

Doc No:

10P153/ KMDA/ESHSM/001

Revision Number: 00

Date: 22/11/2019

<p>Surface Water Quality</p>	<p>Fuelling and operation of heavy machinery and transport vehicles</p>	<p>Contamination of surface water</p>	<p>Minor</p>	<p>Drainage systems, erosion control and silt removal facilities will be regularly inspected and maintained to ensure proper and efficient operation at all times and particularly following rainstorms. Deposited silt and grit will be removed regularly;</p> <p>Any temporarily diverted drainage will be reinstated to its original condition when the construction work has finished or when the temporary diversion is no longer required;</p> <p>Temporary and permanent drainage pipes and culverts will be provided to facilitate runoff discharge. These will be designed for the controlled release of storm flows.</p>
<p>Surface Water Quality</p>	<p>Fuelling and operation of heavy machinery and transport vehicles</p>	<p>Contamination of surface water</p>	<p>Minor</p>	<p>Vehicle servicing areas, vehicle wash bays and lubrication bays will, as far as practical, be located within roofed and cemented areas.</p> <p>The drainage in these covered areas will be connected to sewers via an oil/water interceptor;</p> <p>Any oil leakage or spillage will be contained and cleaned up immediately. Waste oil will be collected and stored for recycling or disposal;</p> <p>Any surplus wastewater from the concrete batching plant will be treated to comply with discharge standards before it is discharged to</p>





WABAG
Sustainable solutions for a better life.

Environment, Social, Health and Safety Management Plan

Doc No:
10P153/KMDA/ESHSMIP/001

Date: 22/11/2019

Revision Number: 00

				the Sea;	
Surface Water Quality	Storage and handling of chemicals	Contamination of surface water	Minor	Designated storage area with proper boundary	
Surface Water Quality	Storage, handling and disposal of construction waste	Contamination of surface water by sanitary effluent	Minor	C&D waste shall be storage away from drains and settlements	
Surface Water Quality	Generation of sanitary effluent	Contamination of surface water	Minor	Provide sanitation facilities	
Ground Water	Fuelling and operation of heavy machinery and transport vehicles	Contamination of groundwater	Minor	Proper SOP has to be followed during such kind of activity	
Air Quality	Operation of heavy machinery and transport vehicles	Exhaust Emissions	Minor	Minimize movement of construction vehicles and enforce a speed limit around the construction site; Regularly maintain all diesel-powered equipment and reduce idling time to avoid emissions of NOx, PM10 and SO2; Where available use low sulphur diesel (LSD) in HGVs and diesel powered equipment in collaboration with best management practices;	





sustainable solutions for a better life.

Environment, Social, Health and Safety Management Plan

Doc No:

10P153/ KMDA/ESHSM/001

Revision Number: 00

Date: 22/11/2019

Air Quality	C&D waste management and Sludge Handling	Dust	Minor	<p>Implement best practice procedures to control vehicle / equipment air emissions (such as turning off equipment when not in use); and Vehicle / equipment exhausts observed to be emitting significant black smoke from their exhausts should be serviced/ replaced.</p>
				<p>As far as possible, locate the concrete batching plant away from sensitive receptors; Implementation of a periodic watering and sprinkling regime in particular during the dry season, at least two times during the day; Minimise the height from which fill materials are unloaded during site backfilling as far as possible. Where possible, this should be below the height of the hoarding around the Project site boundary;</p> <p>During construction, the approach road will be regularly maintained to keep it clean, free from mud and slurry. The approach road will be properly shaped and compacted by rolling to an even and uniform surface to receive pavement.</p> <p>Totally enclose any skips for material transport with impervious sheeting; and</p> <p>No waste will be burnt on or around the Project site.</p>





WABAG
CORPORATE IDENTITY SYSTEM FOR A BETTER LIFE.

Environment, Social, Health and Safety Management Plan

Doc No:
10P153/ KMDA/ESHSM/001

Date: 22/11/2019

Revision Number: 00

Noise

Heavy machinery operations for construction works

Increase in ambient noise levels

Minor

Normal working hours of the contractor will be between 06:00 and 21:00 hours from Monday to Sunday. If work needs to be undertaken outside these hours, it should be limited to activities that do not lead to exceedance of the noise criteria at nearby sensitive receptors; Regular maintenance of equipment including lubricating moving parts, tightening loose parts and replacing worn out components should be conducted;

Low noise equipment should be used as far as practicable;

The number of equipment operating simultaneously should be reduced as far as practicable;

Equipment known to emit noise strongly in one direction should be orientated so that the noise is directed away from nearby sensitive receptors like Adarsha Nagar settlement as far as practicable;

Acoustic enclosure should be erected around DG sets and other stationary noise generating equipment;





WABAG
Sustainable solutions for a better life.

Environment, Social, Health and Safety Management Plan

Doc No:
10P153/ KMDA/ESHSM/001

Date: 22/11/2019

Revision Number: 00

<p>Occupational Health and Safety</p>	<p>General construction activities</p>	<p>Health and safety of construction workforce</p>	<p>Moderate</p>	<p>The Contractor will prepare and implement a Health and Safety Plan prior to commencing work. This plan will include method statements for working methods, plant utilization, construction sequence and safety arrangements;</p> <p>Measures will be implemented to reduce the likelihood and consequence of the following hazards:</p> <ul style="list-style-type: none"> falling from height; falling into water; entanglement with machinery; tripping over permanent obstacles or temporary obstructions; slipping on greasy oily walkways; falling objects; contact with dangerous substances; electric shock; variable weather conditions; lifting excessive weights; <p>A Permit to Enter system will be established to ensure that only authorised persons gain entry to the site;</p> <p>All persons working on site will be provided information about risks on Site and arrangements will be made for workers to discuss health and safety with the Contractor;</p> <p>All workers will be properly informed, consulted</p>
--	---	---	------------------------	--





Environment, Social, Health and Safety Management Plan

Doc No:
10P153/KMDA/ESHSM/001

Revision Number: 00

Date: 22/11/2019

and trained on health and safety issues; Personal Protective Equipment (PPE) shall be worn at all times on the Site.

Women in the region generally wear "sarees", which is not appropriate while working in hazard prone construction areas. If women will be working in the hazard prone areas, then the contractor needs to ensure proper outfit and PPEs.

Before starting work all the appropriate safety equipment and the first-aid kit will be assembled and checked as being in working order;

All lifting equipment and cranes will be tested and inspected regularly. All hoist ways will be guarded;

All scaffolding will be erected and inspected in conformity with the Factories Act and the appropriate records maintained by the Contractor;

Safety hoops or cages will be provided for ladders with a height in excess of two metres;

When there is a risk of drowning lifejackets shall be provided and it shall be ensured that personnel wear adequate buoyancy equipment or harness and safety lines, and that rescue personnel are present when





WABAG
Sustaining Solutions for a better life.

Environment, Social, Health and Safety Management Plan

Doc No:

10P153/ KMDA/ESHSM/001

Revision Number: 00

Date: 22/11/2019

<p>Community Health and Safety</p>	<p>Influx of construction workers</p>	<p>Increased prevalence of disease</p>	<p>Minor</p>	<p>work is proceeding; The Contractor shall provide appropriate safety barriers with hazard warning signs attached around all exposed openings and excavations when the work is in progress. Barriers will be provided to prevent ingress of persons into the construction site and also to protect the public from exposure to hazards associated with the construction activities; Screening, surveillance and treatment of workers, through the provision of medical facilities and, where required, immunization programmes; Undertaking health awareness and education initiatives among workers; Avoiding collection of stagnant water;</p>
<p>Community Health and Safety</p>	<p>Road transportation</p>	<p>Traffic safety</p>	<p>Minor</p>	<p>Road safety awareness building for residents living along the transportation route.</p>
<p>Loss of Income</p>	<p>Repair and Laying of new sewer line.</p>	<p>Road side vendors, kiosk and shops operating their business near the project will face temporary livelihood/income loss during the laying of new sewer line, rising main and replacement along the RoW.</p>	<p>Minor</p>	<p>One time compensation will be paid for the temporary income loss as per the entitlements detailed out in the Entitlement Policy Framework; For identification of the affected persons, a census and socio-economic survey would be conducted based on which the Resettlement</p>






Environment, Social, Health and Safety Management Plan

Doc No:
10P153/KMDA/ESHSM/001

Revision Number: 00

Date: 22/11/2019

	<p>Inflow of Migrant labourers & workers expected during construction phase of the project</p>	<p>Potential conflict with local community; Health risks due to spread of communicable diseases and sexually transmitted diseases</p>	<p>Minor</p>	<p>Action Plan would be prepared.</p> <p>The contractor should ensure that construction work to take place during off-peak business hour and during the night to avoid major disruption</p> <p>During the laying of the rising main near the MPS, contractor should provide proper barricading during construction to ensure that temple is not impacted and accordingly provide safe access for people to visit the temple. A Temple management plan to be developed.</p> <p>Prior to the start of the construction, the shops owners should be made aware of the construction work</p> <p>Contractor during construction should ensure that structure near the RoW are not affected and excavation should be carried out to a possible extend to avoid any damages to residential and commercial structure.</p>
<p>Intra-state Migrant Workers &</p>				<p>Provide adequate facilities to the workers and labourers such as properly constructed and well ventilated labour camps, clean and hygienic sanitation facilities, cooking areas etc. to minimize the health related impacts; Separate toilet and bathing facilities for men</p>



WABAG

water people solutions for a better life.

Environment, Social, Health and Safety Management Plan

Doc No:

10P153/ KMDA/ESHSM/001

Revision Number: 00

Date: 22/11/2019

<p>Labourers</p>		<p>Issue of Sanitation and hygiene</p>		<p>and women; Creating awareness about local tradition and culture among outside migrant and encouraging respect for same; Conducting awareness programme about sexually transmitted diseases among the migrant workers, labourers and for community around project site; Proper disposal of wastes generated from the camp and construction activity to maintain general hygiene in the area;</p>
<p>Visual and Odour</p>	<p>Physical presence of the STP; Illumination from the STP facility. Operation and Storage of Sludge increasing the Odour</p>	<p>Visual and Odour</p>	<p>Minor</p>	<p>Appropriate shading of lights to prevent scattering Tree plantation and odour Monitoring</p>
<p>Surface and ground water quality</p>	<p>Oil spills from oil tanks</p>	<p>Impact on soil and ground water environment Contaminated storm water runoff carrying contaminants to Sea Water</p>	<p>Moderate</p>	<p>The secondary containment structures such as berms, dykes, or walls that could hold up to 110 % of the primary containment volume will be made of firm and impervious material at diesel and lubricating oil storage areas; SOPs will be prepared to manage any oil spills, leaks seepages. SOPs will cover transport, handling, storage, use and disposal of oil/ oil wastes/ empty drums etc. Operating personnel will be trained on the SOPs and monitored in their use on a daily basis; Empty drums will be sent for reuse or for recycling in line with CPCB guidelines;</p>





WABAG
Sustainable Solutions for a better life.

Environment, Social, Health and Safety Management Plan

Doc No:
10P153/KMDA/ESHMSP/001

Date: 22/11/2019

Revision Number: 00

<p>Surface and ground water quality</p>	<p>Oily water-runoff</p>	<p>Contaminated storm water runoff carrying contaminants to Bagjola and Udaypur Khal</p>	<p>Moderate</p>	<p>At all oil and diesel storage tank locations, emergency spill kits will be provided for the operating personnel to use. Operating personnel will be trained to use such kits and dispose of them as part of hazardous waste;</p>
<p>Surface and ground water quality</p>	<p>Spills of fuel, oil and chemicals</p>	<p>Impact on soil and ground water environment Occupational health and safety hazard Contaminated storm water runoff carrying contaminants to Howrah Drainage Channel</p>	<p>Minor</p>	<p>Oily water runoff collected in the oil handling & storage area and oil filled motors and pump bases will be collected in different sump and taken to a common oily waste water sump; The oily wastewater and storm runoff collected from specific areas mentioned above will be treated using an oil water separator; and Separated oil will be disposed of as part of oily wastes and handled as a hazardous waste stream. The treated de-oiled water will be transferred to waste water chamber</p> <p>Acids and other hazardous materials will be stored in a dedicated room as per their MSDS specifications with adequate ventilation; All chemicals will be stored in primary containers that have in-built secondary containment of capacity that is at least 110% of primary containment;</p> <p>The Spill prevention and response guidance presented in Sections 1.5 and 3.7 of the General</p>





Environment, Social, Health and Safety Management Plan

Doc No:
10P153/ KMDA/ESHSM/001
Date: 22/11/2019

Revision Number: 00

<p>Surface and ground water quality</p>	<p>Discharge of domestic wastewater</p>	<p>Impact on Sea Water and channel water quality</p>	<p>Minor</p>	<p>IFC EHS Guidelines (2006) will be followed and implemented.</p> <p>The sewage from the entire plant area will be collected and treated in septic tank/soak pit No untreated sewage will be directly discharged into Sea water or disposed of on land through the project life cycle;</p> <p>National and IFC Guidelines before discharge; and</p> <p>In order to monitor STP performance, continuous evaluation and monitoring of discharge parameters will be undertaken at the outlet point of STP.</p>
<p>Surface and ground water quality</p>	<p>Non-oily site or storm water runoff</p>	<p>Impact on Sea water quality</p>	<p>Minor</p>	<p>Storm water and non-oily surface run off will be collected separately and disposed into Sea through for this stream of wastewater;</p> <p>The discharge system will be periodically inspected for blockages and cleaned at least once before the monsoon season to ensure its functioning; and</p> <p>Operating personnel will be trained to visually inspect discharged water quality for oil and</p>





WABAG
Engineering Solutions for a better life.

Environment, Social, Health and Safety Management Plan

Doc No:
I0P153/KMDA/ESHSM/001

Date: 22/11/2019

Revision Number: 00

Air Quality	Stack emissions	Impact on ambient air quality GHG emissions	Negligible	grease traces (that will be visible on the surface) periodically and take appropriate corrective action. The Project will adopt Gas Turbine system for captive power generation which has a relatively high energy-efficiency and low polluting per unit of power produced compared to other thermal power plants; Comply with the Emission guidelines for Combustion engines in given by CPC. Monitor ambient air quality in and around the Project site as per the Environment Monitoring Program formulated for the Project which will comply with National Regulatory requirements.
Noise	Plant operations	Impact on health of workers and staff	Negligible	Noise monitoring along with health check-up on a regular interval
Noise	Plant operations	Impact on health of workers and staff	Negligible	All noise generating units would be acoustically enclosed; Use of rubber padding underneath high noise and vibration generating machines; Personnel working onsite in high noise generating areas will use ear plugs /ear muffs;





Environment, Social, Health and Safety Management Plan

Doc No:
10P153/ KMDA/ESHSM/001

Revision Number: 00

Date: 22/11/2019

<p>Community Health and Safety</p>	<p>Plant operations</p>	<p>Impact on community assets such as water due to water intake and cooking water discharge Increased vehicular traffic in the region</p>	<p>Minor</p>	<p>Comply with the Community health and safety guidelines presented in Section 3.0 of the General EHS Guidelines published by IFC; Formulate and implement an On-site Emergency Management Plan in consultation and collaboration with local government authorities to streamline the emergency management response and strategy.</p>
		<p>Exposure to site accidents and incidents Project Security</p>		<p>Institute and operate a Community Grievance Redress System in line with ADB SPS and IFC Performance Standard 4 that pertains to Community Health, Safety and Security aspects; and If required, Project Security personnel will be engaged and trained in line with the recommendations of IFC Performance Standard 4.</p>
<p>Occupational Health and Safety</p>	<p>Project Operation Phase</p>	<p>Risk of accident and fatality to worker</p>	<p>Minor</p>	<p>On job training for the workers shall be carried out; Work permit system shall be followed; PPEs to be provided and use of PPEs shall be encouraged; SOPs to be developed for operation and maintenance of the project site.</p>





Water & Power Solutions for a better life.

WABAG

Environment, Social, Health and Safety Management Plan

Doc No:
10PI53/ KMDA/ESHM/P/001

Date: 22/11/2019

Revision Number: 00

Community Health and Safety and other issues	Project Operation Phase	Traffic Movement in newly constructed site approach road	Minor	Awareness campaign among the community residing adjacent to the road Maintaining healthy relationship with community through CSR activity
Community Health and Safety and other issues	Project Operation Phase	Traffic Movement in newly constructed site approach road	Minor	Awareness campaign among the community residing adjacent to the road Maintaining healthy relationship with community through CSR activity



5.1 Hazard Identification and Assessment of Risk

Hazards and risks associated with the project (*including that are carried out by Sub-contractors / suppliers*) shall be identified and controlled.

Refer to **Annexure IV: HIRA Procedure & HIRA Document**

5.2 Aspect Impact

To manage Environment plans effectively a site specific aspect impact register will be maintained by the Safety engineer and it will be updated for the identified aspects and impacts for devising the controls that are to be required for mitigating those.

Refer to **Annexure V: Aspect Impact Document**

5.3 Job Safety Analysis

Job Safety Analysis are identified for each activity pertaining to the project execution, which is a control measure to eliminate any hazard. It is communicated to the Engineers and the workers, before start of any activity. A detailed procedure is available for the preparation of JSA.

Refer to **Annexure VI: JSA Procedure and Documents**

6.0 Site Activity Plan

A site activity plan including all the essential activities for the effective monitoring and implementation of the OHS system is devised.

The following activities has been considered in the plan:

- | | | |
|---|--|---|
| <input type="checkbox"/> Internal Audit | <input type="checkbox"/> Emergency response mock drill | <input type="checkbox"/> Client HSE meeting |
| <input type="checkbox"/> External Audit | <input type="checkbox"/> Update HIRA Register | <input type="checkbox"/> Review of ESHS Plan |
| <input type="checkbox"/> Client Audit | <input type="checkbox"/> Update JSA | <input type="checkbox"/> Vehicle Inspection |
| <input type="checkbox"/> Operational fitness | <input type="checkbox"/> Visitor Alert & Feedback | <input type="checkbox"/> Mass tool box talk |
| <input type="checkbox"/> Safety committee meeting | <input type="checkbox"/> Client walk through | <input type="checkbox"/> Job Specific Training |
| <input type="checkbox"/> Safety Walkthrough | <input type="checkbox"/> Labor camp Inspection | <input type="checkbox"/> Training on HSE Procedures |
| <input type="checkbox"/> Near miss meeting | <input type="checkbox"/> Pest Control | <input type="checkbox"/> Induction Training |
| <input type="checkbox"/> Tool Box Talk | <input type="checkbox"/> Medical Camp | <input type="checkbox"/> Evaluation of Legal compliance |

Refer Annexure VII: Site Activity Plan (Sample)





7.0 Social Management

7.1 Resources

Project Manager shall ensure that adequate resources are made available for provision & maintenance of safe workplace, including human & financial resources, equipment, expertise, technology and training.

- Timely mobilization of personnel / vehicle / equipment / materials, etc., planned for the project considering the progress of activities.
- Availability of communication, transport, office & training facilities, etc., to the concerned.
- Availability of signage, barricades, first aid boxes, fire extinguishers, etc., in adequate quantity.
- Ensure availability of the necessary HSE related equipment like PPE, Fire extinguishers etc. barricading material.

Resources are classified as:

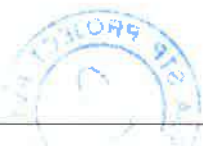
- 1) Human resource
- 2) Equipment, tools and machinery

7.1.1 Human Resource

The resources for the project are identified as per the job structure and the criticality of the activities which needs to be performed. The workmen are identified based on their experience and expertise and skill to perform the job in compliance to the safety requirements. Necessary infrastructure will be provided for their safe working.

Safety Engineer having exposure to the relevant activities and having the required competence will be deployed. They will be reporting to a Safety Manager who will be responsible for implementing the ESHS Plan.

The sub-contractor shall ensure that his staff and labor are all fully trained in and aware of good and safe working practices.



The sub-contractor shall maintain a register of the workmen indicating the following:

FORM XIII : REGISTER OF WORKMEN EMPLOYED BY CONTRACTOR

[Rule 75]

Name and address of contractor _____	Name and address of establishment in/under which contract is carried on. _____
Nature and location of work _____	Name and address of Principal Employer _____

Sl. No.	Name and surname of workman	Age and Sex	Father's/ Husband's name	Nature of Employment/ Designation	Permanent Home Address of workman (Village and Tehsil / Taluk and District)
1	2	3	4	5	6

Local Address	Date of commencement of employment	Signature or thumb-impression of workman	Date of termination of employment	Reasons for termination	Remarks
7	8	9	10	11	12

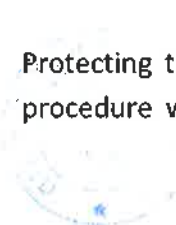
The categorization of workmen shall be as follows

- Skilled and Semi-skilled: Carpenters, Bar binders, Fitters, Scaffolders, Painters, Welders, Grinders, Electrician, Riggers
- Unskilled workers : Helpers

7.2 Consultation, Participation & Management of Workers

Participation and involvement of workers at site is crucial in ensuring the effective implementation of the OHS Management system. The workers have first-hand knowledge of the work being performed and may have suggestions that may help improve the process. They can also report issues that may endanger the lives or cause destruction of property.

Protecting the workers interests is vital as they are the implementers on field. Hence we have a procedure which addresses the feedback, suggestions and complaints given by the workers. This



procedures aims at instilling a sense of responsibility and accountability as well as safeguarding the interests of the workers.

The procedure has been detailed in the procedure, Consultation, participation, grievance redressal of workers. The forms for suggestions and grievances has also been attached.

The project team ensures the participation of the workers through various methods, and ensures they are made aware of the HSE Operational Processes and Procedures being implemented at site level. A platform is created for workers to communicate and resolve any issues related to Health and Safety.

Safety committee meetings are conducted on a monthly basis which will help to encourage workers participation in the identification of risks and mitigation of hazards.

Employees/workers shall be encouraged to raise their concerns / feedback, if any without fear of repercussions, through any of the following modes maintained in the project:

- ◆ Report to respective Supervisors
- ◆ Voice their opinion in HSE meetings.
- ◆ Discuss the issues with the Safety Engineer during the TBT/Awareness Sessions

Concerns / feedback / suggestions obtained as above shall be recorded in the Feedback Register maintained by HSE engineer.

Annexure I: Consultation, participation and grievance redressal procedure and formats

Annexure II: F-540-002 Worker Feedback form: QHSE Review

Annexure III: F-840-003 Worker Feedback form: Complaints and Improvement

The management of the workers and their facilities has been detailed in the Labour Influx and Workers' Camp Management Plan. This includes

1. Risk assessment and mitigation measures
2. Trainings and awareness programs required
3. Workers code of conduct
4. Labour camp health and hygiene
5. Feedback and complaint handling



Annexure XVI: Labour Influx and Workers' Camp Management Plan

7.2.1 Equipment, Tools and Machinery

A detailed list of the equipment, tools and machineries shall be maintained at the site level describing clearly:

- The name of the manufacturer,
- Date of installation and
- The last and due date of inspection
- Safe operating procedure provided by the manufacturer

The calibration report and third party testing certificates will be documented. Maintenance schedule will be prepared for the machines. Periodic inspection of the vehicles/equipment shall be carried out as per the legal requirements and shall be documented by the Safety Engineer.

7.2.2 Competence

All employees including sub-contractors shall possess minimum competence to perform their jobs without any harm to Health, Safety and Environment, which shall be ensured through proper assessment prior to deployment and by providing necessary ESHS trainings as per the contractual requirements. Personnel carrying out activities associated with hazards shall be aware of:

- Their roles & responsibilities in achieving conformity with HSE Policies, relevant procedures and other ESHS requirements.
- Hazards involved in their activities, their effects and the controls required.
- Potential consequences of deviating from the plan / procedures / safe work practices and the benefits of improved personal performance.
- Training schedule will be made to ensure that all employees are trained in their respective areas.
- Emergency response training and fire-fighting training will be imparted to all through mock drills.

HSE Manager in coordination with sub-contractor HSE Staff will organise the job specific ESHS Trainings. The competencies of the workers as per their activities will be mapped in a skill matrix and will be maintained at the site level.

The detailed document regarding training has been attached along with the plan.

Sample project training plan has also been attached

Refer Annexure VIII: Project Training Plan



Refer Annexure IX: Project HSE Training

7.2.3 Social Impact & Mitigation

The social impact is determined through the ESIA study and has been incorporated into the ESHS processes for the site. This has been done through socio-economic survey and focus group studies. The issues of the female community will be addressed through the necessary measures and economic freedom and development will be promoted.

Environmental and social impacts of the Project are anticipated during the decommissioning, construction and operation phase and will encompass changes in land-use, increased noise levels, changes in air quality, use and changes in water quality, occupational health & safety, displacement and resettlement etc. Most of these impacts are limited and localized. The location of the proposed project is mainly along roads and built-up area will not cause direct impact on terrestrial and aquatic biodiversity values. The potential adverse impacts that are associated with design, construction, and operation can be mitigated to standard levels without difficulty through proper engineering design and the incorporation or application of recommended mitigation measures and procedures.

The ESHSMP and EMP plans have developed mitigating measure for:

- Pollution prevention due to emission, noise, solid waste and effluent as per Statutory Norms
- Environmental Quality monitoring program
- Occupational Health & Safety mitigation measures
 - Medical Surveillance
 - Vaccinations
 - First aid
- Awareness building programs - team & community
- Monitoring and reporting mechanism for regulatory compliance as well as contractual requirements compliance.
- Training of the implementation team
- Labour welfare measures including sanitation facilities
- Health awareness & screening amongst the workers and the communities
- Prevent discrimination based on gender, race, religion etc.
- Grievance redressal mechanism

7.2.4 Awareness

Awareness regarding the OHS system will be created through the following ways:

- HSE Policy will be displayed at strategic locations



- Safety message from MD and CEO will be played at the beginning of Monthly HSE meetings.
- Induction trainings and job specific trainings will be conducted.
- Tool box talk will be conducted prior to the start of any activities.
- Mass tool box talk will be conducted every month.
- LTI alerts mailers will be shared, describing the root cause and the corrective and preventive actions taken.

7.2.5 Trainings

Training is very important in the education of the personnel which will help in creating a barrier of knowledge in preventing incidents. The understanding of the risks and consequences is vital in knowing why compliance is necessary. This awareness will be created in ensuring a safe working environment.

The trainings of all personnel involved in the project will be conducted. Different kinds of trainings will be provided depending on the competency and necessity. The detailed training plan is discussed in the document as attached with this plan.

A basic outline of the trainings for the construction:

1. Induction training
2. Tool box training
3. Awareness training
 - a. Health and hygiene
 - b. Communicable diseases
 - c. Sexually transmitted diseases: HIV AIDS
 - d. Heat stress prevention
 - e. Gender discrimination and harassment
 - f. Code of conduct
 - g. Sanitation hygiene
4. Job specific training
 - a. Work permit system
 - b. Work at height
 - c. Excavation
 - d. Electrical systems
 - e. Hot work
 - f. Confined space
 - g. Rotary equipment



- h. Safe lifting techniques
 - i. Chemical handling
 - j. Scaffolding
5. Environment
- a. Spill management
 - b. Waste management
 - c. Environmental aspects and impact
 - d. Water resource protection

The list is described in the annexure mentioned below.

Refer Annexure IX HSE Project Training

7.2.6 Communication

The communication, consultation & employee participation is done through meetings, training, newsletters, written instructions, display of posters, signboards, one-to-one discussions etc. These will be in varied languages that the employees understand (eg: Bengali, Hindi, English etc.).

However, English remains the formal language of all official communication and documentation.

Provision of signs and position of signs shall be subject to employer representative approval. Special attention will be given to areas that are hazardous.

All permanent workplaces shall have the means of communication (phone/radio) and a standby vehicle to drive to obtain assistance.

Participation and support of staff & employees will be encouraged in the identification of hazards, determination of controls, implementation of policies, standards, procedures, schemes & strategies for achieving the objectives.

Communication on ESHS matters will be done to the contractor workers as well, to inform them of any changes to the HSE Management system, new regulations or rules, or for feedback on existing processes.

7.2.7 External Communication

Co-ordination will be done regarding:

- Status of implementation of the HSE activities and programs as per the Project Activity Plan
- Information regarding incidents, environmental incidents and property damage.
- Report on the evaluation of compliance.

- MOM will be communicated after Client Safety Meetings, Safety Walk Through and Inspections
- Audit Plan, Audit Reports and Status of Closure of Non-compliance
- Client feedback, suggestions, complaints and action taken report
- Documents to be shared,
 - Monthly report
 - Incident report
 - Near miss report
 - Violation report
 - Safety committee MOM report
 - Safety walkthrough MOM report
 - Legal compliances on a monthly basis
 - Internal and external audit reports
 - Mock drill reports
 - Inspection Reports
 - Training reports

Communication will be maintained with the Sub-Contractor regarding:

- VA Tech Wabag HSE Policy
- VA Tech Wabag and Client Contractual HSE requirements
- Objectives and Goals of the project
- VA Tech Wabag HSE Procedures and documentation requirement
- MOM: Safety Meetings, Safety walk through and inspections
- Violation notice in case of non-compliance to ESHS Plan including stoppage of work

7.2.8 Internal Communication

The respective internal stakeholders will kept informed about the following:

- Status of implementation of the HSE activities and programs as per the Project Activity Plan
- Information regarding incidents, environmental incidents and property damage
- Report on the evaluation of safety and legal compliance
- MOM will be communicated after Client Safety Meetings, Safety walk through and inspections
- Audit Plan, Audit Reports and Status of Closure of Non compliance
- Client feedback, complaints and suggestions will be recorded and necessary actions will be taken

7.3 Documented Information

The following documents will be maintained at the site and will be available for internal and external audits and client verifications.

Sl.No	Document
1	HIRA/JSA Register
2	PPE Register
3	Daily report
4	Monthly report
5	Tool Box Talk report
6	Incident report (First aid, Form1 and Form 2)
7	Near Miss report
8	Violation report
9	Safety committee meeting MOM
10	Safety walkthrough MOM and Report
11	Client feedback/complaint
12	Best Practices followed at site
13	Legal compliance: Monthly basis
14	Non compliances and corrective action reports
15	External/Internal Training report 1. Induction Training records \\ 2. Mock drill records \\ 3. Job specific training \\ 4. Awareness Training 5. Daily and Mass Tool Box
16	QRM inputs - Management review reports
17	Internal and external audit reports
18	HSE index reports
19	Inspection Reports 1. Vehicular - Earth moving & Lifting 2. Machinery
20	Competency Matrix
21	Worker Feedback Form and complaint register
22	Visitor Feedback Register
23	Work Permits
24	List of machinery, third party inspection record, its calibration records
25	Housekeeping schedule and records
26	Pest control records
27	Emergency Response Plan
28	Site Specific ESHS Plan

29	Waste Disposal Log
30	Legal register
31	Environmental monitoring report
32	First aid register
33	Pest control records
34	Legal licenses
35	Security visitor register
36	Vehicle record register
37	Medical records

8.0 EHS Planning and Control Procedures

8.1 Operational Planning and Control Procedure

The operational control procedures are EHS guidelines and procedures which describe the mandatory processes which are to be followed to ensure safety execution of site activities.

The OCP describe the processes of important aspects such as

1. Safe working methods
2. Site management procedure
3. Incident and near miss reporting and investigation
4. Sub-contractor management
5. Environmental Impact mitigation
6. Waste Management
7. Storage of materials

The following are the Operational Control Procedures which are applicable to the construction operations:

Refer **Annexure X**: Operational Control Procedures

Note: Any specific operational procedures which are not identified will be prepared 15 days before start of the activity

Sl.No	Ref no	EHS Procedure
1	OCP-001	Operating and Maintenance of gas engine
2	OCP-002	Refurbishing sludge digester & Gas Holder
3	OCP-003	Safe working in confined space
4	OCP-004	Electrical Maintenance Works

- | | | |
|----|---------|--|
| 5 | OCP-005 | Handling of Chemicals and spill control |
| 6 | OCP-006 | Welding and Gas Cutting |
| 7 | OCP-007 | Material Lifting/Handling machines and tackles |
| 8 | OCP-008 | Safe erection and dismantling of Scaffolds |
| 9 | OCP-009 | Safe use of Ladders and Stairs |
| 10 | OCP-010 | Safe practices in Hydrostatic & Pneumatic Testing |
| 11 | OCP-011 | Compressor and Pneumatic tool handling |
| 12 | OCP-012 | On site stress relief treatment |
| 13 | OCP-013 | Lock out and Tag out (LOTO) for work on energized systems |
| 14 | OCP-014 | Controlled Blasting |
| 15 | OCP-015 | Emergency Response Plan |
| 16 | OCP-016 | Handling of Wastes includes -Annexure- A |
| 17 | OCP-017 | Control of Vehicular Pollution |
| 18 | OCP-018 | Safe working in, on, near water bodies |
| 19 | OCP-019 | Surface Preparation by blast cleaning and painting |
| 20 | OCP-020 | Safe Excavation |
| 21 | OCP-021 | Permit To Work |
| 22 | OCP-022 | Incident Reporting, Investigation and Correction |
| 23 | OCP-023 | Disciplinary Procedures |
| 24 | OCP-024 | HSE Contractual Agreement |
| 25 | OCP-025 | HSE Site Management Procedures |
| 26 | OCP-026 | Guidelines for good storage practices |

8.2 Job safety analysis

A **job safety analysis (JSA)** is a **procedure** which helps integrate accepted safety and health principles and practices into a particular task or job operation. In a **JSA**, each basic step of the job is to identify potential hazards and to recommend the safest way to do the job. This is a supporting document to the Operational control procedure. The JSA has been prepared for the following activities:

I Civil Works

- 1 Demolition work of digesters
- 2 Rock blasting
- 3 Excavation
- 4 Piling works
- 5 Shuttering/De-shuttering
- 6 Concreting
- 7 Scaffolding
- 8 Work at height
- 9 Pipe laying

II Mechanical Works

- 10 Bar bending and cutting
- 11 Lifting and shifting by cranes
- 12 Welding
- 13 Confined space entry

III Electrical Work

- 14 Cable laying, glanding and termination works

9.0 Environment Management

The protection and conservation of the environment is given highest priority in the works carried out by VA Tech Wabag. Being an environmentally conscious organization, VA Tech Wabag will organize and conduct its operations in a method so as to cause minimum damage to the environment. This includes protection of the soil, water and air from any pollutants such as noxious gases, chemical spills and effluent release. VA Tech Wabag will comply with all Local, National and International Environmental Laws, Rules and Regulations as applicable. Periodic evaluation of controls will be carried out to monitor the effectiveness. Effective utilization and storage of resources will be done to prevent wastage.

Environment related risks will be identified, evaluated and controlled to a level that is "As Low As Reasonably Practicable (ALARP)" in accordance with Hazards (Aspect) & Effects (Impact) Management Process as per ISO 14001: 2015.



Adequate level of environmental awareness will be imparted among the employees to ensure that work is carried out in a manner without causing harm to the environment and without any disturbances to the local community.

Before work commences, supervisors will brief their workers on those environmental issues that need to be taken into account when carrying out their duties.

Periodic inspections will be carried out during and at the completion of the work, to check that the job has been carried out in an environmentally acceptable manner and in accordance with the conditions in environmental permit issued for the project.

Detailed Environmental Management Plan has been submitted which describes the project specific environmental aspects, impacts and the mitigation.

9.1 Water resource protection and management

9.1.1 Water resource protection plan to prevent drinking water contamination

This is prepared for the water resource protection plan to conserve the natural resources and optimum use of resources and reduce the wastage of water and conserve the natural resources. Water conservation programs should be implemented commensurate with the magnitude and cost of water use. These programs should promote the continuous reduction in water consumption and achieve savings in the water pumping, treatment and disposal costs. Water conservation measures may include water monitoring/management techniques; process and cooling/heating water recycling, reuse, and other techniques; and sanitary water conservation techniques. Project construction activities in relation to water use can result in negative impacts upon the water environment and users. This ESHSM therefore:

- Outlines the key policies, legislation and standards relating to waste management;
- Defines roles and responsibilities;
- Outlines actions and measures necessary for the effective management of water resources;
- Covers both accidental and intended impacts on the water environment;
- Details specific control measures to be implemented by the Company and its contractors (and subcontractors);



- Incorporates the requirements of the Regulatory EIA findings, Supplemental Environmental Assessment (2019), international standards, legislation, Lenders requirements and Project-specific construction permits.
- Considers the Company's general approach to water management procedures and methodologies.

In doing so, this EHSSMP defines the actions and measures necessary for the overall management of water by the Project, in line with the applicable laws and other obligations.

General recommendations include:

- Storm/Rainwater harvesting and use
- Zero discharge design/Use of treated waste water to be included in project design processes
- Use of localized recirculation systems in plant/facility/shops (as opposed to centralized recirculation system), with provision only for makeup water
- Use of dry process technologies e.g. dry quenching
- Process water system pressure management
- Project design to have measures for adequate water collection, spill control and leakage control system

9.1.2 Water Monitoring and Management

- The essential elements of a water management program involve:
 - Identification, regular measurement, and recording of principal flows within a facility;
 - Definition and regular review of performance targets, which are adjusted to account for changes in major factors affecting water use (e.g. industrial production rate);
 - Regular comparison of water flows with performance targets to identify where action should be taken to reduce water use.
- Water measurement (metering) should emphasize areas of greatest water use. Based on review of metering data, 'unaccounted' use—indicating major leaks at industrial facilities—could be identified.



9.1.3 Management actions for water resource protection to prevent contamination of drinking water

A range of management actions (and other mitigation measures) are required to be implemented in respect of water management. The specific management actions and mitigation measures required for Contractors (and sub-contractors) are described in detail. These should incorporate Good International Industry Practices (GIIP) in relation to the discharge of water from excavations, prevention of silt pollution and reduction of pollution risk, including the following measures:

- Preventing water from entering excavations, by using cut-off ditches;
- Using pump sumps in excavations;
- Minimising the disturbance of standing water;
- Minimising the amount of time stripped ground and soil stockpiles are exposed;
- Only removing vegetation from the area that needs to be exposed in the near future;
- Managing stockpiles to avoid sediment run-off;
- Using geotextile silt fencing at the toe of the slope, to reduce the movement of silt;
- Collecting run-off in soak ways and allow suspended solids to settle before disposal;
- Diverting clean water away from the area of construction work in order to minimise the volume of contaminated water;
- Equipment and vehicle wheel washing to be carried out in a designated area of hard standing located away from any watercourse or surface water drain;
- Discharge of treated water to the environment with formal approval from the relevant regulator;
- Contaminated water tankered off site for authorised disposal.

Monitoring provisions for this Water Management have been developed through the process outlined in table

Objective	Approach
1: Risk Based	Monitoring programs to address material issues based on the use of the 'source-pathway-receptor' approach in the Environmental Impact Assessment. These are commensurate with: <ul style="list-style-type: none"> ☑ the scale and nature of the activity, ☑ the assessed potential level of impact (and uncertainty thereof), and ☑ the sensitivity of the local environment within the activity area of influence
2: Compliance Based	Additional monitoring programs to meet specific regulatory needs.

Mitigation Measures & Management Actions

Ref	Topic	Location	Requirement	Responsibility	Verification Process
WM 001	Water Management	All	All requirements in the Environmental Agreement in relation to water management must be met	Contractor	Cross check the requirements of the Environmental Agreement
WM 002	Water Management	All	Any relevant requirements in the Pollution Prevention CESMP associated with water management should be put in place.	Contractor	Cross check the requirements of the PPMF
WM 003	Traffic Access	All Watercourses	*The construction traffic will cross watercourses via existing bridges and existing roads.	Contractor	Visual Inspections
WM 004	Sensitive Areas	All Watercourses	Implement Special Method statements for construction and reinstatement at special/sensitive areas, in accordance with permits obtained from Romanian Waters, in locations identified in the Plan of Biodiversity in close contact with the water.	Contractor	Visual inspection against requirements of the method statements.
WM 005	Site Drainage	Construction sites	*Accomplish a drainage system around the site able to receive the rain water volumes, communicating with soakaways and silt and hydrocarbon traps.	Contractor	Visual Inspections
WM 006	Construction Activities	All Watercourses	Any construction activities not associated with water crossing points that have the potential to destabilize the watercourse (including	Contractor	Visual Inspections

			irrigation canals) banks will not be undertaken within 50m of a watercourse.		
WM 007	Construction Activities	All Watercourses	Demarcation and offsets for camp and storage locations and field activities will be at least 50m from watercourses where possible.	Contractor	Visual Inspections
WM 008	Standing Water	All sites	*Access roads, the working corridor, work sites, and pipe warehouses will be maintained to avoid the development of areas of standing water.	Contractor	Visual Inspections
WM 009	Water Consumption	All Sites	Water conservation initiatives will also be undertaken with the aim to limit the water consumption during the construction activities, like the water use for mitigation of dust suspension (e.g. by means of specific staff training to a rational use of water, commensurate with the actual needs)	Contractor	Records of water consumption
WM 010	Water Consumption	All Sites	Water conservation initiatives will be undertaken with the aim of limiting potable water consumption (e.g. by means of specific staff training to a rational use of water resource).	Contractor	Records of potable water consumption
WM 011	Pollution Prevention	All Sites	*All working areas to have appropriate ecological toilets to be emptied by authorized operators	Contractor	Visual Inspections. Audit of relevant paperwork for toilet waste

					collection and transfer
WM 012	Pollution Prevention	All Water bodies	Wastewater should be prevented from entering surface water bodies directly, unless prior assessment has determined it is safe or any necessary treatment has been undertaken	Contractor	Visual inspection, records of wastewater treatment
WM 013	Pollution Prevention	All Sites	Ensure contaminated water from dewatering or cement washing operations is treated prior to discharge, depending on the nature of the contaminants.	Contractor	Visual inspection, records of wastewater treatment
WM 014	Site Drainage	All Sites	*Create a series of small soakaways to reduce erosion and associated turbidity arising from surface water run-off in accordance with the requirements of the Environmental Agreement ⁴ . This states that they should be at approximately 30-50m intervals, up to 10m ² in area and a maximum depth of 30cm.	Contractor	Visual Inspections
WM 015	Pollution Prevention	All Sites	Domestic wastewater is to be separated from hazardous oily water discharges at all sites	Contractor	Visual inspections
WM 016	Pollution Prevention	All Sites	*Contractors will develop and implement an appropriate plan to prevent accidental water pollution based on the BRUA commitments requirements.	Contractor	Review and approval of Plan



WM 017	Flooding	All Sites	*Monitoring the meteorological bulletins meant to take the equipment outside the areas which could be flooded, in case of high waters	Contractor	Records of bulletins consulted.
WM 018	Wastewater Management	All Sites	*Wastewaters will be collected, stored and treated adequately (depending on the nature of the contaminants) to prevent any adverse impact on water quality	Contractor	Audit of records of wastewater collection, storage and treatment.
WM 019	Pollution Prevention	All Sites	*All equipment should be brought onto site in a perfect state of operation and having already undergone an oil change	Contractor	Visual Inspections and audit of equipment service records.

9.2 Air Pollution Control

9.2.1 Dust

The Project Manager and the Resident Construction Manager should identify the sources for the air pollution and take necessary action to mitigate them. Activities & areas with dust potential will be controlled through regular water spray, provision of suitable cover, selection of right equipment with mechanical filters / screens, suitable exhausts, as applicable. This includes earthmoving activities, movement of vehicles on graded roads, crushing, chipping, storage & transportation of construction debris, excavated soil, aggregates, etc.

9.2.2 Emissions from Equipment

The emission of CO, SO₂, NO_x, particulates and hydrocarbons from diesel powered equipment will be monitored and kept at as low a level as reasonably practicable. Periodical maintenance / inspection will be carried out on Vehicles/ Equipment/ Machineries as per schedule in order to ensure proper working conditions and to render exhaust emissions, inoffensive.



9.3 Noise Monitoring & Control

Resident Construction Manager will identify the potential sources of noise, which is to be measured on a monthly basis, to ensure that they are within the legal limits. The identified sources & the mitigation measures shall be discussed & agreed with the Project Manager.

9.4 Spillage Control

Spillage of hazardous liquids hydrocarbon products & chemicals at the point of storage, handling / transfer and transportation of such materials, vehicle / equipment operation, plant operations (Asphalt, Batching Plant, etc.), might have an effect on the soil / ground water.

This will be prevented by ensuring provision of secondary containment for storage of chemicals, drip trays to avoid soil contamination during fuel transfer and maintenance activities and proper maintenance of vehicle / equipment.

The detailed procedure is Operational control procedure OCP-005

9.5 Waste Management

Wastes that have the potential to cause harm to human health and the environment will be segregated and stored at the designated locations at site.


Waste material such as plastic, paper, cardboard etc., will be segregated and stored for disposal at the designated areas.

Waste disposal log will be maintained indicating the type & quantity of wastes disposed, including the mode of disposal.

The detailed procedure is Operational control procedure OCP-016

10.0 Occupational Health and Hygiene

- VA Tech Wabag shall be responsible for the providing health, hygiene and welfare facilities to the personnel.
 - Medical examinations for Height, Trench and confined space workers
 - Welfare of labor camps by ensuring hygienic living quarters.
 - Provide the highest quality of sanitary facilities to the labor camp
 - Conducting regular medical checkup for the contractor workers
- Good housekeeping will be maintained throughout the period of any work, both at work site and around any temporary building/store.
- The working area will be cleaned on a regular basis to ensure good housekeeping.

 <small>Sustainable solutions, for a better life.</small>	Environment, Social, Health and Safety Management Plan	Doc No: 10P153/ KMDA/ESHSM/001
	Revision Number: 00	Date: 22/11/2019

- Escape and other access ways will be kept clear, safety equipment kept accessible and surplus/scrap material will be removed daily.
- The welfare and the training of the construction workers has been discussed in detail in the Labor Influx and Workers' Camp Management plan. It describes the risks involved during works and in the living areas and the measures to mitigate them.

10.1 Workers Welfare Measures and Social Responsibilities

Potable water, Toilets, Latrines, Washing Facilities, and Wastewater Disposal

- Throughout the period of construction VA Tech Wabag will provide, maintain, and cleanse suitable and sufficient toilets, latrines and washing facilities for use by its employees and workmen
- After completion of the works, the temporary toilets, latrines, washing facilities, septic tanks, and soak pits shall be removed, all ground disinfected and the surface restored to its original condition.
- Welfare facilities such as access to drinking water within easy reach, sheds for rest / lunch breaks, toilets in sufficient numbers in well-lit at easily accessible locations shall be made available at all times for male and female employees and workers.
- Workers will not be permitted to eat food at workplaces other than the designated shed / cabins to prevent attracting vermin and ingestion of contaminated food.
- On site updated First aid kit, trained first aiders, emergency response vehicle will be provided.
- The facilities will be kept clean and well maintained.

10.2 Camp Facilities

If a labor camp is provided, all the necessary services and compliance to local regulations will be maintained. These include the mandatory legal requirements mentioned in the BOCW Act. Basic facilities include:

- The inspection of camp will be done to ensure proper hygiene and housekeeping.
- Proper lighting will be provided in all camp areas
- Grass cutting will be done to ensure pest problems
- Proper sanitary facilities will be provided along with running water.
- Safe drinking water will be made available.
- Pest control will be carried out at a pre-decided frequency.
- Timely spraying of insecticide will be done to prevent spread of communicable diseases in the site.
- Emergency contact details will be displayed.



The detailed description of the camp and facilities are described in the Labour Influx and Workers' management plan.

Reference Annexure XVI: Labour influx and worker management plan

11.0 Operational Safety Requirements – Mandatory Compliance

11.1 Health and Safety Procedures

The Operational Control procedures, referenced in Section 8.1 describe the safe working procedures for construction activities; such as

- OCP-003 Safe working in confined spaces
- OCP-006 Welding and Gas cutting
- OCP-008 Safe erection and dismantling of scaffolds
- OCP-007 Material lifting and Handling machines and tackles
- OCP-009 Safe use of ladders and stairs
- OCP-011 Compressor and pneumatic tool handling
- OCP-013 Lock Out and Tag Out for work on energised systems
- OCP-014 Controlled Blasting
- OCP-016 Handling of wastes
- OCP-018 Safe working in, on or near water bodies
- OCP-019 Surface preparation by blast cleaning and painting
- OCP-020 Safe excavation
- OCP-025 Site HSE Management procedures
- OCP-026 Good material storage practices

The procedures contain:

- Purpose
- Scope
- Responsibility
- Potential hazards
- Legal Requirements



- Safe working procedure (Preparation and During work)
- Training and awareness requirements

11.2 PPE

The PPE Mandatory requirements are given in the PPE Matrix

Work Description/PPEs	Safety Helmet	Safety Shoes/Gumboots	Safety Goggles	Reflective Vest	Apron	Ear Plug	Dust / Respiratory Mask	Full body harness - double lanyard	Fall Arrestor	Life line	Welding face shield	Grinding goggles	Cotton Gloves	Rubber/Leather gloves
General work	√	√		√		√	√							
Welding/Gas cutting	√	√	√		√		√				√			√
Grinding and chipping	√	√	√	√	√	√	√					√		√
Confined space	√	√	√	√				√					√	
Working at height	√	√	√	√				√	√	√			√	
Erection (Structures / Equipment etc)	√	√	√	√			√						√	
Excavation /Trenching	√	√	√	√			√	√	√					
Foundation /Concreting	√	√	√	√		√	√							√
Paint Manual/Spray	√	√	√	√	√		√							√
Road Works	√	√	√	√										√
Electrical work	√	√	√	√										√
Site office employee		√												

The details of the PPE standards and usage are detailed in the attachment, Personal protective equipment.

Refer *Annexure XI*: Personal protective equipment

11.3 Lighting

Lighting will be arranged on site in a static formation, where lamps are fixed to support poles, masts or items such as scaffolding and tower cranes, or, it will be arranged locally, as and where work is progressing, by the use of moveable supports or being hand-held with trailing leads.

Walkways will be sufficiently illuminated to reduce slip/trip hazard. To illuminate general working areas, overhead lighting can be suspended from grids at regular spacing.

The arrangement must be such that visual intrusion and light spillage are kept to a minimum, particularly in close proximity to residential properties and busy roads where it may cause nuisance or distraction. Where necessary, lighting should be provided to site boundaries to ensure the safety of passing pedestrians.

11.4 Safety Committee and Near Miss Committee

Safety Committee and near miss committee will be formed after site mobilization. The meetings shall be held every month and will be chaired by site Resident Construction Manager.

- Responsibility of safety committee:
 - Discuss client complaints and feedback
 - Review of previous MOM and its compliance
 - NCR and observations review
 - First aid cases/Reportable injuries
 - Planning future jobs ahead and specific requirements
 - Sub-contractor performance
 - Need for training, resources, PPE.
 - Observation of HSE committee during safety walks and resolution
 - Any new ESHS Initiatives and programs
- Responsibility of near miss committee:
 - The near miss committee shall comprise of supervisors, skilled and unskilled labors and engineers from all work areas.
 - The committee is to encourage reporting of near miss by all workers, by communicating the importance of near miss.
 - The near miss reported is to be communicated to all site employees along with the corrective actions.
- Site Safety Engineer shall have a record of near miss which will be discussed as a part of monthly and quarterly meetings.

11.5 Tool box talk & Awareness Sessions

It is essential that adequate awareness be imparted among the employees, workers (including subcontractors) to ensure that work is carried out in a safe, healthy & environmental friendly manner.

- Tool box talks will be given to the workers everyday about 10-15 minute prior to commencement of the job.
- Before work commences supervisors / crew leaders shall brief their workers on the hazards involved in the activity / task concerned & contents of relevant method statements, in the toolbox talks and carry out periodic inspections to verify that the job is being carried out in an acceptable manner
- Mass tool box talks shall be given by Project Manager/Resident Construction Manager to reinforce a management commitment to Health and Safety.
- The daily tool box meeting will be held in small groups of not more than 20 people and where possible, divided by skill. The responsible area Supervisor of VA Tech Wabag/Sub-contractor will conduct these meetings.
- The respective site execution team member will be present during TBT and will ensure all job specific hazards and controls are communicated.
- TBT will be used for communicating lessons learnt from incidents that occur at other sites.
- TBT Guidebook will be provided for reference on the topics that are to be covered.

Refer Annexure XII: Tool Box Talk Manual

11.5.1 Awareness Sessions for High Risk Activities

The safety engineer in co-ordination with the RCM and Sub-contractor identifies the high risk activities and prepares a schedule for conducting awareness sessions. This session specifically addresses the contents of method statement established, roles and responsibilities, hazards involved & the controls to be implemented including the emergency response plans. Documented information will be maintained.

11.5.2 Awareness building for positive EHS culture

Proactive interventions to stop unsafe practices and to recognize good ESHS practices will be promoted during site visits / inspections & safety committee meetings. The employees are responsible for the safety of themselves, their co-workers, the sub-contractors and labours.

The employees shall be encouraged to intervene when any unsafe practice / condition is encountered. The rewards and recognition will be identified for the showing exemplary commitment. Stop work policy of the project will be displayed at all prominent locations of the project and all are empowered to 'Stop work' and rectify the same.



11.6 Traffic management plan

11.6.1.1 Purpose

The Traffic Management Plan describes procedures and protocols for site access, traffic routing and management, and company policy with respect to vehicle and employee transportation during the KMDA Design, construction and operation maintenance & minimizing the risk of any disturbance to local and visitor people around the project area during the construction and commissioning. TMP provides a consistent framework for assessing and controlling health and safety risks associated with road transport activities.

11.6.1.2 Scope

This Traffic Management Plan applies to project staff, any Contractor, subcontractor or supplier supporting the Company contract.

Ensure that the effective traffic management system is implemented and reviewed to reflect the requirements of the Project. The Project Manager along with Construction Manager and H&S Engineer and subcontractor personnel shall be responsible for monitoring and implementing the 'Traffic Management Plan', and all team members for the Project are responsible collectively for the effective operation of the traffic management system.

11.6.1.3 Documentation requirements

The list of documents required to be submitted to site office is as follows:

- (i) RC (Registration Certificate) Book copy
- (ii) Driving license
- (iii) Insurance documents,
- (iv) Pollution Under Control (PUC) Certificate
- (v) ID proof of driver

11.6.1.4 Common road transport hazards

Common road transport hazards can result from problems with the driver, the vehicle or the external environment. Some common hazards associated with land transport are detailed below. These will be considered during the hazard identification and risk assessment.

Human behaviour is a primary cause in most vehicle incidents. Incidents can occur because the driver may be:

- Untrained for the type of vehicle driven.
- Unaware of risks.
- Without defensive driving skills.



- Not medically fit.
- Under the influence of medication or substance abuse.
- Suffering from stress.
- Lacking in attention.
- Fatigued.
- Lacking judgement or experience.
- Not using safety devices (e.g. seat belt).
- Lacking in knowledge of cargo.
- Impaired visibility (e.g. glare, obstructions or dirty windscreen);

The hazards associated with vehicles include:

- Inadequate selection criteria.
- Poor design/specification.
- Lack of specific safety features (e.g. side and rear guard protection, rear view mirrors, Horn etc).
- Inadequate maintenance (e.g. defective or worn tyres).

11.6.1.5 Risk reduction measures

Flagman

- To avoid collision between construction vehicle and traffic; Flagmen with flags will be used at the exit/entry points of working stretch. The flags for signaling will be 0.60 m x 0.60 m size, made of a good red cloth and securely fastened to a staff of approximately 1m in length.

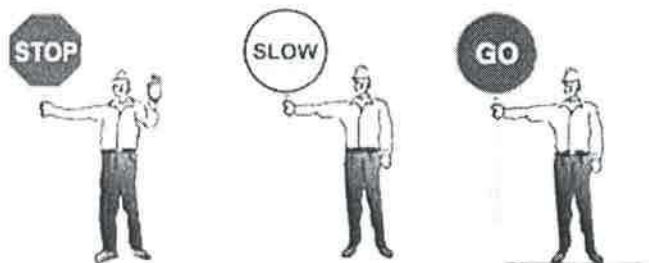


Fig 1 Flagman with signage Board



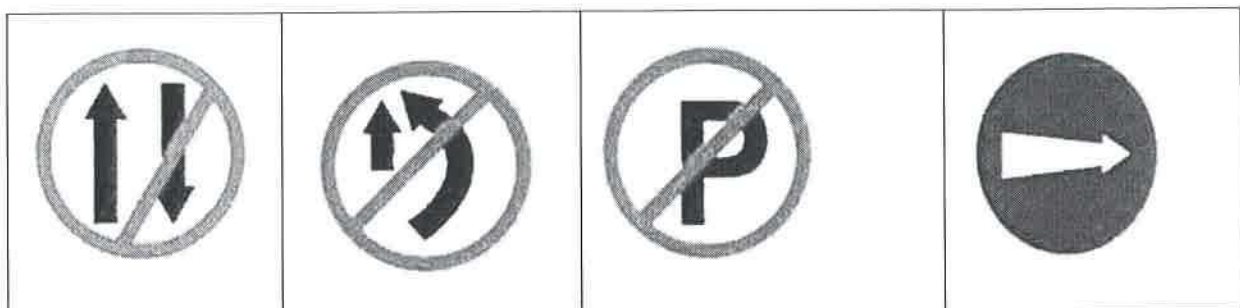
- Flag man need to maintain the flow of traffic continuous past a work zone at relatively reduced speeds by suitably regulating the traffic. He shall stop the traffic for a short while whenever required (e.g. for entry and exit of construction equipment in to work zone).
- Flag man should be positioned in a place where he is clearly visible to approaching traffic and at a sufficient distance to enable the drivers to respond for his flagging instructions. A flag man never leaves his post until properly relieved.
- The standard distance shall be maintained at 60 – 100 m but can be altered depending upon the approach speed and site conditions. In urban areas this distance shall be taken as 20 m to 50 m.

Standard signals

Standard Signals to be given by Flag man are depicted in the Fig 1. They should undergo special task training program through safety department. The construction and maintenance of signage's fall into the three major categories such as regulatory, mandatory Signage. Some other signboards will also be used to regulate the traffic, which have not been standardized. However they confirm with the general requirement of shape and colour, and their message is brief, legible and clearly understandable, i.e., "CAUTION- Men and Machinery at work Go Slow", "CAUTION- Work in Progress Go Slow" etc.

The location, frequency and type of signboards will be governed by the kind of traffic situations arising during the construction. Signboards of 'men at work' and 'speed limit' will be provided at locations wherever required on a case-to-case base

Sample Signage to be used in site are as follows:





11.6.1.6 Designated Pathways for Pedestrians / Vehicle movement

Pedestrian pathways shall be demarcated and should be separated from vehicle movement area.

- Pedestrian pathways shall be identified by signage boards and retro reflection stickers to caution the vehicle drivers.
- Adequate illumination should be ensured in the pedestrian pathways
- Providing of concave mirrors on curves and turnings.

Speed Reducing barriers / Zigzag barriers:

- Speed limit 20 km / hr. shall be achieved by providing speed reducing barriers / Zigzag barriers, in areas where critical activities such as erection & other construction activities are planned.
- Trained signal man should be provided

11.6.1.7 Vehicle parking, reversing and Traffic marshals

- Designated parking areas for busses and construction equipment shall be arranged.

- Safety inspection for the construction equipment shall be performed at this area before being permitted to work place.
 - Functioning of reverse horn should be inspected on daily basis
 - No vehicle shall be reversed without signal man / banksman.
 - Wheel choke blocks / wedge blocks shall be provided for parked vehicles, to avoid idle movement of vehicle.
 - Vehicle reversing signage's shall be provided in area, where vehicle reversing is very prominent, such as Batching plant area, dumping yard & storage area
 - Traffic marshals shall be provided in the area, where site and public vehicle interference is found
 - Suitable traffic controlling materials such as Baton lights, Red flag, Green flag and whistle shall be provided for the traffic marshals
 - Multi mirror arrangement shall be provided at the operator cabin for better rear view during vehicle operation

11.6.1.8 Driver Training and Testing

Induction training

- In order to minimise risks, it is important to provide induction training, supervision by site supervisors and continuous assessment.
- All newly appointed drivers will attend a driving induction course before being allowed to drive on company business. The course should be specific to the job requirement and should include:
 - Main features of the company Land Transport HSE Management System, highlighting key policies, rules and procedures.
 - Local culture and attitude to driving and how this affects the driving environment.
 - Vehicle and driver documentation requirements.
 - Indian traffic regulations, traffic signs and markings;
 - Local accident block spots (areas where frequent accidents have occurred) ;
 - The risks of driving and common causes of incidents.
 - Journey management including maximum driving and duty hours and formal rest periods.
 - Defensive driving techniques.
 - The effects of medication and substance abuse.
 - Vehicle design, specification and condition.
 - The benefits of vehicle safety features such as seat belts.

- Responsibility for care, cleanliness, inspection and maintenance of vehicles and associated equipment.
- Appropriate product or cargo knowledge.
- When, where and how to use personal protective equipment.
- Emergency procedures including product and cargo characteristics.
- Essential elements of incident reporting.
- Refresher training will be provided at regular intervals. The frequency of refresher training should be set so as to maintain optimum driver HSE performance, but will be more often than once in three years.

11.6.1.9 Roles and responsibilities

Driver

1. Drivers shall never drink alcohol and drive. Drinking alcohol and driving is strictly forbidden at all times.
2. Strict disciplinary action will be taken against any violators, violation of this procedure may include termination.
3. Drivers shall never drive when feeling sleepy.
4. Drivers shall never use mobile phones when driving. If the use of a mobile phone is urgently needed, it is required that the operator stop the vehicle and then make / answer a call.
5. Drivers shall never eat when operating a vehicle, it increases the chances of distraction and thus increases the chance of accidents.
6. No one is allowed to smoke when operating a vehicle. It is required not to smoke while operating a vehicle as it is a major distraction, and tobacco smoke contains high amounts of carbon monoxide, which causes dizziness and relaxation causing the operator to lose concentration, increasing the probability of an accident.
7. Driver will comply with all site and Indian traffic rules.
8. Drivers will immediately report any incident/accident involving a motor vehicle to their supervisor.
9. In the case where wildlife is involved it is required that at no time the driver is allowed to step out of the vehicle when in the situation where a wild animal is in the vicinity.

Passenger

1. Passengers when in seat of a vehicle are required to wear their seat belts at all times.
2. Passengers shall not be transported in the rear of pickups or on truck beds, if they are, the trucks or pickups should be provided with proper seats or benches.



3. Drivers should not transport more passengers than the number of seat belts provided in the vehicle.
4. Passengers shall not ride unauthorized Company vehicles.
5. Passengers have full authority to report transport with damage seat belts.
6. Passengers may refuse to ride with a driver who refuses to wear his seat belt.

11.6.1.10 Emergency response

Emergency plans will be based on events and situations identified in land transport risk assessments and will typically include provisions for:

- Driver lost in hostile environment.
- Vehicle stolen.
- ~~Vehicle off the road.~~
- Overtaken vehicle.
- Vehicle fire/explosion in all likely situations (e.g. urban,)
- Collisions involving fatality including multiple fatalities.
- Loss of load or cargo.
- Trailer incidents, such as trailer detachment.
- Leaking hazardous cargo or hazardous chemical incident.
- Cargo or load fire, tyre fire.
- Pollution (water, land or air) incident.

Responses will be documented for each event where a significant risk has been assessed.

Measures should include:

- Emphasizing safety aspects among drivers
- Improving driving skills and requiring licensing of drivers
- Adopting limits for trip duration and arranging driver rosters to avoid overtiredness
- Avoiding dangerous routes and times of day to reduce the risk of accidents
- Use of speed control devices (governors) on trucks, and remote monitoring of driver actions
- Regular maintenance of vehicles and use of manufacturer approved parts to minimize potentially serious accidents caused by equipment malfunction or premature failure.

Where the project may contribute to a significant increase in traffic along existing roads, or where road transport is a significant component of a project, recommended measures include:

- Minimizing pedestrian interaction with construction vehicles
- Collaboration with local communities and responsible authorities to improve signage, visibility and overall safety of roads, particularly along stretches located near schools or other locations where children may be present. Collaborating with local communities on education about traffic and pedestrian safety. Coordination with emergency responders to ensure that appropriate first aid is provided in the event of accidents.
- Using locally sourced materials, whenever possible, to minimize transport distances. Locating associated facilities such as worker camps close to project sites and arranging worker bus transport to minimizing external traffic.

11.6.1.11 Safe Loading and Unloading

The loading and unloading of plant and equipment on site is a high risk activity. To minimize the risk of an accident or injury the following should be put in place. Before loading the vehicle, consideration should be given to how the vehicle will be unloaded later, the positioning of the materials, plant or equipment etc.

The following are some of the key items needed to be considered for any loading / unloading process:

- Deliveries will be timed to avoid the busiest rush hour periods whenever practicable.
- Risk assessment and control measures to be put in place to address / reduce the risk.
- Safe access onto the vehicle body or onto the load to unload the lorry.
- The load needs to be stacked / loaded in a manner that will allow a safe means) of unloading. The receiver of the delivery needs to be aware of the resources to be in place to unload the vehicle.
- All drivers when collecting and after loading the particular machine, piece of plant or any other type of load need to ensure the load is secured and any restraints that are required to be in place are in place even where the vehicle is moving a short distance.
- When an enclosed delivery vehicle arrives at the site the driver must exercise due caution and care when the driver is opening any curtains etc as parts of the load may have moved or been dislodged during transport.
- When arriving on the site, all delivery drivers are to report to the site security guard or report to the Site Office
- Ensure that any load on your vehicle is well secured also that your vehicle is not overloaded or loaded in such a way as to affect the handling of the vehicle.

- When providing vehicles for use on site, ask for information of site hazards and instruct drivers accordingly, e.g. excavations open, overhead cables, blasting operations, etc.
- Ensure drivers are provided with any necessary safety equipment Ensure before reversing that there are no obstructions or people behind the vehicle. Preferably keep a Banksman when reverse.
- Ensure that when reversing or driving towards an edge that a suitable stop has been provided to prevent the vehicle going over the edge.
- Ensure that having tipped the load, the vehicle does not travel forward until the tipper body has returned to the travelling position. This is particularly important on sites with overhead services, or uneven ground.
- The operator of any crane, pipe layer, backhoe, or any other lifting device is prohibited from bringing the boom or any part of the machine or load within the arc zone of high voltage lines.
- Adhere Government regulations for safe working distances.
- Seat belts, where supplied by Manufacturer shall be maintained and worn at all times.
- The use of seat belts by all occupants of cars, vans, Busses and goods vehicles is mandatory. Belts will be of the lap/sash configuration.
- All heavy equipment shall be equipped with an operational back up alarm.
- Drivers of load carrying vehicles have to be properly trained in load securing, and ensure at all times that loads are properly secured before starting on a movement to or in the project site.
- Adequate signage should be provided to indicate diversionary routes
- Provide appropriate public safety and traffic warning signs of activities.
- Ensure safe pedestrian access to businesses/ facilities affected by the pipeline route. Temporary protected pedestrian crossing to be installed.
- Temporary access routes should be identified in consultation with the affected Community.
- Speed limits shall be enforced for project vehicles

11.6.1.12 Excavation and sewer laying over public roads

- Informing the Public: Portable Variable Message Signs will be installed at each end of the Project & public area, prior to any changed traffic conditions due to construction activity. These will be used to inform the public where any road changes as a result of the construction works.
- While trenching care shall be taken to ensure that all underground structures and utilities are disturbed to the minimum. Trenching shall be made with sufficient slopes on sides in order to minimize collapsing of the trench.

- Worker will not be allowed down into an excavation of depth more than 2.5 until an inspection has been carried out and recorded by a competent supervisor who will complete a checklist for excavation support.
- Regular inspection of excavation supports will be carried out daily before workers enter excavation.
- The area of excavation shall be properly lighted and barricaded during the night.
- Barriers should be put in place for deep excavations in populated areas.
- Provide free passage and access to all parts of the project and at all times to authorized representatives from the Municipalities.
- Ensure work area is clearly defined and off limits to the public.
- Maintain condition of public roads to satisfactory safety levels.
- All complaints involving vehicle movements relating to construction activity will be logged and responded to as soon as practicable.
- All ongoing works – in particular exposed manholes, street-related activities, open excavations, etc – must be protected with barriers and identified with warning signs.
- Construction activity should not present an undue risk to members of the public, especially to children. Suitable fencing must be used to secure sites.
- Particularly on street-side works, adequately designed and constructed hoardings should be erected to secure the site work.
- Arrangements must be put in place to ensure that normal pedestrian and public vehicular traffic are not put at undue risk as a result of any changes made.
- Vehicular speeds must be controlled when passing through or in the vicinity of roadwork activities. Speed signs advising drivers of permitted speeds must be erected and displayed appropriately.
- Before road works or road-related activity is undertaken, traffic-control signs must be erected. These should alert the public to the works ahead and to any change of road layout or diversions. The signage work (erecting a single movable sign, constructing a base and installing, commissioning of large signs, etc) must be carefully planned.
- Operators must possess the appropriate training certification as prescribed in the Construction Regulations. The machine must be set up safely when digging: the hand parking brake must be engaged, direction levers must be in neutral, front bucket lowered, machine level, stabilizers dropped appropriately to the ground and all wheels must be off the ground.
- Where the operator's visibility is restricted appropriate auxiliary devices, which may include convex mirrors, flashing beacon and reversing alarm, must be fitted.

- **VEHICLE RECOVERY:** If any vehicle gets into difficulty on site, back actors, excavator booms, lifting arms, etc, should not be used to pull the vehicle free (unless this might prevent injury or death). Only appropriate plant should be used to rescue vehicles, and it should be done from an approved towing point.
- **EXCLUSIVE ZONE:** As a general rule, persons should not be working within the working radius of an excavator boom. People should be kept a safe distance away from working plant and barriers should be used where possible.
- Back filling is the re-instatement and making safe of the excavation. It must be carried out immediately after the support systems are removed. Stop blocks should be used to alert drivers of vehicles (dumpers, lorries, teleporters, etc.) when they are approaching the side of the excavation.
- Enough working space will be left to make sure that the movement and operation of the plant (e.g. swinging of jibs and excavator arms) is clear of passing traffic and is not encroaching into the safety zone.
- The trenches/ pits shall not be kept open in night times. However in case the same is essential the same shall be properly barricaded with proper lighting arrangements & manned. Proper lighting arrangements for illuminating these signs will be made during the night hours
- Reflective paints/sheets will therefore be used for the signs/barricaded so that these are visible at all times.
- The Contractor shall at his own cost, support and protect all buildings, walls, fences or other structures and all utilities e.g. Electrical cables, Telephone Cables, Water pipelines, Sewer pipelines etc., and property which may, unless so protected, be damaged as a result of the execution of the works. He shall also comply with the requirements in the specification relating to protective measures applicable to particular operations or kind of work Special care shall be taken while laying Pipelines near the trees.
- **OPEN HOLES:** All ground openings, manhole openings, etc, as soon as they are created, must be guarded to prevent falls. Usually the opening is surrounded with visible guard rails and toe-boards that are anchored and fixed securely.
- Where openings are covered, the covers (e.g. manhole covers) must be of adequate strength and size and be firmly fixed in position. These covers may also identify what they are covering (e.g. a floor opening) so they will not be inadvertently removed. Excavated openings should be backfilled as soon as possible.
- Warning signboards must be used across the site to alert workers or others when they are approaching high-risk areas (e.g. exclusion zones, leading edges and openings). Supplementary signboards should also be used to convey safety information (e.g. deep excavation). Signs must be placed at an appropriate location.

11.7 Permit to work

To ensure that appropriate controls are rigidly adhered to when high-risk activities (e.g. entering confined spaces, working at heights) is being carried out, a permit-to-work system will be implemented. This ensures that works do not begin until all the safety and environmental controls are in place, and signed off.

Permit to work will be issued for following activities.

- Hot Work
- Blasting/Demolition
- Excavation
- Confined Space
- Working at night
- Electrical Work / Machinery - Lock Out Tag Out(LOTO)
- Working at height
- Other activities which project management considers as high potential

The permit is to be closed or extended after the approved time validity of the permit. For both, re-inspection of the control measures and work area is to be done before approval. The detailed procedure for reference is **OCP- 021 Permit to Work**.

11.8 Fire prevention

The fire hazards in the site premises will be understood and communicated to all the personnel through trainings. They will be educated on the safe and unsafe practices that can result in a fire incident. The emergency response plan for fire incidents will be communicated to make the employees aware of what they are to do in case a fire breaks out.

Fire-fighting training and mock drills will be conducted and the effectiveness of performance will be evaluated and then improved through technical and awareness trainings.

The emergency response procedure is detailed in OCP 015, which will be strictly adhered to.

11.9 Barricade

Barricading will be provided to all open areas, during excavation, pipe laying and to cordon off dangerous areas. The type of barricades will depend upon the degree of risk, and in no case shall an open trench, excavation, pit or dangerous, hazardous or storage area be kept without protection.

- An indicative barricade will be 1.5 meters from the edge of the excavation or opening.



- Barricades, in areas with night traffic by vehicles or people will be lighted with warning flashers every 50 meters.
- Sign boards/ warning tapes: Protective Barricades will be made of GI pipe, sheet metal, wooden beams.
- Indicative Barricades will be made of fluorescent tape, cable or rope with signs.
- Caution boards and warning flags will be suitably placed.

The following are some of the potential workplace dangers requiring barricades:

- Confined spaces
- Moving Machinery
- Excavations
- Swing Area of Crane or Track Hoe
- Working at Elevations
- Restricted Areas Due to Fire/Explosion Potential
- Process Equipment, Vessels, and Lines when Exposed to Vehicle Traffic
- Hazardous area
- Rail /road uploading spot
- Open pits

11.10 Signage

The signage will be displayed at all critical locations to visually communicate to the workers, the hazards and risks of the work activities. All signs will be in the English language and local language. Signage will be maintained in fit & good condition at all times and adjusted to suit the work progress. General Signboards include:

<ul style="list-style-type: none"> ○ Project Signboard ○ Speed Limits ○ Wear Seat Belts ○ No Smoking ○ No flames or heat sources ○ Electrical Safety Warning ○ Lifting in Progress – Keep Away ○ Slow Down – Construction Area 	<ul style="list-style-type: none"> ○ Assembly Point ○ Confined Space ○ First Aid ○ Vehicle Parking Area ○ Waste Disposal Only in Designated Areas ○ Be Cautious of Vehicle / Equipment Movements ○ Visitors – Please Report to Site Office ○ Construction Area – Unauthorized Entry Prohibited
--	--

- | | |
|---|--|
| <ul style="list-style-type: none"> ○ Wear PPE (Helmet, Safety Shoes, Safety Goggles, Ear Plugs / Muffs, Harness Face Mask, Vest, as applicable) ○ Deep Excavation – Keep Away | <ul style="list-style-type: none"> ○ Work at Height – Keep Away ○ Emergency Exit, etc. |
|---|--|

11.10.1 Boundary Marking and Protection Strategy

11.10.1.1 Offsite risk management

The risks associated with the construction activities are as critical for works carried inside the project premises as the public places. Hence for all offsite activities precautions will be taken to ensure that the public safety is taken into consideration.

This also includes the environmental impact of the offsite activities, such as waste management, impact on ground water etc. The safety and environmental risks have been separately identified and mitigation measures have been developed for implementation. The damage to the environment can be reduced by following the measures mentioned in the Environmental management Plan.

All construction activities have been assessed for the risks that it will pose to the nearby communities and environment. All measures will be taken to communicate, educate and implement the ESHS precautions for minimizing the damage to the public and the environment. The details of this risks have been discussed in the EIA report.

During pipeline laying or sewer work in public areas, the safety of the passerby will be ensured through strict implementation of the traffic management rules, excavation procedures, permit system, trainings, signage, barrication etc. Appropriate warning systems will be in place to alert the passerby of the hazards.

11.10.1.2 Security

The Resident Construction Manager is responsible for ensuring the security of all personnel at the site. The Site Safety Engineer will ensure that the requirements mentioned and as per contract are fulfilled and measure its effectiveness.

Training

The Safety Engineer will conduct training programs relevant for Security personnel at the time of induction.

This will include:

The training program should cover at least the following:

- 1) Layout of the site
- 2) Vulnerable locations
- 3) Safety regulations (Statutory and in company)
- 4) Fire Protection Facilities and Locations
- 5) Role in case of Fire / Disaster / Emergencies
- 6) Emergency Procedure and Mock Drills
- 7) Industrial First Aid
- 8) Use of Personnel Protective Equipment
- 9) Disaster Management Plan

The work premises shall be protected from unauthorised access / entry / exit of personnel / vehicles / equipment / material, etc. All Security processes and policies of the Client will be strictly adhered to.

Security personnel

The nature and responsibilities of the work will also include any specific site requirement from the Client side.

The security will have the following responsibility:

1. Inspection of vehicles and material entering the site and maintaining record
2. Inspection of all persons entering the site premises and maintaining records
3. Assisting in fire-fighting and emergency response
4. Ensuring no illegal substances are brought into the site
5. Ensuring that site related items are not taken out without proper documents to prevent theft

The entry and exit points will have security persons stationed at all times in shifts depending on the work timings. Register will be maintained for recording the details of

1. Visitors/Clients
2. Visitor vehicles
3. Contractors
4. Construction vehicles
5. Material receipt
6. Material exit

Security rules:

- All employees must display their identity cards at all times
- All contractors must carry their induction cards for entry
- Prohibited items must be checked at security and confiscated if found



- Before entering the site the visitor must get approval from the RCM and undergo induction training by the Safety Engineer

11.11 Sub-Contractor

The ESHS requirements will be communicated to the Sub-contractor through meetings, trainings and awareness sessions. An HSE Contractual Agreement procedure has been developed for communicating these and signing a MoU which becomes a binding document during contract execution. The Agreement will be shared with the Contractor during awarding of contract.

Refer Annexure XIII: OCP-24 MoU

11.12 Health Management

Employees will be medically examined prior to employments as per the work requirements and the criticality involved in the activities, and the same will be repeated as per rules in vogue. Medical treatment facility will be provided to all employees in case of any occupational health related concerns arising out of the activities that is performed by them in the working hours. And those patients who need further treatment shall be referred to other hospitals in consultation with doctor. Medical screening records of employees will be maintained by the subcontractor. Regular medical camps will be conducted to identify the high risk patients.

12.0 Incidents, Non-conformances, Corrective & Preventive Action

12.1 Incident Investigation – Responsibility & Reporting

In case of any incident:

- The immediate Incident reporting will be done by the Project Manager/RCM/Safety Engineer.
- Incidents where in the consequences are of less severity, detailed investigation will be carried out by the Safety Engineer, with the help of the PM/RCM/site execution team. Reports will be communicated to CEO and Corp QHSE. However, these incidents may undergo detailed investigation, if directed by QHSE Head.
- Incidents where in the consequences are of high severity with LTI or major property damage, the same will be investigated by a special team, constituted by the CEO, having no interest in the project. A detailed report will be submitted to the CEO and Corp QHSE identifying the root cause of incident and recommending the corrective actions to be taken.



12.2 Incident Analysis and Corrective Actions

All incidents, including near misses, will be reported and analysed at appropriate levels; its causes & learnings established and actions taken to prevent recurrence aiming at continual improvement. RCM/Lead Engineer concerned will immediately visit the incident location and initiate recovery measures. The outcome of the analysis will be based on:

- Root Cause identified in incident investigation
- Type of incident/ activities involved.
- Part of body Injured
- Severity of injury
- Frequency of occurrence (No. of incidents / injuries of a particular type per million man-hours worked).
- And any other categories, as found appropriate.

The corrective actions will be initiated at the site level. The effectiveness of the corrective actions will be verified during subsequent audits/inspections.

The detailed procedure is a part of the Operation control procedures attached along with this document; **Operational Control Procedure - OCP 022**

Refer **Annexure X**: Operational control procedures

13.0 Emergency Preparedness and Response

13.1.1 Emergency response plan

Emergency response plans for foreseeable emergency situations involved in project activities will be prepared to ensure that an effective and efficient response is achieved in case of any emergency.

The emergency response includes the following contingencies:

1. Fire and explosion
2. Structural collapse
3. Chemical spill/Toxic Gas Release
4. Flood/Earthquake
5. Fall from Height/injuries
6. Bomb/Substance Threat
7. Electrocution
8. Snake bite

If any additional threats are identified, it will be incorporated into the emergency response procedure at the site level. The draft of the ERP is the Operational control procedure- OCP 015. The site specific emergency plan with the details of emergency response team and communication chart is prepared using the draft.

13.1.2 Emergency Mock Drills

Emergency Mock Drills will be conducted on potential emergency scenarios as per the schedule established in the Site Activity Plan.

13.1.3 First Aid and Life-saving Apparatus on Site

Life-saving apparatus, which is appropriate and adequate will be provided at Site. The first aid facilities will be as per the BOCW Act. Trained first aiders will be available at the site. They will be trained to act in case of an emergencies at site.

14.0 Records

VA Tech Wabag will maintain records of the personal details of the workers, the nature of work they are to perform.

The records include, trainings, meetings, audits, inspections, corrective action requests, violations, various analysis / review reports, incidents viz., vehicle / equipment related accidents, personal injuries, utility service damages, customer complaint and feedback, worker complaint and feedback etc., shall be maintained by the functionaries concerned at the project level, to provide evidence of conformance to the requirements and effectiveness of the IMS Management System. Records shall be maintained in the relevant formats and the originator of such records shall ensure that the records are legible, complete and identifiable.

15.0 Performance Evaluation

15.1 OHS Monitoring and Measurement

OHS performance are monitored and measured as detailed below:

- Safety feedback from clients and workers
- Safety walk through
- Non-Conformities arising out of Audits
- Effectiveness of JSA/HIRA
- Legal Compliances
- HSE Performance Index

These evaluate the efficiency of the HSE Site management system and its effectiveness in providing a safe working environment.

15.2 Internal Audits

- The audit will be conducted to measure the effectiveness of the HSE Management System during construction and also to monitor legal, safety and environment compliances.
- Audit is conducted by the team as per schedule, using appropriate audit checklist, audit report is prepared by the audit team and submitted to the QHSE head for review.
- The report is then circulated to the respected site/department for the follow up action and compliance.
- Audit would be carried out by external audit team and report submitted by the team will be circulated to all stakeholders for review and follow up action.
- The audit procedure has been attached along with the plan.

Refer Annexure XIV: Internal audit procedure

15.3 Safety Inspection

Inspection of work premises are conducted by safety engineer/ Corp QHSE on a regular basis to ensure safe working conditions. The inspection will be focused on assessing, any potential hazards while using tools, operating equipment/facilities or following a certain working procedure. The findings will be recorded in the Safety Inspection report which will be then discussed with the Resident Construction Manager and Project Manager for corrective actions.

15.4 HSE Index

HSE Index is a performance measurement tool designed for aligning project sites with the VA Tech Wabag Safety standards. It is a checklist which covers the different aspects of the Safety Management System and it will be carried out as per the schedule described in the Site Activity Plan. HSE Index score of above 90 indicates a good compliance to the requirements of the HSE Management System.

Refer Annexure XV: HSE Index checklist

15.5 Management Review: QRM (Quarterly Review Meeting)

- The project safety performance of different sites is reviewed by the top management every quarter.
- The main focus of the meeting is to review the details pertaining to any incidents, near misses or any other site safety issues, and actions taken thereof.
- The discussion of the meeting is recorded as MOM and any decisions taken are put into an action plan with the responsibilities and closure target dates.



Environment, Social, Health and Safety Management Plan

Doc No:
10P153/ KMDA/ESHSM/001

Revision Number: 00

Date: 22/11/2019

- The status of closure is monitored closely by the top management and is reviewed during the subsequent QRM.

16.0 Improvements

16.1 Internal Audit Report

The audit outcomes are followed upon for the closure of any observation and NCs and their closure is documented for the continual improvement of the system.

16.2 Management Review Outputs

The outputs from the management review meeting are to be put into an action plan and worked upon for their closure within the specified timeline for the improvement of the system.



**Environment, Social, Health and Safety Management
Plan**

Doc No:
10P153/ KMDA/ESHSM/001

Revision Number: 00

Date: 22/11/2019

ANNEXURES

(All annexures have been attached as separate documents along with the ESHSM)



ANNEXURES

ANNEXURE – 1

1.0 Framework for worker participation

Wabag promotes involvement of workers through their representative by ensuring their participation in discussions on all issues relating to safety and health at work in a balanced way. Appropriate measures are taken to consider their proposal for improvement and creating a positive safety culture.

Wabag Believes that;

- Worker participation helps in developing effective ways of protecting workers by providing a sense of ownership
- By getting involved in an issue at the planning stage, workers are more likely to identify the reasons for taking a particular action, help find practical solutions, and comply with the end result.
- If workers are given the opportunity to participate in shaping safe work systems, then they can advise, suggest, and request improvements. They also help in developing measures to prevent occupational incidents and ill-health in a timely and cost-effective manner.

1.1 Process

- 1.1.1 The workers and their representatives will be given training on the project specific HSE Plan /HSE Policy /Safety Initiatives/Hazards and risks/Safe operating procedures/Operational Controls. The role of the workers in OH&S operations at sites is briefed.
- 1.1.2 The policy will be prominently displayed at key work places and Project Site Main gate.
- 1.1.3 Important safety instructions will be displayed at all critical work operational areas. The Project Manager / RCM / HSE Engineer ensures involvement of workers in hazard identification, risk assessments, determination of controls, incident investigation, development & review of policy and objectives. Their consultation & representation on OHS matters is critical as it affects the overall site OHS performance. Consultation with contractors is important where changes could affect the OHS performance.
- 1.1.4 Trainings will be conducted through, Induction Training, Tool box, Mass tool box, Awareness sessions in languages which the workers are familiar. This will help in improving their understanding towards hazard identification, risk assessment, risk control methods and reporting of incidents.
- 1.1.5 The proactive and reactive performance of OHS system is also shared in such training delivery to all the workers.
- 1.1.6 Site Engineer conducts periodic toolbox meetings with contract workmen for enabling better work practices and take their feedback for improvement



 <p>WABAG infrastructure solutions. for a better life.</p>	Consultation, participation & grievance redressal of workers	Doc No: Date: 14-02-2019
---	---	-----------------------------

- 1.1.7 Workers are trained to report hazards and any defects in the construction arrangements to project fellow workmen. A Safety Committee is constituted by drawing members from Project Management Team, sub-contractors and workers representative and PM as the convener.
- 1.1.8 Site HSE Committee discusses the following issues in its agenda:
- a) Development & review of HSE policy and procedures
 - b) Changes that affect work place health & safety.
 - c) Suggestions / complaints from employees and workers representatives.
 - d) Status of HSE performance and improvement plan.
 - e) Salient features of changes in the statutory & regulatory requirements.
 - f) Incident investigation
 - g) Issues discussed and corrective actions proposed
 - h) New OHS initiatives
 - i) LTI Alerts
- 1.1.9 Safety Engineer at Project Site will record the proceedings and communicate to all Site Team Members / Worker representatives. The worker representatives will be responsible for communicating the same to the workers working under them.
- 1.1.10 The Management decision and review out comes, OHS decisions are communicated to Safety Committee and Workers Representatives, so that the implementation is effective and workers are aware that their concerns and suggestions are addressed.
- 1.1.11 The management representative during the site visit, will have an informal discussion with the workers to understand their concerns. This will be recorded in the Worker Feedback Form- QHSE Review (F-540-002). This will reviewed by QHSE Head for necessary action.

2.0 Worker grievance system

- 2.1 The following procedure will ensure that the workers are provided with a mechanism to report issues and feel confident that timely resolution will be done. This system is vital in addressing problem areas that can affect the morale of the worker. Grievances can encompass minor as well as serious issues. If well-handled, an effective grievance mechanism can help develop positive relationships and build trust with the workers, which can lead to a safer workplace and a healthier work-force.
- 2.2 This procedure should be made available to the worker during recruitment and make it easily accessible to them, with no retribution and it should not restrict access to judicial or administrative remedies through the law, or substitute any grievance mechanism through collective agreements. The procedure has been formulated based on the



 <p>WABAG Sustainable solutions for a better life.</p>	<p>Consultation, participation & grievance redressal of workers</p>	<p>Doc No: Date: 14-02-2019</p>
--	--	-------------------------------------

guidelines of PS1 &PS2.

2.3 Procedure

- 2.3.1 Project Manager shall ensure that sufficient and qualified resources have been made available to achieve effective implementation of the grievance management procedure.
- 2.3.2 The Project Manager will be responsible for implementing and overseeing the grievance procedure.
- 2.3.3 The Safety In-charge will obtain, organize and document the feedback or complaints that is received from the workers. A worker feedback form is prepared in conjunction with the procedure. This is to be made available to all workers and in case the worker is unable to fill it, it will be filled in by the Safety In-charge. A form will also be made available in Hindi and local language.
- 2.3.4 The form has to be communicated to the RCM & Engineer in charge for review and corrective actions are to be proposed during the Safety Committee Meeting. If investigation of the complaint is to be done, selected members of the Safety Committee, will be nominated by the Project Manager depending on the nature and severity of the issue raised.
- 2.3.5 The grievance raised will be followed up in each Safety committee meeting to ensure that corrective actions have been taken and effectively implemented.
- 2.3.6 All grievances raised will be documented along with the details of action taken.
- 2.3.7 Worker grievances or feedback can also be anonymous. These can be collected through locked drop boxes in worker accommodation and canteens.
- 2.3.8 Bulletin boards will be used to post responses to anonymous complaints as appropriate. Other means will be tool box talks, mass tool box talks, training sessions etc.
- 2.3.9 Form No: F-540-003 will be used for recording all complaints and improvement suggestions.

3.0 Forms and Documented Information

3.1 Forms

- 3.1.1 F-540-001 Participation and Consultation Worksheet: Site
- 3.1.2 F-540-002 Workers Feedback Form : QHSE Review
- 3.1.3 F-540-003 Workers Feedback Form : Complaint and Improvement



ANNEXURE – 2



Workers Feedback Form: QHSE Review

ISO 45001 : (Cl 5.4)

F-540-002 A Revision number : 00

Date: 13-12-2018

Project Name		Project Reference No :
Location		Date

Details of discussion with works

Sl no	Workers Name	Contractor	Concerns raised by the workmen

General remarks by the QHSE representative

Name and Designation of the QHSE Representative	Date and Signature

Brief description of action report taken by QHSE Head

--



	Workers Feedback Form: QHSE Review	ISO 45001 : (Cl 5.4)
	F-540-002 A Revision number : 00	Date: 13-12-2018

Name Designation	Date and Signature
-------------------------	---------------------------



ANNEXURE – 3



Workers Feedback Form -Site

ISO 45001:2018(CI 5.4)

F-540-003 Revision number : 00

Date: 13-12-2018

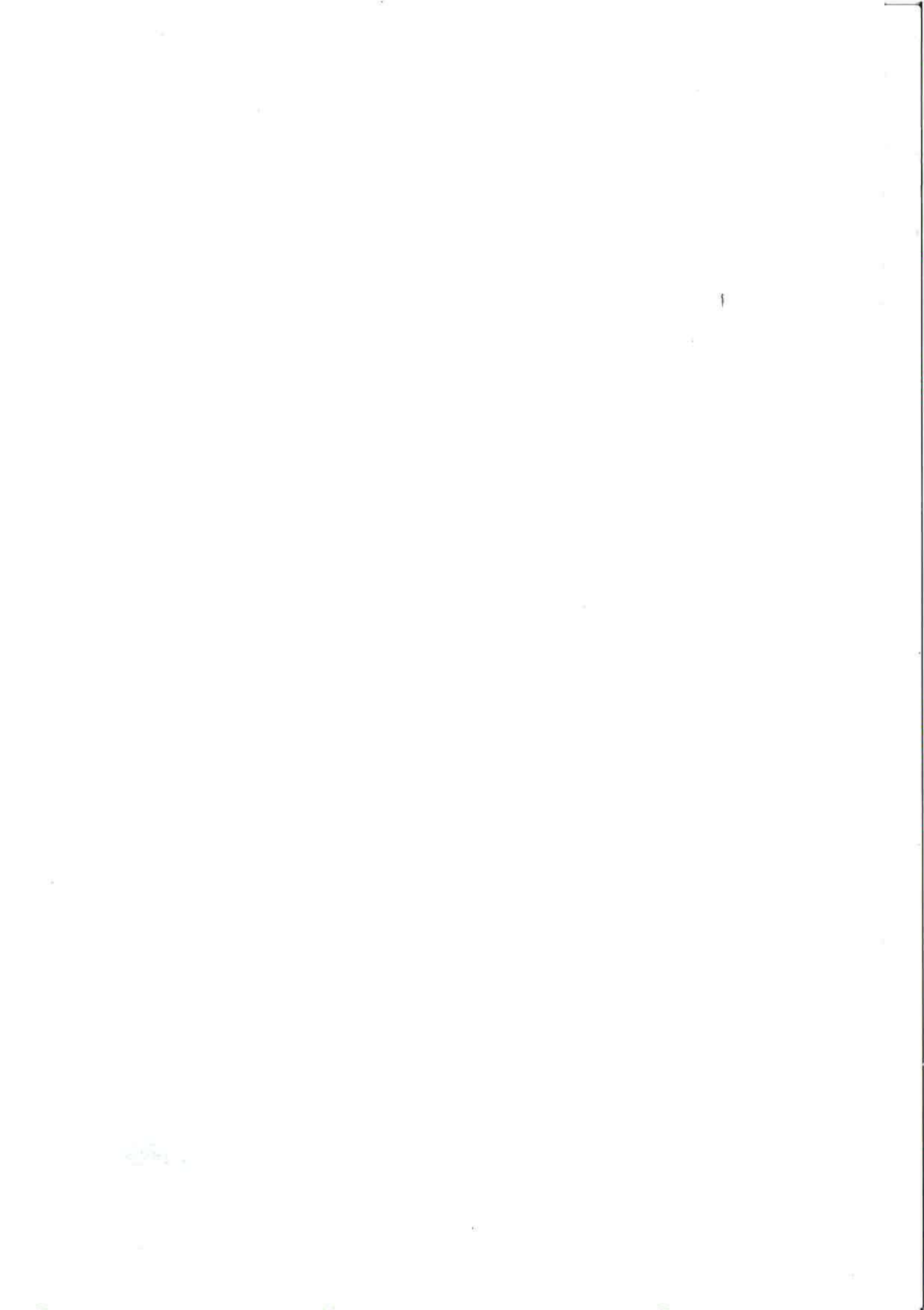
Project Name		Project Reference No	
Location		Date	

Feedback Details			
Workers Name		Sub-contractor	
Activity performed		Induction date	
Feedback (Please tick)	<input type="checkbox"/> Complaint		<input type="checkbox"/> Improvement
Description			

Action taken				
S.No	Corrective action	Responsibility	Due Date	Status

Prepared by	Approved by
Name :	Name :
Designation:	Designation:
Signature :	Signature :





ANNEXURE – 4



COMMON MANAGEMENT PROCEDURES

Procedure number
CMP- 14

Approved by

Pankaj
Sachdeva

IDENTIFICATION OF ASPECTS/ IMPACTS AND HAZARDS/RISKS

Rev. No. : 01

Reviewed by

Benny John

Date: 05-01-2018

Prepared by

S. Jayachitra

1.0 OBJECTIVE:

To identify the Occupational Health, Safety (OHS) Hazards/Risks and the Environmental Aspects /Impacts (ASIM) of all activities, products & Services rendered by the company and to identify the significant aspects and risks to effect control measures to mitigate the impact on environment and reduce the risk potential for Occupational Health and Safety of workmen

2.0 SCOPE:

This procedure covers all activities, products and services of the Company as mentioned in system HSE-SCO .

3.0 HSE MANUAL REFERENCE

HSE- 6.1,6.1.2/4.3.1 Identification of Environmental aspects/ impacts and Hazards and Risks.

4.0 PROCEDURE:

4.1 PLANNING :- Action to address risks and opportunities.

4.1.1 The planning on Environmental aspects/ impacts and identification of Hazards and Risk review shall be carried out to the process(es) as applicable to establish, implement and maintain the HSE requirements such as General, Environment aspects, Compliance Obligations and Planning action and the status of compliance with respect to as per the contract and at the company level.

4.1.2 The following requirements must be covered in the Planning of HSE Management System at EPC Sites and O&M Plants and Offices as well.

- a. Planning and determine the HSE Risks and its opportunities of internal and external issues as per the contract scope.
- b. Planning and determine the interested parties needs and expectations along with compliance obligations as per the contract scope.
- c. Planning and determine the significant Hazards/ Environment aspects and also includes if any changes / modified in products or services or activities and an abnormal and foreseeable emergency situations as well.
- d. Planning and determine the compliance obligations related to HSE as per the contract scope.
- e. Planning action to address the significant environment aspects, Hazards and its risks and opportunities and the relevant Compliance obligations as well.
- f. Planning on communication of significant Environmental aspects / Hazards and risks among the various levels and functions as appropriate.
- g. Ensure that the aforesaid requirements maintained by a documented information to ensure that they are carried out as per the planning.





COMMON MANAGEMENT PROCEDURES

Procedure number
CMP- 14

Approved by

Pankaj
Sachdeva

IDENTIFICATION OF ASPECTS/ IMPACTS AND HAZARDS/RISKS

Rev. No. : 01

Reviewed by

Benny John

Date: 05-01-2018

Prepared by

S. Jayachitra

- h. Identified external hazards which could adversely affect the Occupational health and safety of operating personnel within the workplace and which are under the direct control of the company
- i. Occupational Health and Safety Hazards/Risks associated with infrastructure, equipment and materials at the workplace, whether provided by the company or others;
- j. Design of work areas, processes, installations, machinery / equipment, operating procedures and work organization, including their adaptation to human capabilities.

4.1.3 For identification of Environmental Aspects/Impacts and OHS Hazards/Risks, the following are to be followed,

- a. Select an activity, product or service, which should be large enough for a meaningful examination and small enough to be sufficiently understood.
- b. Identify as many Environmental Aspects/Impacts and Occupational health & safety hazards/Risks as possible associated with the selected activity, product or service.
- c. Identify the actual and potential, positive and negative Environmental Impacts and OHS Risks possible for each identified Environmental Aspect/ OHS Hazard.

4.1.4 For identification of Occupational Health and Safety Hazards/Risks, the initial review shall also cover thermal, radiation, fire & explosion, accidental fall from heights, biological, ergonomic, chemical, electrical and various other health hazards.

Examples: Aspects/Impacts, Hazards/Risks

Activity/ Product/ Services	Aspect	Impact	Hazard	Risk
Handling Hazardous chemical	Accidental spill	Land/water pollution	Chemical hazard	Burn injury Exposure to chemical fumes
Poor maintenance of vehicles	High Emission of gas	Air pollution	High Noise	Hearing impairment
			Toppling	Bodily Injury
DG Operations	Diesel Usage	Resource depletion	Flammable Vapour	Burn injury/ asphyxiation
	Diesel Spill	Land pollution Resource loss	Slip, trip fall	Bodily injury
	Waste oil	Land /water pollution	Waste Oil Handling	dermatitis
RCC mixing	Dust emission	Air pollution	Dust. hazard Noise hazard	Lungs congestion Hearing impairment
	High sound	--Do--		

4.2 EVALUATION OF SIGNIFICANT IMPACTS/RISKS:

4.2.1 Head of the Departments/Team Leaders/Project Managers/RCMs/Plant Managers along with their associates shall identify the OHS Hazards/Risks and Environmental Aspect/ Impacts and evaluate their significance by considering the following,

a) Legislative Concern (LOR):

Environmental Aspects/Impacts and Occupational Hazards/Risks which are covered by the existing applicable Acts/Rules/Regulation of Central or State Government **Shall be considered significant.**

b) Interested Party concern (IPC):

Feedback received on HSE, by employees or feedback received from other interested parties on HSE related issues form the basis to identify the interested party concern.



**COMMON MANAGEMENT PROCEDURES**Procedure number
CMP- 14

Approved by

Pankaj
Sachdeva**IDENTIFICATION OF ASPECTS/ IMPACTS AND HAZARDS/RISKS**

Rev. No. : 01

Reviewed by

Benny John

Date: 05-01-2010

Prepared by

S. Jayachitra

Where a significant number of employees (i.e. more than 25 % of the employees working in the EPC Site or O&M Plant) have express their concern on an HSE issue, it shall be taken into consideration as significant.

Any critical or major HSE issue discussed in the HSE committee meeting and addressed in the minutes for taking corrective action, could be considered for significant.

c) Resource Concern (RC):

Aspects which have the potential to optimize the resource use like, e.g. energy, water, steel, process chemical, cement etc. could be identified under the Resource concern. Head of the Departments/Team Leaders//Project Managers/RMCs/Plant Managers may identify such aspects and decide the resource conservation potential associated with it.

Where potential exists to save Rs. 1,00,000 or more in O&M and Rs.5,00,000 or more in EPC, for an aspect per instance, it could be considered as significant.

In case of natural resources like water or oil or energy, suitable limits on consumption can be set based on the current consumption levels, beyond which the aspect could be considered as significant.

d) Business concern (BC):

If in the opinion of MD & CEO/MR(HSE)/India Clusters any **Environmental Aspect/OHS Hazards, which are likely to have an adverse effect on the business potential or could cause an impact on the reputation /image of the company or its policies including HSE Policy such Aspect/Hazard could be considered as significant.**

For e.g. Loss to company's image e.g. legal non- compliance, major repetitive incidents etc.,

a) Repetitive incidents leading to fatality which could dent the image of the company.

4.2.2 For all Environmental Aspects/Impacts & OHS Hazards/Risks, other than those which are considered under LOR, IPC,RC and BC., the criteria for evaluation of Environmental Aspects/Impacts & OHS Hazards/Risks is given in Annexure-1,

4.2.3 **The criteria on Probability of occurrence and Severity OHS Hazards/Risks and the Probability of occurrence, Severity and duration is given in Annexure-1. Any Environmental Aspects/impacts having a total score of 27 (i.e. product of severity, likely hood of occurrence and duration) and above or OHS Hazards/Risks having a total score of 9 (i.e. product of severity and likely hood of occurrence) and above or which has severity score of 4 and above shall be considered as significant.**

4.2.4 **Aspects/impacts and OHS Hazards/Risks associated with potential emergency situations shall be identified as significant.**

4.3 The identified significant Aspects/OHS hazards shall be considered for setting Objectives & Targets, including those which are necessary to ensure legal compliance.

4.4 **Aspects/OHS Hazards which are found not significant based on the OHSE Policy given under Cl.5.2/4.2 shall be mitigated through the control measures identified against the specific Aspect/OHS hazards and/or through the Operational Control Procedures**

GUIDELINES ON HAZARDS CATEGORISATION



COMMON MANAGEMENT PROCEDURES

Procedure number
CMP- 14

Approved by

Pankaj Sachdeva

IDENTIFICATION OF ASPECTS/ IMPACTS AND HAZARDS/RISKS

Rev. No. : 01

Reviewed by

Benny John

Date: 05-01-2018

Prepared by

S. Jayachitra

Sl. No.	Hazard category	Examples
1	Physical Hazard	Bodily injury, cuts, fracture,
2	Chemical Hazard	Chemical Burns,
3	Mechanical Hazard	Entrapment ,entanglement, caught in, impact
4	Electrical Hazard	Electrical shock, electrocution
5	Biological hazard	Viral infection, dermatitis,
6	Ergonomics	Back ache, back pain , stiff neck
7	Health hazard	Respiratory diseases, asphyxiation,
8	Heat Hazard	Burn injury, heat stress
9	Cold hazard	Burn, blisters
10	Noise and vibrations	Hearing impairment and white finger, numbness
9	Behavioural Hazards	Horseplay, violence at work, safety violation, pass by, PPE violation, stress

ANNEXURE – 1 TABLE ON CRITERIA FOR ASSESSING THE SIGIFICANCE OF ENVIRONMENTAL

ASPECT/ IMPACT and OCCUPATIONAL HEALTH & SAFETY, HAZARD/ RISK

PARAMETER	SCORE VALUE				
	1	2	3	4	5
A) Severity Score for Aspects & Impacts and OHS Hazards & Risks					
For OCCUPATIONAL HEALTH	First Aid Only	Medical Treatment	Hospita- lisation	Temporary disruption	Chronic Disease
For SAFETY	First Aid Only	Medical Treatment	Lost Time injury	Partial Disability	Death or permanent disability
For ENVIRONMENT	Localised within the location of working	Localised within the work place	Localised within the Site/Plant	~1 km from the boundary of the Site/ Plant	< 10 kms. from boundary of Site/ Plant
B) Probability Score for Aspects & Impacts and OHS Hazards & Risks					
LIKELY HOOD OF OCCURENCE	May occur, only in rare & exceptional circumstances.	Unlikely to occur but could happen	Possible, likely to occur at some part of the time	Likely to occur frequently	Almost certain to occur under most circumstances
For Environmental Aspects /Impacts only					
C) DURATION	Few minutes	Less than 8 hour	Less than a day	Less than a month	More than a month

GUIDELINES:

OCCUPATIONAL HEALTH

First Aid: Rendered at site by trained First aiders (non-medicos)




Medical Treatment: Out patient treatment given at a Clinic/Hospital/dispensary by nursing staff/Doctor

Hospitalisation: In-patient treatment resulting in loss of man days

Temp. Disruption: Unable to perform the specific job temporarily might require job restrictions or job change

(For e.g. exposure during radiography)



	COMMON MANAGEMENT PROCEDURES	Procedure number CMP- 14	Approved by	Pankaj Sachdeva	
IDENTIFICATION OF ASPECTS/ IMPACTS AND HAZARDS/RISKS		Rev. No. : 01	Reviewed by	Benny John	
		Date: 05-01-2018	Prepared by	S. Jayachitra	

Chronic Disease: Cannot perform the job any more (For e.g. T.B, Bronchitis & Asthma,etc)

SAFETY

First Aid: Rendered at site by trained First Aiders (non-medicos)

Medical Treatment: Out patient treatment given at a Clinic/Hospital/dispensary by nursing staff/Doctor

Lost Time: Absence from the job for more than 48 Hrs (reportable to the regulators)

Partial disability: Dismemberment

Fatal: Permanent dismemberment /disablement or fatality/ death.

5.0 RECORDS:

The Register of Aspect/Impact, Hazards/Risks and list of significant Aspects/Hazards to be maintained up to date

- 1) Register of Aspects/Impacts & Hazards/Risk Identification for EPC in Doc No. HIRADC/EPC/XX and,
- 2) Register of Aspects/Impacts & Hazards/Risk Identification for O&M in Doc No. HIRADC/O&M/XX

6.0 CMP 14 - REVISION HISTORY:

Rev. No.	Effective date	Nature of revisions effected
01	05-01-2018	Procedures are reviewed with current existing process and to align with CMP procedures
00	20-10-2016	ISO 14001:2015 requirements are reviewed and added in the procedure





REGISTER OF HAZARDS/RISK IDENTIFICATION

HIRADC/EPC/15
Rev.No: 0
DATE: 01/10/13

S.No	Job Step / Task BEHAVIOURAL ATTITUDE	HAZARD	RISK	R/NR/ E	LOR	IPC	Severity B	Likelihood C	Risk* BxC	Significant	Elimination/ Substitution	Engg. Control	Administration &PPE control	Mandatory PPE's requirements for HSE:	
														Safety shoes and safety Helmets	Wear Full Body harness for more than 2m height
														Administration Requirements for HSE:	
														Display pictorial HSE Images	
														No Alcohol/drug use at sites	
														Tool box meeting to be conducted before site work	
														Hse induction training for new employees	
														Refresh induction training for old employees	
														Job Specific Control Measures	
1	Cooking near by the Work Spot (Non - Designated area)	Fire / Explosion	Body Injury / Fatal	R	N	N	5	2	10	Y	Y	N	Y	Follow the SITE HSE Rules as per HSE Induction Training Cooking shall be done at the labour colony area No one cook at site Regualr Tool Box Talks Display Pictorial HSE Poster in local language	
2	Eating the Work Spot (Non - Designated area) and not cleaning the food particles	Attract of Rat /insects / Vermin	Rat / Insects Sting	NR	N	N	1	3	3	N	Y	N	Y	Eat only at Designated area Regular Housekeeping Remove the left over foods by covered plastic bag and disposal to the waste bin Display Pictorial HSE Poster in local language Follow the SITE HSE Rules as per HSE Induction Training	
3	Sleeping/ Walking (Non Designated Area) such as beams/ walls / dark area at the ground /elevated levels	Fall of Personnel	Body Injury / Fatal	R	N	N	2	5	10	Y	Y	N	Y	Sleeping at the designated area only Pictorial HSE Image for Hazards of Sleeping at Non Designated area Place Tool Box Talks Meeting. Display Pictorial HSE Poster in local language Motivational Programme for Alcohol and drugs	
4	Sleeping at the rear side of the vehicles / Construction Machinery	Run Over by Vehicles / Machinery	Body Injury / Fatal	R	N	N	2	5	10	Y	Y	N	Y	Follow the SITE HSE Rules as per HSE Induction Training Do not leave engine keys when vehicle unattended. Sleep / Rest only at the designated place at site Display Pictorial HSE Poster in local language	
	Horseplay with peer Group	Fighting with Hand Tools Or Power operated tools	Body Injury / Fatal	R	N	N	2	5	10	Y	Y	N	Y	Follow the SITE HSE Rules as per HSE Induction Training No one allow to do horseplay at site Report to foreman /supervisor/ Engineer immediately in case of any problem Both Fighting personnel will be terminated from the site. Display Pictorial HSE Poster in local language	



REGISTER OF HAZARDS/RISK IDENTIFICATION

S.No	Job Step / Task BEHAVIOURAL ATTITUDE	HAZARD	RISK	R/NR / E	LOR	IPC	Severity B	Likelihood C	Risk* BxC	Significant	Elimination/ Substitution	Engg. Control	Administration & PPE control	Mandatory PPE's requirements for HSE:	
														Safety shoes and safety Helmets Wear Full Body harness for more than 2m height	
Administration Requirements for HSE:															
Display pictorial HSE images No Alcohol/drug use at sites Tool box meeting to be conducted before site work Hse induction training for new employees Refresh induction training for old employees															
Job Specific Control Measures															
7	Using Alcohol and Drugs	Unconscious at work Confusion at work	Body Injury / Fatal	NR	Y	N	5	2	10	Y	Y	Y	Y	Y	Sending out the alcohol drugs users from the site Breathlyzer shall be used for monitoring HSE Pictorial: Image Posters for Alcohol and Drugs Regular Tool Box Talks Follow the SITE HSE Rules as per HSE Induction Training
8	Not Wearing PPE Wilfully	Violation of Mandatory Rules & Site Management Instruction	Body Injury / Fatal	R	Y	N	3	4	12	Y	N	N	Y	Y	Follow the SITE HSE Rules as per HSE Induction Training No one allow at site without mandatory PPE's Wear Helmet and Shoes as Mandatory Wear Job Specific PPEs as per Site Management Instrn., Display Pictorial HSE Poster in local language
9	Smoking at Site	Discomfort to others Fire Hazard	Body injury	R	Y	N	3	3	9	Y	Y	Y	Y	Y	Follow the SITE HSE Rules as per HSE Induction Training Smoke at the designated place Do not smoke while working with peer groups Display Pictorial HSE Poster in local language
10	Stealing	Threatening by Sharp Tools / Gun	Body injury / Fatal	NR	Y	N	5	1	5	Y	N	Y	Y	Y	Fencing the periphery of the site Adequate lighting at the fencing and storage materials 24hrs Security watch Communicate Emergency contact personnel Create Alert among Security Groups by tool box talks Follow the SITE HSE Rules as per HSE Induction Training
11	Damaging the construction materials	Aggressive / Anger	Body injury / Fatal	NR	N	N	3	2	6	N	N	N	Y	Y	Follow the SITE HSE Rules as per HSE Induction Training. Motivational Programme among work groups Display Pictorial HSE Poster in local language





REGISTER OF HAZARDS/RISK IDENTIFICATION

HIRADC/EPC/15
Rev.No: 0
DATE: 01/10/13

S.No	Job Step / Task BEHAVIOURAL ATTITUDE	HAZARD	RISK	R/N/R	LOR	IPC	Severity B	Likelihood C	Risk BxC	Significant	Elimination/ Substitution	Engg. Control	Administration & PPE control	Mandatory PPE's requirements for HSE: Safety shoes and safety Helmets Wear Full Body harness for more than 2m height Administration Requirements for HSE: Display pictorial HSE Images No Alcohol/drug use at sites Tool box meeting to be conducted before site work Hse induction training for new employees Refresh induction training for old employees	Job Specific Control Measures
12	Argument with Site Management Personnel	Abusing or Assault or Damaging the materials	Body Injury by fighting	NR	N	N	3	2	6	N	N	N	Y	Follow the SITE HSE Rules as per HSE Induction Training. Motivational Programme among work groups Display Pictorial HSE Poster in local language Inform to the Site Incharge In case of work related problems.	Follow the SITE HSE Rules as per HSE Induction Training. Motivational Programme among work groups Display Pictorial HSE Poster in local language Inform to the Site Incharge In case of work related problems.
13	Swimming at the Prohibited Areas	Violation of Site Rules and wilfully Swimming	Drowning / Fatal	NR	N	N	5	2	10	Y	N	Y	Y	Follow the SITE HSE Rules as per HSE Induction Training. Hard Barrier at the access entry area Display of Pictorial Image for Prohibited Swimming in local language Keep the emergency aids at site Tool box talks Motivational Programme	Follow the SITE HSE Rules as per HSE Induction Training. Hard Barrier at the access entry area Display of Pictorial Image for Prohibited Swimming in local language Keep the emergency aids at site Tool box talks Motivational Programme
14	Chewing and Spitting at site	Attracts Insects or Vermin	Insects Sting	R	N	N	1	4	4	N	Y	N	Y	Follow the SITE HSE Rules as per HSE Induction Training. Provide Spltoons at the work place Display of Pictorial Image for spitting in local language Avoid using Chewing gum to prevent to attract Insects Tool box talks Motivational Programme	Follow the SITE HSE Rules as per HSE Induction Training. Provide Spltoons at the work place Display of Pictorial Image for spitting in local language Avoid using Chewing gum to prevent to attract Insects Tool box talks Motivational Programme
15	Wearing loose clothes / Half trousers	Caught in between	Body Injury	R	N	N	2	5	10	Y	Y	N	Y	Follow the SITE HSE Rules as per HSE Induction Training. Close fitting clothes to avoid caught in between Wear Full Pant and Full shirts Motivational Programme Tool Box Talks	Follow the SITE HSE Rules as per HSE Induction Training. Close fitting clothes to avoid caught in between Wear Full Pant and Full shirts Motivational Programme Tool Box Talks





REGISTER OF HAZARDS/RISK IDENTIFICATION

HIRADC/EPC/15
Rev.No: 0
DATE: 01/10/13

S.No	Job Step / Task BEHAVIOURAL ATTITUDE	HAZARD	RISK	R/NR/ F	LOR	IPC	Severity B	Likelihood C	Risk* BxC	Significant	Elimination/ Substitution	Engg. Control	Administration &PPE control
													Mandatory PPE's requirements for HSE: Safety shoes and safety Helmets Wear Full Body harness for more than 2m height Administration Requirements for HSE: Display pictorial HSE Images No Alcohol/drug use at sites Tool box meeting to be conducted before site work Hse induction training for new employees Refresh induction training for old employees Job Specific Control Measures

HEALTH

1	Cooking near by the Work Spot (Non - Designated area)	Smoke	Respiratory effect	R	N	N	1	4	4	N	Y	N	Y
													Cooking at the Labour Colony only Do not cook at the site Minimize the exposure of smoke Display of Pictorial Image for Prohibited Swimming in local language
2	Eating the Work Spot (Non - Designated area) and not cleaning the food particles	Rat /Insects or vermin attract	Communicable Disease	R	N	N	2	5	10	Y	Y	Y	Y
													Eat only at Designated area or labour colony Regular Housekeeping Remove the left over foods by covered plastic bag and disposal to the designated waste bin Display Pictorial HSE Poster in local language Follow the SITE HSE Rules as per HSE Induction Training
3	Using Alcohol and Drugs	Increasing blood pressure	Digestion system or Respiratory System effect	NR	Y	N	5	2	10	Y	Y	Y	Y
													Sending out the alcohol/ drugs users from the site Breathalyzer shall be used for monitoring HSE Pictorial Image Posters for Alcohol and Drugs Regular Tool Box Talks Follow the SITE HSE Rules as per HSE Induction Training Motivational Programme for Health Issues
4	Smoking at Site	Respiratory System Effect	Destroying Immunity cells	R	N	N	3	4	12	Y	Y	N	Y
													Follow the SITE HSE Rules as per HSE Induction Training Smoking is injurious to the health Do not smoke while working with peer groups Display Pictorial HSE Poster in local language Motivational Programme






REGISTER OF HAZARDS/RISK IDENTIFICATION


HIRADC/EPC/15
Rev.No: 0
DATE: 01/10/13

S.No	Job Step / Task BEHAVIOURAL ATTITUDE	HAZARD	RISK	R/NR/E	LOR	IPC	Severity B	Likelihood C	Risk* BxC	Significant	Elimination/ Substitution	Engg. Control	Administration &PPE control	Mandatory PPE's requirements for HSE: Safety shoes and safety Helmets Wear Full Body harness for more than 2m height Administration Requirements for HSE: Display pictorial HSE images No Alcohol/drug use at sites Tool box meeting to be conducted before site work Hse induction training for new employees Refresh induction training for old employees
5	Not Wearing Respiratory Mask Wilfully	Lungs Infection	Asphyxiation/ Un conscious	R	Y	N	3	3	9	Y	N	N	Y	<p align="center">Job Specific Control Measures</p> <p>Follow the SITE HSE Rules as per HSE Induction Training Wear Job Specific PPEs as per Site Management Instrn., OR MSDS Instruction Display Pictorial HSE Poster in local language</p>
6	Argument with Site Management Personnel	Abusing by unparliment words	Increasing blood pressure Emotional	NR	N	N	3	2	6	N	N	N	Y	<p>Follow the SITE HSE Rules as per HSE Induction Training. Motivational Programme among work groups Display Pictorial HSE Poster in local language Inform to the Site Incharge in case of work related problems.</p>



REGISTER OF HAZARDS/RISK IDENTIFICATION FOR CONSTRUCTION ACTIVITIES																													
		HIRADC/EPC/12																											
		Rev.No: 02																											
S.No		Job Step / Task ELECTRICAL EQUIPMENT ERECTION		HAZARD		RISK		R/N/R/E		LOR		IPC		Severity B		Likelihood C		Risk* BxC		Significant		Elimination/ Substitution		Engg. Control		Administration &PPE control		Mandatory PPE's requirements for HSE:	
																												Safety shoes and safety Helmets	
1		Under Ground Cable Pulling		Fall of Cable Drums		Body Injury/ Fatal		R		N		3		3		9		N		NIL		Y		Y		Wear Full Body harness for more than 2m height			
																										Administration Requirements for HSE:			
2		Pulling of Cable by Hand		Caught in between at the pinch point		Hand Injury		R		N		2		3		6		N		NIL		Y		Y		Display pictorial HSE images			
																										No Alcohol/drug use at sites			
3		Pulling of Cable by Winch		Caught in between at the pinch point		Hand Injury		R		Y		2		3		6		Y		NIL		Y		Y		Tool box meeting to be conducted before site work			
																										Hse induction training for new employees			
																										Refresh induction training for old employees			
																										Job Specific Control Measures			
																										Depending on the weight and size of the drum, suitable size of the cable rolling shaft (Spindle) shall be placed inside the central axis of the drum.			
																										Suitable jacks shall be placed firmly on the ground and jacked-up to allow clearances from the ground depending on the size of the cable drum.			
																										The drum shall be lifted and placed on the jacks.			
																										Place the Cable Drums on the Flat Ground			
																										Use Chocker when the lifting aids are not available			
																										The cable drum will be correctly positioned and the direction of cable pulling as indicated by arrow on the drum shall be complied..			
																										During pulling with winch, the tension on the cable will not exceed that given by the manufacturer			
																										Cable be shall be laid/ pulled by hand with grip hand gloves and / or winch			
																										The cable shall be fixed with the winch by means of a cable sock or gripper			
																										Wear Leather Hand Gloves			
																										Refer BOCW Rules No. 59			




REGISTER OF HAZARDS/RISK IDENTIFICATION FOR CONSTRUCTION ACTIVITIES														
<div style="display: flex; justify-content: space-between;"> <div style="text-align: center;">  <p>WABAG</p> </div> <div style="text-align: right;"> <p>HIRADC/EPC/12 Rev.No: 02 DATE: 01/10/2013</p> </div> </div>														
S.No	Job Step / Task	HAZARD	RISK	R/NR/E	LOR	IPC	Severity B	Likelihood C	Risk* BxC	Significant	Elimination/ Substitution	Engg. Control	Administration &PPE control	Mandatory PPE's requirements for HSE:
4	Above Ground Cable Pulling	Slip/ Trip/ Fall	Body Injury	R	N	N	2	3	6	N	NIL	NIL	Y	Safety shoes and safety Helmets Wear Full Body harness for more than 2m height Administration Requirements for HSE: Display pictorial HSE images No Alcohol/drug use at sites Tool box meeting to be conducted before site work Hse induction training for new employees Refresh induction training for old employees
Job Specific Control Measures														
5	Cable tray and Conduit Pipe erection	Fall of Materials	Body injury	R	N	N	2	3	6	N	NIL	NIL	Y	Cable rollers shall be used Safety for people pulling cables will be ensured by providing safe scaffolding adequate working platforms, using full body harness while working at high elevations. Administration and PPE's Requirements Leather type hand gloves are required Refer OCP No.8,OCP No. 9 & OCP No. 21 Cable trays shall be supported on ISA 50x50x6mm MS/GI brackets. Brackets shall be welded to steel plate inserts in the trenches/tunnels or supporting channel angle/inserts in other areas. The entire GI conduit system shall be firmly fastened in position. Cable trays/racks shall be so arranged that they do not obstruct of passage way Pictorial HSE Posters for Caution and warning signs shall be displayed



REGISTER OF HAZARDS/RISK IDENTIFICATION FOR CONSTRUCTION ACTIVITIES														
WABAG		HIRADC/EPC/12 Rev.No: 02 DATE: 01/10/2013												
S.No	Job Step / Task ELECTRICAL EQUIPMENT ERECTION	HAZARD	RISK	R/N/R/E	LOR	IPC	Severity B	Likelihood C	Risk* BxC	Significant	Elimination/ Substitution	Engg. Control	Administration & PPE control	Job Specific Control Measures
1	Unloading, Unpacking, Heat Transportation, lifting, Positioning, Alignment, cable pulling for the electrical items - transformers, panels, motors & cables drums from stores/yard and work area.	Heat	Heat Stress / Heat Cramp	R	N	N	2	3	6	N	NIL	N	Y	Provide shaded shelter for resting; Drinking Water ; Electrolyte Job rotation/ Job rest First Aid Kit with stretcher availability Get Medical Attention Immediately
		Cold Where Applicable	Numbness/ Frost Injury	R	N	N	2	3	6	N	NIL	N	Y	Provide shaded shelter for resting Warm up the body Full suit cover all is required Do not touch the materials with bare hand Use leather type hand gloves / Safety Glasses/ Face Shield and Mandatory PPE's Job rotation/ Job rest First Aid Kit with stretcher availability Get Medical Attention Immediately

HEALTH



		REGISTER OF HAZARDS/RISK IDENTIFICATION FOR CONSTRUCTION ACTIVITIES													HIRADC/EPC/12 Rev.No: 02 DATE: 01/10/2013	
		S.No	Job Step / Task ELECTRICAL EQUIPMENT ERECTION	HAZARD	RISK	R/N/R/E	LOR	IPC	Severity B	Likelihood C	Risk* BxC	Significant	Elimination/ Substitution	Engg. Control	Administration & PPE control	Job Specific Control Measures
2	Cable joining	Reaching out and body bending	Body Ache	R	N	N	2	3	6	Y	NIL	N	Y	Y	Avoid awkward position during manual handling Safe lifting method shall be followed to avoid sprain / strain Use mechanical aids to avoid reaching out and body bending HSE Training for Ergonomics Pictorial Posters shall be displayed	Wear respiratory masks Job Rotation Display HSE images for Lead Hazards





REGISTER OF HAZARDS/RISK IDENTIFICATION FOR CONSTRUCTION ACTIVITIES

HIRADC/EPC/03

Rev.No: 02

DATE: 01/10/2013

S.No	Job Step / Task Excavation	HAZARD	RISK	R/N/R/E	LOR	IPC	Severity B	Likelihood C	Risk* BxC	Significant	Elimination/ Substitution	Engg. Control	Administration &PPE control	Mandatory PPE's requirements for HSE: Safety shoes and safety Helmets Wear Full Body harness for more than 2m height Administration Requirements for HSE: Display pictorial HSE images No Alcohol/drug use at sites Tool box meeting to be conducted before site work HSE induction training for new employees Refresh induction training for old employees	Job Specific Control Measures
1	Area clearing bush cutting & Tree cutting with Manual / Machinery & Tools	Falling of trees	Body Injury/Fatal	NR	N	N	3	3	9	Y	N	N	Y	Cordon off the area Display Cautions / Warning Signs Secure trees by tailing rope anchored Gum boots / Ankle Safety Shoes/ Full handgloves at the Jungle area. Refer OCP-21 Permit to work	
		Sharp edges	Body Injury	NR	N	N	2	3	6	Y	Y	N	Y	Use machine Saw to cut the trees with tailing rope anchored Use Leather type hand gloves	
		Snake / insects bite stings	Poisoning /Fatal	NR	N	N	5	3	15	Y	N	Y	Y	Use Machinery for bush removal to minimize the manual deployment Restrict the people in minimum Apply of carbolic acid prior to cutting Administration and PPE Requirements for HSE Display the snake bite alert at the job site. Wear Ankle Safety Shoes / Gumboots / Full suit Cover all Antivenom & Stretcher	





REGISTER OF HAZARDS/RISK IDENTIFICATION FOR CONSTRUCTION ACTIVITIES

HIRADC/EPC/003
Rev.No: 02
DATE: 01/10/2013

S.No	Job Step / Task Excavation	HAZARD	RISK	R/N/R/F	LOR	IPC	Severity B	Likelihood C	Risk* BXC	Significant	Elimination/ Substitution	Engg. Control	Administration & PPE control	Job Specific Control Measures	
														Y	N
2	Excavation at the ground level/ Confined Space / near by Undermining Structures	Collapse of soil/ Cave In	Fatal	R	Y	N	5	3	15	Y	NIL	Y	Y	<p>Mandatory PPE's requirements for HSE: Safety shoes and safety Helmets Wear Full Body harness for more than 2m height Administration Requirements for HSE: Display pictorial HSE images No Alcohol/drug use at sites Tool box meeting to be conducted before site work HSE induction training for new employees Refresh induction training for old employees</p>	<p>Sloping/berching/shoring shall be provided based on soil condition at the site No vehicle movement within the safe distance of 1.5m No dumping excavated material within the 1.5m safe distance from the edge of the excavation at all the sides Inspection by the Civil Engineer is required Permit to Work as per the OCP No. 021 Safe Accessibility such as ladder with 1m extension / Backfilling or shoring shall be provided to avoid Cave in Hard Barrier on all the sides of the excavation Administration and PPE Requirements for HSE Refer OCP-003 Working in confined space. Refer OCP-009 Safe use of Ladders Refer OCP -20 Excavation Refer OCP -21 Permit to work</p>
		Injury from falling materials or Machinery	Body injury / Fatal	R	Y	N	5	3	15	Y	NIL	Y	Y	<p>Hard barrication around all the sides of excavations Stopper is required to restrict the vehicle / machinery movements No materials dumping with safe distance of 1.5m at the edge of the excavation Sufficient Lighting at Site Permit to Work as per the OCP 020</p>	





REGISTER OF HAZARDS/RISK IDENTIFICATION FOR CONSTRUCTION ACTIVITIES

HIRADC/EPC/03
Rev.No: 02
DATE: 01/10/2013

S.No	Job Step / Task Excavation	HAZARD	RISK	R/N/R/E	LOR	IPC	Severity B	Likelihood C	Risk Bxc	Significant	Elimination/ Substitution	Engg. Control	Administration & PPE control	Mandatory PPE's requirements for HSE: Safety shoes and safety Helmets Wear Full Body harness for more than 2m height Administration Requirements for HSE: Display pictorial HSE images No Alcohol/drug use at sites Tool box meeting to be conducted before site work HSE Induction training for new employees Refresh induction training for old employees	Job Specific Control Measures
		Fall of personnel	Body Injury / Fatal	R	Y	N	3	3	9	Y	NIL	Y	Y	Y	Provide ladders with 1m extension and assess for excavation above 1.5 m for every 15 meter. Scaffold/ Stairway with side handrails / Benching shall be provided Refer OCP-008 Safe Ladder use Refer OCP 009 Safe Scfolding Refer BOCW Rules 2006
		Engulfment by Water Ingress Ground water Table / Rain Water	Strangulation Drowning	R	Y	N	5	2	10	Y	NIL	Y	Y	Y	Ensure continuous dewatering for maintaining water level below the working level. Suspend the excavation during heavy rain and flood. No excavation after flooding and shall be inspected and authorised prior to start of work Availability of Rescue aid at site Permit to Work as per the OCP 021
		Contact with O H/ Buried Power lines	Electrocution	R	Y	N	3	3	9	Y	NIL	N	Y	Y	Safe distance shall be maintained as per IE rules in view of Voltage capacity identify and isolate the energy Maintain clear distance between OH Power lines as per IE rules. Display the Pictorial Image of OH Powerlines Lock out and tag out system shall be provided Permit to Work as per the OCP No. 004 Refer OCP-021 Permit to work





REGISTER OF HAZARDS/RISK IDENTIFICATION FOR CONSTRUCTION ACTIVITIES

HIRADC/EPC/03
Rev.No: 02
DATE: 01/10/2013

S.No	Job Step / Task	HAZARD	RISK	R/NR/F	LOR	IPC	Severity B	Likelihood C	Risk BXC	Significant	Elimination/ Substitution	Engg. Control	Administration & PPE control	Mandatory PPE's requirements for HSE: Safety shoes and safety Helmets Wear Full Body harness for more than 2m height Administration Requirements for HSE: Display pictorial HSE images No Alcohol/drug use at sites Tool box meeting to be conducted before site work HSE induction training for new employees Refresh induction training for old employees
Job Specific Control Measures														
3	Excavation by manual & machinery near by Public area and Undermining structures	Fall of structures / Personnel	Body Injury/ Fatal	R	Y	N	3	3	9	Y	Y	Y	Y	Substitution- Trenchless Excavation Adjacent structures shall be ensured by the Civil Engineer Fencing / Guarding in public places to prevent pedestrians and vehicles falling into them. Provide adequate guarding, signage, lighting and warning notices on all footpaths, cycle tracks or roads. Cover the trenches near the residential area to prevent fall of person Secure the near by structures or undermining structures with suitable shoring or Sheet Piling Display the Pictorial Images Permit to Work as per the OCP No. 021
4	Rock Blasting by using detonation	Flying debris <input type="checkbox"/>	Body Injury/ Fatal	AN	Y	N	3	3	9	Y	NIL	Y	Y	Corden off the area around the blasting sites. License & authorisation from PESO for Supply, Transportation, Storage and Shot firers Safe storage and handling of explosives as per the PESO No blasting before sunrise/ after sunset. Post Signal Men, Red flag and warning lights at the blasting sites. Ambulance, Stretcher, Fire Extinguisher/ Fire Brigade and First aiders availability at site. Safe Distance between blasting point and Detanator charging shelter as per the Explosive rules. No one is allowed to enter the blasting area until it is cleared off. Refer OCP-021 Permit to work Refer OCP-014 Controlled blasting
		Uncontrolled explosion (mis- firing, delayed explosion etc)	Body Injury Fatal	E	Y	N	3	4	12	Y	NIL	N	Y	No one is allowed to enter the mis fire area until it is cleared off Refer OCP-014 Controlled blasting
	Refer HIRADC/EPC/03 Revision 02													For Material Handling, Receipt, Storage, Transportation, Surface preparation, Lifting, Erection and Alignment etc





REGISTER OF HAZARDS/RISK IDENTIFICATION FOR CONSTRUCTION ACTIVITIES

HIRADC/EPC/03

Rev.No: 02

DATE: 01/10/2013

S.No	Job Step / Task Excavation	HAZARD	RISK	R/NR/E	LOR	IPC	Severity B	Likelihood C	Risk* BXC	Significant	Elimination/ Substitution	Engg. Control	Administration & PPE control	Mandatory PPE's requirements for HSE:
														Safety shoes and safety Helmets Wear Full Body harness for more than 2m height Administration Requirements for HSE: Display pictorial HSE images No Alcohol/drug use at sites Tool box meeting to be conducted before site work HSE Induction training for new employees Refresh induction training for old employees
Job Specific Control Measures														
5	Back Filling after Excavations	Hit by Machines Pinch Point at Tail Gate	Body Injury	R	Y	N	3	3	9	Y	NIL	Y	Y	Cordon off the swinging area A person to guide the machinery during reversing with High Visibility Jacket. Sufficient lighting during night time Administration and PPE Requirements for HSE Cover All is required Display of HSE posters, Caution/ Warning Signs for alerts Refer OCP-021 Permit to work Refer OCP-020 Safe excavation
6	Illumination during excavation/ Backfilling	Darkness	Discomfort	R	Y	N	2	4	8	Y	N	Y	Y	Sufficient illumination during excavation and Backfilling activities at the worksite and access area. Wear High Visibility Jacket during night work





**REGISTER OF HAZARDS/RISK IDENTIFICATION
FOR CONSTRUCTION ACTIVITIES**

HIRADC/EPC/03
Rev.No: 02
DATE: 01/10/2013

S.No	Job Step / Task	HAZARD	RISK	R/N/R/F	LOR	IPC	Severity B	Likelihood C	Risk* BxC	Significant	Elimination/ Substitution	Engg. Control	Administration & PPE control	Job Specific Control Measures
													<u>Mandatory PPE's requirements for HSE:</u> Safety shoes and safety Helmets Wear Full Body harness for more than 2m height <u>Administration Requirements for HSE:</u> Display pictorial HSE images No Alcohol/drug use at sites Tool box meeting to be conducted before site work HSE induction training for new employees Refresh induction training for old employees	

HEALTH

1	Excavation	Heat	Heat Stress / Heat Cramp	R	N	N	2	3	6	N	NIL	N	Y	Provide shaded shelter for resting; Drinking Water ; Electrolyte Job rotation/ Job rest Wear Loose Cotton Clothes Take plenty of drinking water frequently First Aid Kit with stretcher availability Get Medical Attention Immediately
		Cold Where Applicable	Numbness/ Frost Injury	R	N	N	2	3	6	N	NIL	N	Y	Provide shaded shelter for resting Warm up the body Full suit cover all is required Use leather type hand gloves / Safety Glasses/ Face Shield and Mandatory PPE's Job rotation/ Job rest First Aid Kit with stretcher availability Get Medical Attention Immediately
		Reaching out and body bending	Body Ache	R	N	N	2	3	6	Y	NIL	N	Y	Avoid awkward position during manual handling Safe lifting working method to avoid sprain / strain Use mechanical aids to avoid reaching out and body bending HSE Training for Ergonomics Pictorial Posters shall be displayed





REGISTER OF HAZARDS/RISK IDENTIFICATION FOR CONSTRUCTION ACTIVITIES


HIRADC/EPC/03

Rev.No: 02

DATE: 01/10/2013

S.No	Job Step / Task Excavation	HAZARD	RISK	R/NR/E	LOR	IPC	Severity B	Likelihood C	Risk ⁺ BXC	Significant	Elimination/ Substitution	Engg. Control	Administration & PPE control	Job Specific Control Measures		
														Control Measure	Control Measure	
															Mandatory PPE's requirements for HSE: Safety shoes and safety Helmets Wear Full Body harness for more than 2m height Administration Requirements for HSE: Display pictorial HSE images No Alcohol/drug use at sites Tool box meeting to be conducted before site work HSE induction training for new employees Refresh induction training for old employees	
		Noise by Construction machinery / Vehicles	Discomfort	R	Y	N	1	4	4	Y	NIL	Y	Y		Ensure that Noise level not exceeding 85dba Use Ear plug for greater than 85 dba Use Ear Muff for greater than 100 dba Muffler Facilities Display pictorial image poster by local language.	
		Dust Emission during excavation	Respiratory problems	R	N	N	2	3	6	N	NIL	N	Y		Suppression of dust by water sprinkling Wear Respiratory Nose Mask Job Rotataion Display pictorial image poster by local language.	



 REGISTER OF HAZARDS/RISK IDENTIFICATION FOR CONSTRUCTION ACTIVITIES		HIRADC/EPC/09												
		Rev.No: 02	DATE: 01/10/2013											
S.No	Job Step / Task FABRICATION	HAZARD	RISK	R/N/R/E	LOR	IPC	Severity B	Likelihood C	Risk* BxC	Significant	Elimination/ Substitution	Engg. Control	Administration & PPE control	Job Specific Control Measures
1	GAS CUTTING OF STRUCTURAL STEELS	Fire / Explosion by Pressurized Gas Cylinders	Burn Injury / Fatal	R	Y	N	5	2	10	Y	N	Y	Y	<p>Keep Gas Cylinders at the shaded shelter</p> <p>Put water gunny bags on the cylinders to reduce pressure high</p> <p>Keep Fire extinguishers/ Fire Brigade near by</p> <p>Do not expose gas cylinders on hot sun</p> <p>Administration and PPE Requirements for HSE:</p> <p>Leather type hand gloves are required</p> <p>HSE Training is required for Gas welding and cutting</p> <p>Refer OCP - 006 Gas Cutting & Welding</p> <p>Refer OCP-021 Permit to work</p>
		Fire / Explosion by back fire or flash back	Burn Injury / Fatal	R	Y	N	3	3	9	Y	N	Y	Y	<p>Ensure regular inspection of following : oxygen and fuel gas Cylinders condition</p> <p>A cylinder valves;A pressure regulator;A flashback arre the acetylene pressure must not exceed 0.62 bar (9 psf);</p> <p>If a backfire does occur:</p> <ol style="list-style-type: none"> 1.shut off the blowpipe valves, oxygen first and then the fuel gas; 2.Shut off the oxygen and fuel gas cylinder valves; 3. Cool the blowpipe with water, if necessary; 4. Check the equipment for damage or faults, particularly the nozzle.



REGISTER OF HAZARDS/RISK IDENTIFICATION FOR CONSTRUCTION ACTIVITIES

HIRADC/EPC/09
Rev.No: 02
DATE: 01/10/2013

W A B A G

S.No	Job Step / Task FABRICATION	HAZARD	RISK	R/NR/ E	LOR	IPC	Severity B	Likelihood C	Risk* BxC	Significant	Elimination/ Substitution	Engy. Control	Administration & PPE control	Job Specific Control Measures
		Fire / Explosion by Gas leakage	Burn Injury / Fatal	R	Y	N	3	3	9	Y	N	Y	Y	<p>Mandatory PPE's requirements for HSE: Safety shoes and safety Helmets Wear Full Body harness for more than 2m height</p> <p>Administration Requirements for HSE: Display pictorial HSE images No Alcohol/drug use at sites Tool box meeting to be conducted before site work HSE induction training for new employees Refresh induction training for old employees</p> <p style="text-align: center;">Job Specific Control Measures</p> <p>Provide adequate ventilation Store gas cylinders well-ventilated place; Repair or replace the component When the leak is found, Any detergent should be flushed off with clean water to remove any corrosive salts. Never look for gas leaks with a naked flame. If a cylinder leaks when the valve is closed, the cylinder should be taken outside to a ventilated area, away from sources of ignition (naked flames, sparks, electric lights and motors, etc) Notify the supplier immediately. Cap protection always for avoid valves damage Secure cylinders by upright condition by trolley with chains Refer OCP-006 Gas cutting and welding</p>
		Splash of molten metal	Burn injury	R	Y	N	2	3	6	N	N	Y	Y	<p>Screen is required to avoid splattering of molten metal Leather Apron shall be used</p>
		Hot Surface of Materials	Burn injury	R	N	N	2	3	6	N	N	Y	Y	<p>Use Inspected Hand and Powered tools (Hammer, Chiesel Hack saw and drillingmc) Wear Leather type hand gloves and Leather apron</p>



W A B A G		REGISTER OF HAZARDS/RISK IDENTIFICATION FOR CONSTRUCTION ACTIVITIES										HIRADC/EPC/09 Rev.No: 02 DATE: 01/10/2013			
S.No	Job Step / Task FABRICATION	HAZARD	RISK	R/N/R/E	LOR	IPC	Severity B	Likelihood C	Risk* BxC	Significant	Elimination/ Substitution	Engg. Control	Administration & PPE control	Mandatory PPE's requirements for HSE: Safety shoes and safety Helmets Wear Full Body harness for more than 2m height Administration Requirements for HSE: Display pictorial HSE images No Alcohol/drug use at sites Tool box meeting to be conducted before site work HSE induction training for new employees Refresh induction training for old employees	Job Specific Control Measures
		Repeated Body Twisting	Sprain/ Strain	R	N	N	2	3	6	N	N	Y	Y	Job Rest is required Job Rotation is required HSE Training for Ergonomics is required	
2	Cutting of structural steel members by Hacksaw	Crushing of hand/palm / fingers between hammer and chisel	Body Injury	R	Y	N	3	3	9	N	N	Y	Y	Keep away Hand and fingers when holding the chisel Use Long Handle to hold chisel while remove bending or tents Head position Shall be always at the sides while hammering Inspect the hammer and chisel without mushroom edges and power tools safety prior to use them. Provide the wooden members or cushion effect materials at the ground to avoid materials jumpoff. Administration and PPE Requirements for HSE Leather type hand gloves are required HSE Training is required for hand tools safety	



REGISTER OF HAZARDS/RISK IDENTIFICATION FOR CONSTRUCTION ACTIVITIES

HIRADC/EPC/09
Rev.No: 02
DATE: 01/10/2013


W A B A G

S.No	Job Step / Task FABRICATION	HAZARD	RISK	R/N/R/E	LOR	IPC	Severity B	Likelihood C	Risk' Bxc	Significant	Elimination/ Substitution	Engg. Control	Administration &PPE control	Job Specific Control Measures
3	Arc Welding by using electrical powered welding machine	Touching live electrical parts	Electrocution	R	Y	N	5	3	15	N	N	Y	Y	<p>Mandatory PPE's requirements for HSE: Safety shoes and safety Helmets Wear Full Body harness for more than 2m height</p> <p>Administration Requirements for HSE: Display pictorial HSE images No Alcohol/drug use at sites Tool box meeting to be conducted before site work HSE induction training for new employees Refresh induction training for old employees</p> <p>Job Specific Control Measures Ensure that earthing pits resistance value, fuse rating, Body earthing of welding mc, cables insulation and ELCB device to avoid shock Turn off power supply when not in use Do not use cables that are worn or broken. Do not wrap cables around body Electrodes are removed from the holders when not in use Wet welding mc thoroughly dried and tested before being used. Administration and PPE Requirements for HSE Proper Face protection HSE Training is required for Welding safety Refer OCP-004 Electrical Maintenance Refer OCP-013 Lock out Tag out on energized systems</p>
		Fire by welding near by flammable material	Burn Injury / Fatal	R	Y	N	3	3	9	Y	N	Y	Y	<p>Remove all flammable materials from area of welding Do not weld around flammable liquids A fire extinguisher shall be available when welding, cutting or heating</p>



W A B A G		REGISTER OF HAZARDS/RISK IDENTIFICATION FOR CONSTRUCTION ACTIVITIES										HIRADC/IEPC/09 Rev.No: 02 DATE: 01/10/2013			
S.No	Job Step / Task FABRICATION	HAZARD	RISK	R/N/R/E	LOR	IPC	Severity B	Likelihood C	Risk* Bxc	Significant	Elimination/ Substitution	Engg. Control	Administration & PPE control	Mandatory PPE's requirements for HSE: Safety shoes and safety Helmets Wear Full Body harness for more than 2m height Administration Requirements for HSE: Display pictorial HSE images No Alcohol/drug use at sites Tool box meeting to be conducted before site work HSE induction training for new employees Refresh induction training for old employees	Job Specific Control Measures
4	Alignment, Erection & Fixing of structural members at the ground level and elevated levels	Caught in between at the pinch point	Body Injury	R	N	N	2	3	6	Y	Nf	Nf	Y	Use levers and place spacers (wood planks) before lifting. Do not place hand/foot at the pinch points Alignment using mechanical aid. Use of leverage for final alignment Administration and PPE's Requirements Leather type hand gloves are required HSE Training is required for caught in between at pinch points	
		Injury from fall of Materials	Body Injury/Fatal	E	Y	N	3	3	9	Y	Nf	Nf	Y	Equipments shall be secured suitably by a lifting machinery 3rd party inspection certification for lifting machinery and lifting tools and tackles Loose materials shall be secured Guy ropes shall be provided to support of structural members to avoid collapse during high winds Fixing of bolts and nuts at least 70% with the structural members shall be ensured where it is applicable. Refer OCP - 007 Lifting and Handling	



		REGISTER OF HAZARDS/RISK IDENTIFICATION FOR CONSTRUCTION ACTIVITIES										HIRADC/EPC/09 Rev.No: 02 DATE: 01/10/2013				
		S.No	Job Step / Task FABRICATION	HAZARD	RISK	R/NR/E	LOR	IPC	Severity B	Likelihood C	Risk* BxC	Significant	Elimination/ Substitution	Engg. Control	Administration & PPE control	Mandatory PPE's requirements for HSE: Safety shoes and safety Helmets Wear Full Body harness for more than 2m height Administration Requirements for HSE: Display pictorial HSE images No Alcohol/drug use at sites Tool box meeting to be conducted before site work HSE induction training for new employees Refresh Induction training for old employees
																Frog walk by sitting position shall be allowed on structural beam No one allowed to walk on beam by standing position Horizontal Life lines with turn buckles devices Vertical grab life lines with anchorage for vertical steel members Access ladder and walkway scaffold platform shall be arranged Administration and PPE's Requirements : Wearing Nose mask Leather type hand gloves are required HSE Training is required for Ergonomics and Rigging work Full Body harness required Refer OCP-008 Safe Scaffolding Refer OCP-009 Safe use of ladder





WABAG

**REGISTER OF HAZARDS/RISK IDENTIFICATION
FOR CONSTRUCTION ACTIVITIES**

HIRADC/EPC/09

Rev.No: 02

DATE: 01/10/2013

S.No	Job Step / Task FABRICATION	HAZARD	RISK	R/N/R/ E	LOR	IPC	Severity B	Likelihood C	Risk* BxC	Significant	Elimination/ Substitution	Engg. Control	Administration &PPE control	Mandatory PPE's requirements for HSE: Safety shoes and safety Helmets Wear Full Body harness for more than 2m height Administration Requirements for HSE: Display pictorial HSE images No Alcohol/drug use at sites Tool box meeting to be conducted before site work HSE induction training for new employees Refresh induction training for old employees	Job Specific Control Measures
				1	2	3	4	5	6	7	8	9	10		
1	Fabrication and erection of structural steel members by manual / by using welding mc and gas cutting cylinders at the ground level and height work	Heat Cold Where Applicable	Heat Stress / Heat Cramp Numbness/ Frost Injury	R	N	N	2	3	6	N	L	NI	Y	Provide shaded shelter for resting; Drinking Water ; Electrolyte Job rotation/ Job rest First Aid Kit with stretcher availability Get Medical Attention Immediately Provide shaded shelter for resting Warm up the body Full suit cover all is required Do not touch the materials with bare hand Use leather type hand gloves / Safety Glasses/ Face Shield Job rotation/ Job rest First Aid Kit with stretcher availability Get Medical Attention Immediately	

HEALTH



REGISTER OF HAZARDS/RISK IDENTIFICATION FOR CONSTRUCTION ACTIVITIES



S.No	Job Step / Task FABRICATION	HAZARD	RISK	R/N/R/E	LOR	IPC	Severity B	Likelihood C	Risk* BxC	Significant	Elimination/ Substitution	Engg. Control	Administration &PPE control	Job Specific Control Measures
		Reaching out and body bending	Body Ache	R	N	N	2	3	6	N	NI	N	Y	<p>Mandatory PPE's requirements for HSE: Safety shoes and safety Helmets Wear Full Body harness for more than 2m height</p> <p>Administration Requirements for HSE: Display pictorial HSE images No Alcohol/drug use at sites Tool box meeting to be conducted before site work HSE induction training for new employees Refresh induction training for old employees</p> <p>Job Specific Control Measures Avoid awkward position during manual handling Safe lifting method shall be followed to avoid sprain / strain Use mechanical aids to avoid reaching out and body bending HSE Training for Ergonomics Pictorial Posters shall be displayed</p>
		Fumes and gases exposure	Asphyxiation/ Respiratory effect	R	Y	N	2	4	8	Y	NI	N	Y	<p>Keep our head out of the fumes. Wear an appropriate respirator Removal of fumes with the use of ventilation may be needed, use a fan to remove fumes</p>
		UV / Infrared Radiation/ Intense Visible Light	"Arc Eye" / Skin Burn Injury	R	Y	N	2	4	8	Y	NI	N	Y	<p>No time shall the arc be observed without eye protection. safety glasses and with side shields and proper shade or filter Leather Apron is required</p>
		Ozone and nitrogen oxide produced by UV Welding Arc	Lungs infection/ Head ache / Chest pain	R	Y	N	2	3	6	Y	NI	N	Y	<p>Wear Respiratory mask Job rotation Job rest Protective Screen / adequate ventilation is required</p>



WABAG		REGISTER OF HAZARDS/RISK IDENTIFICATION FOR CONSTRUCTION ACTIVITIES										HIRADC/EPC/01 Rev.No: 02 DATE: 01/10/2013		
S.No	Job Step / Task MATERIAL HANDLING RECEIPT,STORAGE, TRANSPORTATION AND LIFTING ETC,	HAZARD	RISK	R/NR/E	LOR	IPC	Severity B	Likelihood C	Risk* BxC	Significant	Elimination / Substitution	Engg. Control	Administration &PPE control	Job Specific Control Measures
1	Unloading of Materials from Vendors to stores/yard	Injury by Fall of Materials	Body Injury	R	Y	N	3	3	9	Y	NIL	Y	Y	<p><u>Mandatory PPE's requirements for HSE:</u> Safety shoes and safety Helmets Wear Full Body harness for more than 2m height <u>Administration Requirements for HSE:</u> Display pictorial HSE images No Alcohol/drug use at sites Tool box meeting to be conducted before site work HSE Induction training for new employees Refresh induction training for old employees</p> <p>Job Specific Control Measures</p> <p>Corden off the area Use Mechanical Equipments to avoid contact manually Use Lifting machinery with lifting tools Inspected by 3rd party Ensure Safe working load recommended by mfrs. Wedges shall be used to avoid roll out materials Buddy system will be arranged for safe transfer of materials if manually Fixing Tailing Rope While unloading. <u>Administration and PPE Requirements for HSE:</u> Leather type hand gloves are required HSE Training is required for Working at Height & Fall of Materials First Aid Kit and Stretcher availability Refer OCP No. 7 Material Lifting</p>
2	Unpacking of Unloaded Materials at Stores / yard	Sharp edges (From Steel Strap; Nails)	Body Injury	NR	N	N	2	3	6	N	NIL	Y	Y	<p>Do not leave sharp straps and protruding nails at the job site. Collect and disposal at the designated area Administration and PPE Requirements for HSE Leather type hand gloves are required HSE Training is required for material handling and Refer OCP No. 16 Handling of Waste</p>



REGISTER OF HAZARDS/RISK IDENTIFICATION FOR CONSTRUCTION ACTIVITIES														
WABAG		HIRADC/EPC/01 Rev.No.: 02 DATE: 01/10/2013												
S.No	Job Step / Task MATERIAL HANDLING RECEIPT, STORAGE, TRANSPORTATION AND LIFTING ETC.,	HAZARD	RISK	R/N/R/E	LOR	IPC	Severity B	Likelihood C	Risk* BxC	Significant	Elimination / Substitution	Engg. Control	Administration & PPE control	Job Specific Control Measures
3	Vehicle / Construction Machinery brought to site for Preparation of lifting the materials from stores / yard	Topping of Machines / Vehicles by Unstable road / ground surface	Body Injury/ Fatal	R	N	N	3	3	9	N	NIL	Y	Y	Cordon off the area Compaction of the earth shall be ensured prior to vehicle or machinery movement. Speed limit 15km/ hr shall be followed at site roads(Designated) Use only the identified designated roads for vehicle/ machinery movements Outriggers shall be placed prior to lifting Administration and PPE Requirements for HSE Leather type hand gloves are required HSE Training is required for material handling and Refer OCP No.7 for lifting of materials
4	Transportation of loaded materials by lifting machinery or vehicles from Stores to Workspot	Fall of materials	Body Injury/ Fatal	R	N	N	3	3	9	N	NIL	Y	Y	Cordon off the area PostSignal man for traffic management Tie the load with talling rope Lifting Machinery Maintenance as per the Manufacturers No operator under eighteen year of age. No person cross on suspended load Ensure functioning of Hoist Limit Switches, Boom Limit Switches and Swinging distance



WABAG		REGISTER OF HAZARDS/RISK IDENTIFICATION FOR CONSTRUCTION ACTIVITIES										HIRADC/EPC/01 Rev.No: 02 DATE: 01/10/2013		
S.No	Job Step / Task MATERIAL HANDLING RECEIPT, STORAGE, TRANSPORTATION AND LIFTING ETC,	HAZARD	RISK	R/NR/ E	LOR	IPC	Severity B	Likelihood C	Risk* BxC	Significant	Elimination / Substitution	Engg. Control	Administration & PPE control	Job Specific Control Measures
	Transportation of loaded materials by lifting machinery or vehicles from Stores to Workshop (CONTINUE)	Fall of materials												<p>SL.NO. 4 Continue</p> <p>Ensure the Condition of Slings free from broken or knot or bird cage and functioning of safety latches.</p> <p>Counter- weights shall be ensured</p> <p>Ensure the Center of Gravity while rigging</p> <p>Ensure firm ground during the transportation</p> <p>Speed limit 15km/ hr shall be followed at site roads(Designated)</p> <p>Use only the identified designated roads for vehicle/ machinery movements</p>
4	Transportation of Loaded materials by lifting machinery or vehicles from Stores to Workshop (CONTINUE)	Hit By Vehicle	Body Injury/Fatal	R	N	N	2	3	6	N	NIL	Y	Y	<p>Pictorial Warning signs shall be displayed for the vehicle movement</p> <p>No one cross the road during a vehicle movements.</p> <p>Signal Men</p> <p>Use Reverse Horn and Flash Lights</p> <p>Vehicle Maintenance and Brake Condition</p> <p>Speed limit 15km/ hr shall be followed at site roads(Designated)</p> <p>Use only the identified designated roads for vehicle/ machinery movements</p>



REGISTER OF HAZARDS/RISK IDENTIFICATION FOR CONSTRUCTION ACTIVITIES

HIRADC/IEPC/01
Rev.No: 02
DATE: 01/10/2013

S.No	Job Step / Task	HAZARD	RISK	R/N/R/E	LOR	IPC	Severity B	Likelihood C	Risk* BxC	Significant	Elimination / Substitution	Engg. Control	Administration & PPE control	Mandatory PPE's requirements for HSE:
5	Lifting of loaded Materials/ Equipments by lifting machinery, tools and tackles at Work Spot	Fall of Materials	Body Injury	R	Y	N	3	3	9	Y	NIL	Y	Y	<p>Job Specific Control Measures</p> <p>Corden off the area with lifting sign boards by the local language. Post Signal man. Tie the load with guy rope designated. No person rides on suspended / standing below load ; 3rd party inspection of Lifting machinery, tools and tackles ; SWL for Lifting Machinery, tools and tackles ;Hoist Limit Switches, Boom Limit Switches and Swinging distance.Condition of Slings free from broken or knot or bird cage and functioning of safety latches. Counter- weights shall be ensured;Ensure the Center of Gravity while lifting Refer BOCW Rules No. 64 Refer OCP No. 21 & OCP No. 7</p>
6	Raising Boom While lifting or movement of lifting / construction machinery	Contact with OH Buried Power lines	Electrocution	R	Y	N	5	3	15	Y	NIL	Y	Y	<p>Maintain Safe Distance from OH Lines Lock out and tag out system if necessary Permit to work Refer OCP No. 4 & OCP 21</p>



WABAG		REGISTER OF HAZARDS/RISK IDENTIFICATION FOR CONSTRUCTION ACTIVITIES										HIRADC/EPC/01 Rev.No: 02 DATE: 01/10/2013		
S.No	Job Step / Task MATERIAL HANDLING RECEIPT,STORAGE, TRANSPORTATION AND LIFTING ETC.	HAZARD	RISK	R/NR/E	LOR	IPC	Severity B	Likelihood C	Risk* BXC	Significant	Elimination / Substitution	Engg. Control	Administration & PPE control	Mandatory PPE's requirements for HSE: Safety shoes and safety Helmets Wear Full Body harness for more than 2m height Administration Requirements for HSE: Display pictorial HSE images No Alcohol/drug use at sites Tool box meeting to be conducted before site work HSE induction training for new employees Refresh induction training for old employees
Job Specific Control Measures														
7	Construction of Scaffold with working platform for alignment of lifting materials	Collapse of scaffold	Body Injury	E	Y	N	2	3	6	Y	NIL	NIL	Y	Scaffold shall be erected as per the scaffold procedure Scaffold shall be secured by a guy rope to secure Putlog Tie off with the permanent Structures Refer BOCW Rules No. 188 Refer OCP No.8
8	Working at Height while Positioning of lifting materials etc.,	Fall of person from height	Body Injury	NR	Y	N	3	3	9	Y	NIL	Y	Y	Provide Guard Rails Erection of Safe Scaffold & Working platform Administration and PPE's Requirements Leather type hand gloves are required HSE Training is required for working at height and Fall of Materials Full body harness with double lanyard upto 6m level;Full body harness, double lanyard and shock absorber if more than 6m level
3	Working at Height while Positioning of lifting materials etc., (CONTINUE)	As same as above	As same as above											SL.NO. 7 Continue Safety Net and Horizontal or Vertical life line where fixing of hard barrication is difficult / impossible Refer OCP No.8 Safe Scaffolding Refer OCP No. 9 Ladder & Stair Refer OCP No. 21 Permit to work Refer BOCW Rules No.196



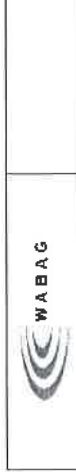
REGISTER OF HAZARDS/RISK IDENTIFICATION FOR CONSTRUCTION ACTIVITIES														
<p style="text-align: right;">HIRADC/EPC/01 Rev.No: 02 DATE: 01/10/2013</p> <p>Mandatory PPE's requirements for HSE: Safety shoes and safety Helmets Wear Full Body harness for more than 2m height Administration Requirements for HSE: Display pictorial HSE images No Alcohol/drug use at sites Tool box meeting to be conducted before site work HSE induction training for new employees Refresh induction training for old employees</p>														
S.No	Job Step / Task	HAZARD	RISK	R/NR/ E	LOR	IPC	Severity B	Likelihood C	Risk* BxC	Significant	Elimination / Substitution	Engg. Control	Administration &PPE control	Job Specific Control Measures
9	Lifting of loaded Materials/ Equipments and Alignment by Mono rails	Fall of materials on personnel due to breakage of Slings	Injury due to Fall R of Materials	R	Y	N	3	3	9	Y	NIL	NIL	Y	Check the weight of Material before Lifting Slings should be connected with eye Bolts or sling points to secure the Material Slings should be checked by third party Administration and PPE's Requirements Helmet and Safety Shoes are mandatory. Wearing Nose mask & Leather type hand gloves are required HSE Tool box talks shall be conducted prior to start work Display of HSE posters, Caution/ Warning Signs for alerts HSE Training is required for Ergonomics and Rigging work
10	Preparation of Bed Floor (Chipping)	Flying of Particles (Loose Materials/ Debris)	Eye Injury	N	N	N	1	3	3	N	NIL	N	Y	Wear Safety Glasses Wear Dust Mask Refer OCP-007 Lifting and Handling of materials Refer HIRA EPC-14 Transportation of Materials.
11	Alignment and positioning of lifting materials	Caught in between at the pinch point	Body Injury	NR	N	N	2	3	6	Y	NIL	NIL	Y	Use levers and place spacers (wood planks) before lifting. Do not place hand/toe at the pinch points Alignment using mechanical aid. Use of leverage for final alignment Administration and PPE's Requirements Leather type hand gloves are required HSE Training for caught in at pinch points



WABAG		REGISTER OF HAZARDS/RISK IDENTIFICATION FOR CONSTRUCTION ACTIVITIES										HIRADC/EPC/01 Rev.No: 02 DATE: 01/10/2013		
S.No	Job Step / Task MATERIAL HANDLING RECEIPT,STORAGE, TRANSPORTATION AND LIFTING ETC,	HAZARD	RISK	R/NR/ E	LOR	IPC	Severity B	Likelihood C	Risk* BxC	Significant	Elimination / Substitution	Engg. Control	Administration &PPE control	Control Measures
1	Unloading, Unpacking, Transportation, lifting, Positioning, Alignment of Materials from stores/yard and work area.	Heat Cold Where Applicable	Heat Stress / Heat Cramp Numpness/ Frost Injury	R	N	N	2	3	6	N	NIL	N	Y	Provide shaded shelter for resting; Drinking Water ; Electrolyte Job rotation/ Job rest First Aid Kit with stretcher availability Get Medical Attention Immediately Provide shaded shelter for resting Warm up the body Full suit cover all is required Do not touch the materials with bare hand Use leather type hand gloves / Safety Glasses/ Face Shield and Mandatory PPE's Job rotation/ Job rest First Aid Kit with stretcher availability Get Medical Attention Immediately
HEALTH														
Job Specific Control Measures														



REGISTER OF HAZARDS/RISK IDENTIFICATION FOR CONSTRUCTION ACTIVITIES



S.No	Job Step / Task	HAZARD	RISK	R/NR/ E	LOR	IPC	Severity B	Likelihood C	Risk* BxC	Significant	Elimination / Substitution	Engg. Control	Administration & PPE control	Job Specific Control Measures
	MATERIAL HANDLING, RECEIPT, STORAGE, TRANSPORTATION AND LIFTING ETC,													
		Reaching out and body bending	Body Ache	R	N	N	2	3	6	N	NIL	N	Y	Avoid awkward position during manual handling Safe lifting method shall be followed to avoid sprain / strain Use mechanical aids to avoid reaching out and body bending HSE Training for Ergonomics Pictorial Posters shall be displayed

Mandatory PPE's requirements for HSE:
 Safety shoes and safety Helmets
 Wear Full Body harness for more than 2m height
Administration Requirements for HSE:
 Display pictorial HSE images
 No Alcohol/drug use at sites
 Tool box meeting to be conducted before site work
 HSE induction training for new employees
 Refresh induction training for old employees





**REGISTER OF HAZARDS/RISK IDENTIFICATION
FOR CONSTRUCTION ACTIVITIES**

HIRADC/EPC/10

Rev.No: 02

DATE: 01/10/2013

S.No	Job Step / Task	HAZARD	RISK	R/N/R/E	LOR	IPC	Severity B	Likelihood C	Risk BxC	Significant	Elimination/ Substitution	Engg. Control	Administration & PPE control	Mandatory PPE's requirements for HSE:
1	Cleaning the Surface at the ground level or working at height (Including Confined Space)	Slip, trip and fall	Body injury	R	N	N	3	3	9	N	NIL	NIL	Y	Safety shoes and safety Helmets Wear Full Body harness for more than 2m height Administration Requirements for HSE: Display pictorial HSE Images No Alcohol/drug use at sites Tool box meeting to be conducted before site work HSE induction training for new employees Refresh induction training for old employees Job Specific Control Measures
2	Grit blasting at the ground level or at elevated levels (Including Confined Space)	Hitting Caused by Burst of hoses (Excessive Air Pressure)	Body Injury	R	Y	N	3	3	9	N	NIL	Y	Y	TRANSPORTATION AND LIFTING OF MATERIALS REFER HIRA -EPC 14 Rev-02 Cordon off the area Ensure working pressure of a blast hose shall not exceed the Manufacturers Specification. Provide Pressure Relief Valve Hose from the pot to the blast nozzle is kept as straight Avoid Sharp Curves.
2	Grit blasting at the ground level or at elevated levels (Including Confined Space) CONTINUE			R	Y	N	3	3	9	N	NIL	Y	Y	Ensure Hose whip checks or hose coupling safety locks <input type="checkbox"/> Safety cables are used to support the weight of elevated hoses <input type="checkbox"/> Pin holes are not taped in the blast hose. Nozzle holders and couplings fit snugly on the blast hose. <input type="checkbox"/> Dead man control switch shall be used at the blast nozzle.



REGISTER OF HAZARDS/RISK IDENTIFICATION FOR CONSTRUCTION ACTIVITIES



S.No	Job Step / Task	HAZARD	RISK	R/M/R/E	LOR	IPC	Severity B	Likelihood C	Risk B/C	Significant	Elimination/ Substitution	Engg. Control	Administration & PPE control	Mandatory PPE's requirements for HSE:
	Job Step / Task GRIT BLASTING													Safety shoes and safety Helmets Wear Full Body harness for more than 2m height Administration Requirements for HSE: Display pictorial HSE images No Alcohol/drug use at sites Tool box meeting to be conducted before site work HSE induction training for new employees Refresh induction training for old employees
														Job Specific Control Measures Covering by tarpaulin or any other suitable material at the blasting area Suppression of high velocity Grit by foggy spray Exhaust with duct shall be provided to avoid flying of abrasive Never point a blast nozzle at a person; Using a dead-man control device at the nozzle end of the blasting hose; Provision of guards to protect the operator from high-speed particles;
2	Grit blasting at the ground level or at elevated levels (Including Confined Space) CONTINUE	High Speed Particles	Body injury	R	N	N	2	3	6	N	NIL	Y	Y	Safety shoes shall be with anti-static rubber linings Proper bonding and grounding Refer OCP -004
	Grit blasting at the ground level or at elevated levels (Including Confined Space) CONTINUE	Static Electricity caused by abrasive media	Static electricity	R	Y	N	2	2	4	N	NIL	Y	Y	





**REGISTER OF HAZARDS/RISK IDENTIFICATION
FOR CONSTRUCTION ACTIVITIES**

HIRADC/EPC/10
Rev.No: 02
DATE: 01/10/2013

S.No	Job Step / Task GRIT BLASTING	HAZARD	RISK	R/N/R/E	LOR	IPC	Severity B	Likelihood C	Risk* BxC	Significant	Elimination/ Substitution	Engg. Control	Administration &PPE control	Job Specific Control Measures
1	Grit blasting at the ground level and working at height (Including Confined Space)	Heat	Heat Stress / Heat Cramp	R	N	N	2	3	6	N	NIL	N	Y	Provide shaded shelter for resting; Drinking Water ; Electrolyte Job rotation/ Job rest First Aid Kit with stretcher availability Get Medical Attention Immediately
		Cold Where Applicable	Numpruss/ Frost Injury	R	N	N	2	3	6	N	NIL	N	Y	Provide shaded shelter for resting Warm up the body Full suit cover all is required Do not touch the materials with bare hand Use leather type hand gloves / Safety Glasses/ Face Shield and Mandatory PPE's Job rotation/ Job rest First Aid Kit with stretcher availability Get Medical Attention Immediately
		Reaching out and body bending	Body Ache	R	N	N	2	3	6	N	NIL	N	Y	Avoid awkward position during manual handling Safe lifting method shall be followed to avoid sprain / strain Use mechanical aids to avoid reaching out and body bending HSE Training for Ergonomics Pictorial Posters shall be displayed
		Exposure to Abrasive Media	Lungs Infection/ Head ache	R	N	N	1	4	4	N	NIL	N	Y	Wear a particle dust mask respirator Removal of abrasive by suitable exhaust duct facilities Refer OCP No. 019 Blast Cleaning Refer OCP No.003 Confined Space Refer OCP No. 021 Permit to work Refer OCP No. 011 Pneumatic Tool Handling
	Grit blasting at the ground level and working at height (Including Confined Space)	Vibration	white finger	R	N	N	2	4	8	N	NIL	N	Y	Job rotation Frequent breaks (e.g., a 10-minute break after each hour of continuous blasting); Regular maintenance of blasting equipment Keep hands warm and dry while on the job. Certain glove designs also reduce vibration.

HEALTH




WABAG		REGISTER OF HAZARDS/RISK IDENTIFICATION FOR CONSTRUCTION ACTIVITIES										HIRADC/EPC/10 Rev.No: 02 DATE: 01/10/2013			
S.No	Job Step / Task GRIT BLASTING	HAZARD	RISK	R/N/R/E	LOR	IPC	Severity B	Likelihood C	Risk* BxC	Significant	Elimination/ Substitution	Engg. Control	Administration & PPE control	Mandatory PPE's requirements for HSE: Safety shoes and safety Helmets Wear Full Body harness for more than 2m height Administration Requirements for HSE: Display pictorial HSE images No Alcohol/drug use at sites Tool box meeting to be conducted before site work HSE induction training for new employees Refresh induction training for old employees	Job Specific Control Measures
		Noise	Ear Plug / Ear muff	R	Y	N	2	4	4	N	NIL	N	Y	<p>Air discharge from blast nozzle: 112 to 119 dBA (Ear muff) Supply air inside operator's helmet: 94 to 102 dBA (Ear Muff) Abrasive blasting cabinets: 90 to 101dBA (Ear Muff) Air compressors: 85 to 88 dBA(Ear Plug) Maximum noise levels up to 145 dBA when the grit pot runs out of abrasive.(Ear Muff)</p>	<p>Air discharge from blast nozzle: 112 to 119 dBA (Ear muff) Supply air inside operator's helmet: 94 to 102 dBA (Ear Muff) Abrasive blasting cabinets: 90 to 101dBA (Ear Muff) Air compressors: 85 to 88 dBA(Ear Plug) Maximum noise levels up to 145 dBA when the grit pot runs out of abrasive.(Ear Muff)</p>



WABAG		REGISTER OF HAZARDS/RISK IDENTIFICATION FOR CONSTRUCTION ACTIVITIES										HIRADC/EPC/02 Rev.No: 00 DATE: 01/10/2013			
S.No	Job Step / Task Piling Work and Piling Cap and load testing	HAZARD	RISK	RNR/ E	LOR	IFC	Severity B	Likelihood C	Risk* BxC	Significant	Elimination/ Substitution	Engg. Control	Administration & PPE control	Mandatory PPE's requirements for HSE: Safety shoes and safety Helmets Wear Full Body harness for more than 2m height Administration Requirements for HSE: Display pictorial HSE images No Alcohol/drug use at sites Tool box meeting to be conducted before site work HSE induction training for new employees Refresh induction training for old employees	Job Specific Control Measures
1	Fixing of Tripod Stand and operation of air hammer	Injury by fall of Tripod /hitting by hammer by connection break	Body Injury	R	Y	N	5	2	10	Y	N	Y	Y	Cordon off the area Heavy timber sill or concrete bed or secured foundation for stability of Tripod standard lock pin at the base of each log Hammer must be securely lashed. Do not allow un authorized personnel during piling activities Tool box talks for Piling Operation to all workers by supervisor	
2	Handling Rotating Augers	Entrapment of Clothes / Hands or Limbs	Body Injury	R	N	N	2	3	6	N	N	N	Y	Cordon off the area Display of Pictorial HSE Image for Entrapment around piling area wear close fitting clothes Wear Full suit cover all Wear Hand Gloves	
3	Tripping or falling over tools/ equipment/ materials	Injury by Falling or Tripping	Body Injury	R	N	N	2	3	6	N	N	Y	Y	Ensure tools, equipment and materials are placed tidily and securely to avoid danger of tripping and fall over Stack materials safely. Hammer is blocked at the bottom of the head when not in use	
4	Slipping in Mud	Falling	Body Injury	R	Y	N	3	3	9	27	N	N	Y	Cordon off the area Clean the Mud from bore hole flushing and grout mixing or spillage. Make the drainage channel and disposal to the designated Keep the area cleaned and drained. Wear Gum boots	



REGISTER OF HAZARDS/RISK IDENTIFICATION FOR CONSTRUCTION ACTIVITIES										HIRADC/EPC/02					
										Rev.No.: 00					
										DATE: 01/10/2013					
S.No	Job Step / Task	HAZARD	RISK	R/NR/ E	LOR	IPC	Severity B	Likelihood C	Risk* BxC	Significant	Elimination/ Substitution	Engg. Control	Administration & PPE control	Mandatory PPE's requirements for HSE:	Job Specific Control Measures
	Job Step / Task Piling Work and Piling Cap and load testing													Safety shoes and safety Helmets Wear Full Body harness for more than 2m height Administration Requirements for HSE: Display pictorial HSE images No Alcohol/drug use at sites Tool box meeting to be conducted before site work HSE induction training for new employees Refresh induction training for old employees	
5	Tripping or falling into / onto piles	Falling	Body Injury	NR	Y	N	2	3	6	Y	N	Y	Y	Ensure tubular piles are elevated at least 1m from ground and marked. Ensure piles are concrete filled as soon as possible after completion of work Ensure mushroom caps are placed on to exposed reinforcement Suitable working platforms, Hand rails & Toe bores shall be provided where structural tower supports to lead a pile driving	
6	Hammering operation	Noise	Discomfort	R	Y	N	1	5	5	Y	N	N	Y	Reduce exposure time Wear ear plug Job Rotation Display Pictorial HSE image poster in local language	
7	Illumination at Night	Inadequate lighting	Discomfort	R	N	N	1	3	3	N	N	N	Y	Refer HIRA for 003 Excavation for Illumination requirement	
8	Welding & Oxy Acetylene Cutting for piling operation	Fire/ Explosion	Body Injury	NR	Y	N	4	2	8	Y	N	N	Y	Refer HIRA for 009 Fabrication for Welding activities	
9	Sheet piling	Fall of sheet piling on personnel	Body injury	NR	Y	N	3	3	9	Y	N	Y	Y	Cordon off the area Signal man is required to guide the operator. Safe distance is to be maintained while lowering the sheets. Use sheet pile threader to safely interlock the sheet piles.	
		Collapse of load	Body Injury	NR	Y	N	3	3	9	Y	N	N	Y	Cordon off the area. Provide HSE pictorial image poster Prohibited for unauthorised persons	



WABAG		REGISTER OF HAZARDS/RISK IDENTIFICATION FOR CONSTRUCTION ACTIVITIES											HIRADC/EPC/02 Rev.No: 00 DATE: 01/10/2013			
		S.No	Job Step / Task Piling Work and Piling Cap and load testing	HAZARD	RISK	R/N/R/E	LOR	IPC	Severity B	Likelihood C	Risk* BxC	Significant	Elimination/ Substitution	Engg. Control	Administration & PPE control	Mandatory PPE's requirements for HSE: Safety shoes and safety Helmets Wear Full Body harness for more than 2m height Administration Requirements for HSE: Display pictorial HSE images No Alcohol/drug use at sites Tool box meeting to be conducted before site work HSE Induction training for new employees Refresh induction training for old employees
HEALTH																
	Piling Work and Piling Cap and load testing	Heat	Heat Stress / Heat Cramp	R	N	N	2	3	6		NIL	N	Y	Provide shaded shelter for resting; Drinking Water ; Electrolyte Job rotation/ Job rest First Aid Kit with stretcher availability Get Medical Attention Immediately		
		Cold Where Applicable	Numbness/ Frost Injury	R	N	N	2	3	6		NIL	N	Y	Provide shaded shelter for resting Warm up the body Full suit cover all is required Do not touch the materials with bare hand Use leather type hand gloves / Safety Glasses/ Face Shield and Mandatory PPE's Job rotation/ Job rest First Aid Kit with stretcher availability Get Medical Attention Immediately		
		Handling of Chemicals	Skin / Body Irritation	R	Y	N	2	5	10	Y	N	Y	Y	Wear PPE's MSDS Recommendations Storage, Handling and use as per the MSDS Instructions Emergency action as per the MSDS		
		Reaching out and body bending	Body Ache	R	N	N	2	3	6	N	NIL	N	Y	Avoid awkward position during manual handling Safe lifting method shall be followed to avoid sprain / strain Use mechanical aids to avoid reaching out and body bending HSE Training for Ergonomics Pictorial Posters shall be displayed		



REGISTER OF HAZARDS/RISK IDENTIFICATION FOR CONSTRUCTION ACTIVITIES

HIRADC/IEPC/06
Rev.No: 02
DATE: 01/10/2013

WABAG

S.No	Job Step / Task Reinforcement	HAZARD	RISK	R/N/R/E	LOR	IPC	Severity B	Likelihood C	Risk* Bxc	Significant	Elimination/ Substitution	Engg. Control	Administration &PPE control	Job Specific Control Measures
1	Cutting and fixing the reinforcement bars members by manually at the ground level; height work and confined space	Caught in between in Re-bar cutting	Hand & Finger injury,	R	N	N	2	3	6	N	NIL	Y	Y	Use levers and place spacers (wood planks) while cutting the re-bars Do not keep fingers at the pinch point Machine Guarding at nip points at proximity switches
		Missing of body earthing for the cutting machine	Shock injury	R	Y	N	3	3	9	Y	NIL	Y	Y	Earthing Pits Resistance Value, Rating of fuses &electrical cables, MCB and ELCB as per the IE Rules HSE Caution / Warning Sign boards are required Refer OCP -004 Electrical maintenance Refer OCP - 013 Lock out and Tagout.
		Caught in between (Rotating Parts)	Hand & Finger injury, Foot Injury	R	Y	N	2	2	4	Y	NIL	NIL	Y	Provide a guard for rotating parts HSE Caution/ Warning Signs shall be displayed
		Scattered cut pieces on the ground	Foot Injury	R	N	N	2	3	6	N	NIL	NIL	Y	Regular Housekeeping Collection; segregation; stack at the designated place Caution / warning signs are to be displayed Refer OCP-016 Handling of waste




REGISTER OF HAZARDS/RISK IDENTIFICATION FOR CONSTRUCTION ACTIVITIES

HIRADC/EPC/06
Rev.No: 02
DATE: 01/10/2013


WABAG

S.No	Job Step / Task Reinforcement	HAZARD	RISK	R/NR/E	LOR	IPC	Severity B	Likelihood C	Risk* BxC	Significant	Elimination/ Substitution	Eng. Control	Administration & PPE control	Mandatory PPE's requirements for HSE: Safety shoes and safety Helmets Wear Full Body harness for more than 2m height Administration Requirements for HSE: Display pictorial HSE images No Alcohol/drug use at sites Tool box meeting to be conducted before site work HSE induction training for new employees Refresh induction training for old employees	Job Specific Control Measures
		Collapse of reinforcement by heavy wind	Body injury	E	Y	N	2	3	6	Y	NIL	NIL	Y	Provide Tie rod facilities for all the sides to stable the re-bars to protect high wind Guy rope shall be provided while erecting rebar and supporting bars are required for all the sides to avoid collapse by heavy wind.	
		Entanglement between the re-bars while tying insitu (Confined Space)	Body Injury	R	Y	N	3	3	9	Y	NIL	NIL	Y	Access and egress facilities at the confined space area (eg., ladder or Access platform) Ladder/ Scaffolding / Suitable working platform shall be arranged for erection of re bar materials Permit to work system for working at height that is more than 2m Full body harness is required when the work is more than 2m height Good communication between the work groups while taking rebars between each other especially at height Refer OCP - 008 Safe scaffolding Refer OCP -003 Safe working in confined space Refer OCP -021 Permit to work	
		Rebar touching on electrical line while fixing	Electrocution	R	Y	N	3	3	9	Y	NIL	NIL	Y	Barricade the re-bar swinging area. No unauthorized personnel into the re- bar swinging area Safe distance shall be maintained between the OH electrical lines and edge of the re bar as per the IE Rules Wear Leather Gloves Keep emergency Rescue Aids Refer OCP No. 4 & OCP No. 13	



		REGISTER OF HAZARDS/RISK IDENTIFICATION FOR CONSTRUCTION ACTIVITIES										HIRADC/EPC/06 Rev.No: 02 DATE: 01/10/2013				
		S.No	Job Step / Task Reinforcement	HAZARD	RISK	R/NR/ F	LOR	IPC	Severity B	Likelihood C	Risk ² BxC	Significant	Elimination/ Substitution	Engg. Control	Administration & PPE control	Mandatory PPE's requirements for HSE: Safety shoes and safety Helmets Wear Full Body harness for more than 2m height Administration Requirements for HSE: Display pictorial HSE images No Alcohol/drug use at sites Tool box meeting to be conducted before site work HSE induction training for new employees Refresh induction training for old employees
			Sharp edges while tying of re-bars	Cut Injury	R	N	2	3	6	N	NIL	NIL	Y	Y	Hand gloves are mandatory Ensure Anti- Septic Vaccination. HSE caution/ warning signs shall be displayed	
			Protruding Re-bars	Body Injury	R	N	4	3	12	Y	NIL	Y	Y	Y	Barricade the area. Cover the Protruding by Re bar caps or wooden planks with tie off or any other suitable materials	



REGISTER OF HAZARDS/RISK IDENTIFICATION FOR CONSTRUCTION ACTIVITIES																			
HIRADC/EPC/06 Rev.No: 02 DATE: 01/10/2013																			
 S.No	Job Step / Task Reinforcement	HAZARD	RISK	R/NR/π	LOR	IPC	Severity B	Likelihood C	Risk BxC	Significant	Elimination/ Substitution	Engg. Control	Administration & PPE control	Mandatory PPE's requirements for HSE: Safety shoes and safety Helmets Wear Full Body harness for more than 2m height Administration Requirements for HSE: Display pictorial HSE images No Alcohol/drug use at sites Tool box meeting to be conducted before site work HSE induction training for new employees Refresh induction training for old employees					
														.Job Specific Control Measures					

HEALTH

1	Reinforcement using steel structures	Heat	Heat Stress / Heat Cramp	R	N	N	2	3	6	N	N	N	Y	Provide shaded shelter for resting; Drinking Water ; Electrolyte Job rotation/ Job rest First Aid Kit with stretcher availability Get Medical Attention Immediately					
		Cold (Wherever applicable)	Numbness/ Frost Injury	R	N	N	2	3	6	N	N	N	Y	Provide shaded shelter for resting Warm up the body Full suit cover all is required Do not touch the materials with bare hand Use leather type hand gloves / Safety Glasses/ Face Shield and Mandatory PPE's Job rotation/ Job rest First Aid Kit with stretcher availability Get Medical Attention Immediately					
		Reaching out and body bending	Body Ache	R	N	N	2	3	6	N	N	N	Y	Avoid awkward position during manual handling Safe lifting method shall be followed to avoid sprain / strain Use mechanical aids to avoid reaching out and body bending HSE Training for Ergonomics Pictorial Posters shall be displayed					



W A B A G		REGISTER OF HAZARDS/RISK IDENTIFICATION FOR CONSTRUCTION ACTIVITIES											HIRADC/EPC/07 Rev.No: 02 DATE: 01/10/2013	
S.No	Job Step / Task Form Work	HAZARD	RISK	R/NR/E	LOR	IPC	Severity B	Likelihood C	Risk BxC	Significant	Elimination/ Substitution	Engg. Control	Administration & PPE control	Job Specific Control Measures
1	Making and fixing form work members and dismantling manually at the ground level; height work and confined space	Caught in between while fixing	Hand & Finger injury,	R	N	N	2	3	6	N	NIL	NIL	Y	Use levers and place spacers (wood planks) while fixing it. Do not keep fingers at the pinch point Wear Hand Gloves
		Missing of body earthing for the power operated tools	Shock	R	Y	N	3	3	9	Y	NIL	NIL	Y	Earthing Pits Resistance Value, Rating of fuses & electrical cables, MCB and ELCB as per the IE Rules HSE Caution / Warning Sign boards are required Refer OCP -004 Electrical maintenance Refer OCP - 013 Lock out and Tagout.
		Sharp Tools or Nails on the ground	Foot Injury	R	N	N	2	3	6	N	NIL	NIL	Y	Regular Housekeeping Collection; segregation; stack at the designated place Caution / warning signs displayed Cordon off the area HSE Tool box talks for housekeeping
		Collapse of form work by heavy wind	Body Injury	E	Y	N	2	3	6	Y	NIL	NIL	Y	Provide Tie rod facilities for all the sides to stable form work to protect high wind Props shall be provided while erecting form work and supporting bars are required for all the sides to avoid collapse by heavy wind. Refer OCP-008 Safe Scaffolds



REGISTER OF HAZARDS/RISK IDENTIFICATION FOR CONSTRUCTION ACTIVITIES															
W A B A G		HIRADC/EPC/07 Rev.No: 02 DATE: 01/10/2013													
S.No	Job Step / Task Form Work	HAZARD	RISK	R/NR/E	LOR	IPC	Severity B	Likelihood C	Risk* BxC	Significant	Elimination/ Substitution	Engg. Control	Administration & PPE control	Mandatory PPE's requirements for HSE: Safety shoes and safety Helmets Wear Full Body harness for: more than 2m height Administration Requirements for HSE: Display pictorial HSE images No Alcohol/drug use at sites Tool box meeting to be conducted before site work HSE induction training for new employees Refresh Induction training for old employees	Job Specific Control Measures
		Entanglement between the form work while tying insitu (Confined Space)	Body Injury	R	Y	N	3	3	9	Y	NIL	NIL	Y	Follow the Confined Space HIRA Access and egress facilities at the confined space area (eg., ladder or Access platform) Ladder/ Scaffolding / Suitable working platform shall be arranged for erection of form work materials Permit to work system for working at height that is more than 2m Full body harness is required when the work is more than 2m height Good communication between the work groups while erecting form work between each other especially at height Refer OCP-008 Safe scaffolds Refer OCP-009 Safe use of ladders and Stairs Refer OCP-021 Permit to work	
		Form work touching on electrical line while fixing	Electrocution	R	Y	N	3	3	9	Y	NIL	NIL	Y	Barricade the form work swinging area. No unauthorized personnel into the form work swinging area Safe distance shall be maintained between the OH electrical lines and edge of the re bar as per the IE Rules Wear Leather Gloves Refer OCP-021 Permit to work Refer OCP-004 Electrical Maintenance	
		Sharp edges while erection	Cut Injury	R	N	N	2	3	6	N	NIL	NIL	Y	Hand gloves are mandatory Anti-septic is preferred. HSE Tool box talks for wearing hand gloves HSE caution/ warning signs shall be displayed	



Refer HIRA/EPC/01 Revision 2 For Material Handling, Receipt, Storage, Transportation, Surface preparation, Lifting, Erection and Alignment etc.

WABAG		REGISTER OF HAZARDS/RISK IDENTIFICATION FOR CONSTRUCTION ACTIVITIES										HIRADC/EPC/07 Rev.No: 02 DATE: 01/10/2013		
S.No	Job Step / Task Form Work	HAZARD	RISK	R/NR/ E	LOR	IPC	Severity B	Likelihood C	Risk* BxC	Significant	Elimination/ Substitution	Engg. Control	Administration & PPE control	Job Specific Control Measures
	Form Work for Beams and Columns	Fall of personell	Body Injury	NR	Y	N	4	3	12	Y	NIL	N	Y	<p>Cordon off the area with warning signs</p> <p>Safe Scaffolding and access ladder arrangement</p> <p>Access ladder with 1m extension at landing area</p> <p>Full body harness with double lanyard upto 6m level</p> <p>Full body harness, double lanyard with shock absorber for more than 6m level</p> <p>Horizontal Life line with turn buckle facility</p> <p>Refer OCP-008 Safe Scaffolding arrangement</p> <p>Refer OCP-009 Ladderd and Stairs</p>



S.No	Job Step / Task Form Work	HAZARD	RISK	R/NR/ F	LOR	IPC	Severity B	Likelihood C	Risk* BxC	Significant	Elimination/ Substitution	Engg. Control	Administration &PPE control
													Mandatory PPE's requirements for HSE: Safety shoes and safety Helmets Wear Full Body harness for more than 2m height Administration Requirements for HSE: Display pictorial HSE images No Alcohol/drug use at sites Tool box meeting to be conducted before site work HSE induction training for new employees Refresh induction training for old employees
Job Specific Control Measures													

HEALTH

Form Work	Heat	Heat Stress / Heat Cramp	R	N	N	2	3	6	N	NIL	N	Y	Control Measures
													Provide shaded shelter for resting; Drinking Water ; Electrolyte Job rotation/ Job rest Wear Loose Cotton Clothes Take plenty of drinking water frequently First Aid Kit with stretcher availability Get Medical Attention Immediately
	Cold Where Applicable	Numbness/ Frost Injury	R	N	N	2	3	6	N	NIL	N	Y	Provide shaded shelter for resting Warm up the body Full suit cover all is required Use leather type hand gloves / Safety Glasses/ Face Shield and Mandatory PPE's Job rotation/ Job rest First Aid Kit with stretcher availability Get Medical Attention Immediately
	Reaching out and body bending	Body Ache	R	N	N	2	3	6	Y	NIL	N	Y	Avoid awkward position during manual handling Safe lifting working method to avoid sprain / strain Use mechanical aids to avoid reaching out and body bending HSE Training for Ergonomics Pictorial Posters shall be displayed



WABAG		REGISTER OF HAZARDS/RISK IDENTIFICATION FOR CONSTRUCTION ACTIVITIES										HIRADC/EPC/07 Rev.No: 02 DATE: 01/10/2013		
S.No	Job Step / Task Form Work	HAZARD	RISK	R/NR/ E	LOR	IPC	Severity B	Likelihood C	Risk ⁺ BXC	Significant	Elimination/ Substitution	Eng. Control	Administration & PPE control	Job Specific Control Measures
		Use of Oil for form work	Skin Irritation and absorption	NR	N	N	2	3	6	N	NIL	N	Y	Mandatory PPE's requirements for HSE: Safety shoes and safety Helmets Wear Full Body harness for more than 2m height Administration Requirements for HSE: Display pictorial HSE images No Alcohol/drug use at sites Tool box meeting to be conducted before site work HSE induction training for new employees Refresh induction training for old employees
														Ensure use of hand Gloves





REGISTER OF HAZARDS/RISK IDENTIFICATION

HIRADC/EPC/04

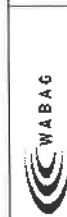
Rev.No: 02

DATE: 01/10/2013

S.No	Job Step / Task DEMOLITION	HAZARD	RISK	R/NR/ R	LOR	IPC	Severity B	Likelihood C	Risk* BxC	Significant	Elimination / Substitution	Engg. Control	Administration & PPE control	Mandatory PPE's requirements for HSE: Safety shoes and safety Helmets Wear Full Body harness for more than 2m height Administration Requirements for HSE: Display pictorial HSE images No Alcohol/drug use at sites Tool box meeting to be conducted before site work HSE induction training for new employees Refresh Induction training for old employees	Job Specific Control Measures
1	Demolition	Fall of Personnel from height	Body Injury/ Fatal	R	Y	N	3	3	9	Y	NIL	Y	Y	<p>Safe Scaffold and Working platform with access ladders as per the standard procedure</p> <p>Access ladders shall extend 1m at the platform level</p> <p>Hand rails at 1.10 m height and 6" toe guards</p> <p>Full body harness, lanyard and shock absorber more than 6m level</p> <p>Safe working platform around edge of the demolishing area</p> <p>Opening shall be covered suitably</p> <p>Opening used for debris removal shall not be located near to the access.</p> <p>Administration and PPE Requirements for HSE</p> <p>Wear Safety glass, Face shield, Hand gloves & respiratory masks while demolishing</p> <p>Pictorial HSE Image Poster displayed by the local language.</p> <p>Refer OCP-008 Scaffolding arrangement</p> <p>Refer OCP-009 ladder & Stairs</p>	<p>Injury from falling materials</p> <p>Body Injury/ Fatal</p> <p>R</p> <p>Y</p> <p>N</p> <p>3</p> <p>3</p> <p>9</p> <p>Y</p> <p>NIL</p> <p>Y</p> <p>Y</p> <p>Hard barrier around the area</p> <p>Marking of Exclusion Zones</p> <p>Ensure the structure age before demolition</p> <p>Ensure the stability of the structure and type of construction and provide necessary supporting arrangement accordingly.</p> <p>Covered walkways</p> <p>Storage of materials shall not be in the access ways</p> <p>Caution and warning signs should be posted</p> <p>Protection shall be taken on fragile surface or partially demolished floors that are in hanging condition</p> <p>Consider the weight of removed material or machinery equipments on floors above the ground level while demolishing</p>




REGISTER OF HAZARDS/RISK IDENTIFICATION



S.No	Job Step / Task DEMOLITION	HAZARD	RISK	R/N/R/E	LOR	IPC	Severity B	Likelihood C	Risk BxC	Significant	Elimination / Substitution	Engg. Control	Administration & PPE control	Job Specific Control Measures
		Un controlled Collapse	Body Injury / Fatal	E	Y	N	5	2	10	Y	NIL	Y	Y	Mandatory PPE's requirements for HSE: Safety shoes and safety Helmets Wear Full Body harness for more than 2m height Administration Requirements for HSE: Display pictorial HSE images No Alcohol/drug use at sites Tool box meeting to be conducted before site work HSE induction training for new employees Refresh induction training for old employees
		Tools operated by electric power	Shock	R	Y	N	3	3	9	Y	NIL	Y	Y	Cordon off the area Caution / Warning signs are required to give alerts on near by structures. Un guarded walls / beams/ columns or other structure shall be protected due to wind pressure or Vibration. Hard barrier around the area Marking of Exclusion Zones
		Tools operated by Pneumatic	Body Injury	R	Y	N	3	3	9	Y	NIL	Y	Y	Ensure Hose whip checks or hose coupling safety locks or both are fitted to Hose. Safety cables are to be used to support the weight of elevated hoses Refer OCP-011 Pneumatic tool handling
		Hitting by Transport Vehicle/	Body Injury / Fatal	NR	N	N	3	3	9	Y	NIL	Y	Y	Pictorial Image safety posters for hitting hazards Flash Lights Cordon off the area Signal Man with Hi- Visibility
		Contact with O H/ Buried Power lines	Electrocution/ Fatal	R	Y	N	5	2	10	Y	NIL	N	Y	Safe distance shall be maintained as per IE rules in view of Voltage capacity identify and isolate the energy Maintain clear distance between OH Power lines as per IE rules. Refer OCP-013 Lock out and tag out system shall be provided Refer OCP-004 Electrical Maintenance



REGISTER OF HAZARDS/RISK IDENTIFICATION															
															
HIRADC/EPC/04 Rev.No: 02 DATE: 01/10/2013															
S.No	Job Step / Task DEMOLITION	HAZARD	RISK	R/NR/E	LOR	IPC	Severity B	Likelihood C	Risk BxC	Significant	Elimination / Substitution	Eng. Control	Administration & PPE control	Mandatory PPE's requirements for HSE: Safety shoes and safety Helmets Wear Full Body harness for more than 2m height Administration Requirements for HSE: Display pictorial HSE images No Alcohol/drug use at sites Tool box meeting to be conducted before site work HSE induction training for new employees Refresh induction training for old employees	Job Specific Control Measures
2	Mechanical Demolition Powershovel, Bucket bull Dozer	Injury by Fall of materials or hitting by Mechanical method	Body Injury/ Fatal	NR	Y	N	5	3	15	Y	NIL	Y	Y	Hard barrier shall be provided Radius of exclusionzone will be 1.5 times height of such affected portion. 8M Shall be maintained if the line of travel of bucket Height of structure for demolishing shall not more than 24m A radius for demolishing by swinging weight shall be 1.5 times height of the structure. Warning signs by the local language that No person enter other than demolishers.	
HEALTH															
1	Demolition	Heat	Heat Stress / Heat Cramp	R	N	N	2	3	6	N	NIL	N	Y	Provide shaded shelter for resting; Drinking Water ; Electrolyte Job rotation/ Job rest First Aid Kit with stretcher availability Get Medical Attention Immediately	
		Cold Where Applicable	Numpness/ Frost Injury	R	N	N	2	3	6	N	NIL	N	Y	Provide shaded shelter for resting Warm up the body Full suit cover all is required Do not touch the materials with bare hand Use leather type hand gloves / Safety Glasses/ Face Shield and Mandatory PPE's Job rotation/ Job rest First Aid Kit with stretcher availability Get Medical Attention Immediately	





REGISTER OF HAZARDS/RISK IDENTIFICATION

HIRADC/EPC/04

Rev.No: 02

DATE: 01/10/2013

S.No	Job Step / Task DEMOLITION	HAZARD	RISK	R/N/R/E	LOR	IPC	Severity B	Likelihood C	Risk* BxC	Significant	Elimination / Substitution	Engg. Control	Administration & PPE control	Job Specific Control Measures
		Reaching out and body bending	Body Ache	R	N	N	2	3	6	N	NIL	N	Y	<p>Mandatory PPE's requirements for HSE: Safety shoes and safety Helmets Wear Full Body harness for more than 2m height</p> <p>Administration Requirements for HSE: Display pictorial HSE images No Alcohol/drug use at sites Tool box meeting to be conducted before site work HSE induction training for new employees Refresh Induction training for old employees</p>
		Noise	Deafness/ Discomfort	R	Y	N	2	3	6	Y	NIL	NIL	Y	<p>Avoid awkward position during manual handling Safe lifting method shall be followed to avoid sprain / strain Use mechanical aids to avoid reaching out and body bending HSE Training for Ergonomics Pictorial Posters shall be displayed Wear Ear plug during the operation</p>
		Vibration	Hand - Arm Vibration Syndrome	R	Y	N	3	3	9	Y	NIL	NIL	Y	<p>Wear Leather Gloves Cover all Required Job Rest / Job Rotation is required</p>
		Dust	Respiratory illness	R	Y	N	3	3	9	Y	NIL	NIL	Y	<p>Wear Dust Mask</p>



**REGISTER OF HAZARDS/RISK IDENTIFICATION
FOR CONSTRUCTION ACTIVITIES**

HIRADC/EPC/05
Rev.No: 02
DATE: 01/10/2013

S.NO	W A B A G	JOB STEP / TASK PCC	HAZARD / ASPECT	RISK / IMPACT	R/N/R/N/AN/E	LOR	IPC	SEVERITY (A)	LIKELIHOOD (B)	Risk = A*B	SIGNIFICANT	ELIMINATION	ENG. CONTROL	ADMINISTRATION & PPE	Job Specific Control Measures
1		Cleaning the area for PCC	Injury from Tripping/Slipping	Body Injury	R N N	N N	N	2	2	4	N	N	Y	Y	Mandatory PPE's requirements for HSE: Safety shoes and safety Helmets Wear Full Body harness for more than 2m height Administration Requirements for HSE: Display pictorial HSE images No Alcohol/drug use at sites Tool box meeting to be conducted before site work HSE induction training for new employees Refresh induction training for old employees
2		Application of cement slurry on the earthSurface	Slippage and Falling due to slippery Surface	Body Injury	R N N	N N	N	2	2	4	N	N	Y	Y	Good Housekeeping Remove Scattered Materials Refer OCP-019 Surface preparation Display the Pictorial HSE Poster in local language Administration and PPE Requirements for HSE Wear Cover all Wearing Nose mask and hand gloves are required
3		Handling of Cement Concrete from transit mixer by buddy system at the ground level or elevated level or confined space	Using Wet Portland Cement	Burn Injury	R	Y N	N	2	3	6	Y	NIL	Y	Y	Use Portable Hand trolley for shifting of concrete Wear Close-fitting Clothes Cover all is required Gumboots, 3m filter Nose mask / hand gloves & Goggles Display of HSE posters for alerts for cement hazards Permit to work OCP -021



**REGISTER OF HAZARDS/RISK IDENTIFICATION
FOR CONSTRUCTION ACTIVITIES**

HIRADC/EPC/05
Rev.No: 02
DATE: 01/10/2013

WABAG

S.NO	JOB STEP / TASK PCC	HAZARD / ASPECT	RISK / IMPACT	R/NR/N/AN/E	LOR	FC	SEVERITY (A)	LIKELIHOOD (B)	Risk = A*B	SIGNIFICANT	ELIMINATION	ENG. CONTROL	ADMINISTRATION & PPE	Job Specific Control Measures
													<p>Mandatory PPE's requirements for HSE: Safety shoes and safety Helmets Wear Full Body harness for more than 2m height</p> <p>Administration Requirements for HSE: Display pictorial HSE images No Alcohol/drug use at sites Tool box meeting to be conducted before site work HSE induction training for new employees Refresh induction training for old employees</p>	
4	Vibrating PCC	Fall of Personnel or Materials or Machinery Vibrator operated by power	Body Injury Shock Injury	R R	Y Y	N N	2 2	5 5	10 10	Y Y	N N	Y Y	Y Y	<p>Safe Scaffold Refer OCP -008 Safe Access Ladder Refer OCP -009 Confined Space Refer OCP -003 Use Portable Hand trolley for shifting of concrete Clean the slippage concrete immediately Wear Close-fitting Clothes Cover all is required Gumboots, 3m filter Nose mask / hand gloves & Goggles Display of HSE posters for alerts for falling hazards</p> <p>Good condition of cable Insulation MCB and ELCE Facilities Electrically Insulated Valves Refer OCP - 004 Electrical maintenance Refer BOCW Rules 103.</p>



WABAG		REGISTER OF HAZARDS/RISK IDENTIFICATION FOR CONSTRUCTION ACTIVITIES										HIRADC/EPC/05 Rev.No: 02 DATE: 01/10/2013		
S.NO	JOB STEP / TASK PCC	HAZARD / ASPECT	RISK / IMPACT	ADMINISTRATION & PRE										Job Specific Control Measures
				R/N/R/N/A/N/E	LOR	IPC	SEVERITY (A)	LIKELIHOOD (B)	Risk = A*B	SIGNIFICANT	ELIMINATION	ENG. CONTROL	Y	
1	Pouring of Cement concrete manually or by pump	Heat Cold Where Applicable	Heat Stress / Heat Cramp Numbness/ Frost Injury	R	N	N	2	3	6	NIL	N	Y	Provide shaded shelter for resting Drinking Water ; Electrolyte Job rotation/ Job rest First Aid Kit with stretcher availability Get Medical Attention Immediately	Mandatory PPE's requirements for HSE: Safety shoes and safety Helmets Wear Full Body harness for more than 2m height Administration Requirements for HSE: Display pictorial HSE images No Alcohol/drug use at sites Tool box meeting to be conducted before site work HSE induction training for new employees Refresh induction training for old employees

HEALTH



S.NO	JOB STEP / TASK PCC	HAZARD / ASPECT	RISK / IMPACT	R/NR/N/A/E	LOR	IFC	SEVERITY (A)	LIKELIHOOD (B)	Risk = A*B	SIGNIFICANT	ELIMINATION	ENG. CONTROL	ADMINISTRATION & PPE	Mandatory PPE's requirements for HSE:		
														Safety shoes and safety Helmets	Wear Full Body harness for more than 2m height	
														Administration Requirements for HSE:		
														Display pictorial HSE images	No Alcohol/drug use at sites	
														Tool box meeting to be conducted before site work	HSE induction training for new employees	
														Refresh induction training for old employees		
														Job Specific Control Measures		
		Reaching out and body bending	Body Ache	R	N	N	2	3	6	N	MIL	N	Y	Y	Avoid awkward position during manual handling Safe lifting method shall be followed to avoid sprain / strain Use mechanical aids to avoid reaching out and body bending HSE Training for Ergonomics Pictorial Posters shall be displayed	
2	Vibrating PCC	Vibration effect	Numbness / White finger	R	Y	Y	3	3	9	Y	N	N	Y	Y	Job Rest Job Rotation Wear Hand gloves	
3	Vibrating PCC	Noise	Discomfort	R	Y	N	1	3	3	Y	N	Y	Y	Y	Ensure Noise Level not exceeding 85 dba Wear Ear Plug Job Rotation	
4	Handling of PCC	Using Wet Portland Cement	Skin Irritation/ Dermatitis	R	Y	N	2	4	8	Y	N	Y	Y	Y	Wear Close-fitting Clothes Cover all is required Gumboots, 3m filter Nose mask / hand gloves & Goggles Display of HSE posters for alerts for falling hazards	




WABAG		REGISTER OF HAZARDS/RISK IDENTIFICATION FOR CONSTRUCTION ACTIVITIES										HIRADC/EPC/08			
												Rev.No: 02 DATE: 01/10/2013			
S.NO	JOB STEP / TASK	HAZARD / ASPECT	RISK / IMPACT	R/N/R/N/A/N/E	LOR	IPC	SEVERITY (A)	LIKELIHOOD (B)	Risk = A*B	SIGNIFICANT	ELIMINATION	ENG. CONTROL	ADMINISTRATION & PPE	Mandatory PPE's requirements for HSE: Safety shoes and safety Helmets Wear Full Body harness for more than 2m height Administration Requirements for HSE: Display pictorial HSE images No Alcohol/drug use at sites Tool box meeting to be conducted before site work HSE induction training for new employees Refresh induction training for old employees	
														Job Specific Control Measures	
1	Cleaning the area for RCC	Injury from Tripping/Slipping	Body Injury	R	N	N	2	2	4	N	N	N	Y	Good Housekeeping Remove Scattered Materials Refer OCP-019 Surface preparation Display the Pictorial HSE Poster in local language	
2	Application of cement slurry on the earthSurface	Slippage and Falling due to slippery Surface	Body Injury	R	N	N	2	2	4	N	N	N	Y	Administration and PPE Requirements for HSE Wear Cover all Wearing Nose mask and hand gloves are required	
3	Handling of Cement Concrete from transit mixer by buddy system at the ground level or elevated level or confined space	Using Wet Portland Cement	Burn Injury	R	Y	N	2	3	6	Y	NIL	Y	Y	Use Portable Hand trolley for shifing of concrete Wear Close-fitting Clothes Cover all is required Gumboots, 3m filter Nose mask / hand gloves & Goggles Display of HSE posters for alerts for cement hazards Permit to work OCP -021	



WABAG		REGISTER OF HAZARDS/RISK IDENTIFICATION FOR CONSTRUCTION ACTIVITIES										HIRADC/EPC/08 Rev.No: 02 DATE: 01/10/2013			
		S.NO	JOB STEP / TASK Pouring of RCC	HAZARD / ASPECT	RISK / IMPACT	R/R/N/A/N/E	LOR	IPC	SEVERITY (A)	LIKELIHOOD (B)	Risk = A*B	SIGNIFICANT	ELIMINATION	ENG. CONTROL	ADMINISTRATION & PPE
	Handling of Cement Concrete from transit mixer by buddy system at the ground level or elevated level or confined space	Injury from fall of personnel / Materials / Machinery	Body Injury	R	Y	N	2	3	6	Y	NIL	Y	Y	Y	Safe Scaffold Refer OCP -008 Safe Access Ladder Refer OCP -009 Confined Space Refer OCP -003 Use Portable Hand trolley for shifting of concrete Clean the slippage concrete immediately Wear Close-fitting Clothes Cover all is required Gumboots, 3m filter Nose mask / hand gloves & Goggles Display of HSE posters for alerts for falling hazards
4	Handling of Cement Concrete through Hoist at the elevated level or confined space	Injury from Fall of Material / Hitting by Uncontrolled lifting / lowering movements by (Material Hoist)	Body Injury/ Fatal	R	Y	N	5	2	10	Y	NIL	Y	Y	Y	3rd party certification for Hoist Wall of hoist must extend 2m above the floor or platform Safety factor at least 3 for maximum load at platform. Platform of Hoist equipped with Safety gear. Locking arrangement at the platform of hoist for workers Enclosures of wire mesh for Sides of Hoist except loading/unloading platform. Breaking strength atleast 6 times the load to carry Personnel are not allowed to ride on hoist Electrical switches and panel protected from rain Proper earthing shall be provided Effective magnetic release brake will be automatically applied. The person who picks up the load shall use the full body harness. Upper, lower & Emergency limit switches in the hoist



		REGISTER OF HAZARDS/RISK IDENTIFICATION FOR CONSTRUCTION ACTIVITIES										HIRADC/EPC/08 Rev.No: 02 DATE: 01/10/2013			
		S.NO JOB STEP / TASK Pouring of RCC	HAZARD / ASPECT	RISK / IMPACT	R/NR/N/AN/E	LOR	IPC	SEVERITY (A)	LIKELIHOOD (B)	Risk = A*B	SIGNIFICANT	ELIMINATION	ENGG. CONTROL	ADMINISTRATION & PPE	Mandatory PPE's requirements for HSE: Safety shoes and safety Helmets Wear Full Body harness for more than 2m height Administration Requirements for HSE: Display pictorial HSE Images No Alcohol/drug use at sites Tool box meeting to be conducted before site work HSE Induction training for new employees Refresh induction training for old employees
		High / Burst pressure Bursting at coupling (Delivery system) and hitting scaffold	Body Injury Fatal	R	N	Y	3	3	9	Y	N	Y	Y	Training and Reading the Pump manual prior to start Stay clear of pressurized concrete placing area Provide Air Release Valve attachment near the top of pipe that carries concrete. Adequate insulation shall be provided on hoses Attach pump nozzle by a bolted collar Use whipping line to hold the concrete pipe line Safety Wire or Spring Load arrestor shall be provided. Strong enough Supporting / Scaffolding shall be provided for the entire delivery line while laying at the elevated area to bear all the building workers who are on the scaffold Wear Face Shield and Safety Goggles. Refer OCP-008 Safe Scaffolding Refer OCP-009 Ladders Refer OCP-011 Pneumatic Tool Handling.	
		Caught in between Hopper grates/ Out rigger/ water box	Body Injury	R	N	Y	3	2	6	Y	N	N	Y	Keeps handsout hopper grates, valve assembly water box Regular inspection on pump mechanism Read the Manufacturer's instruction	



WABAG		REGISTER OF HAZARDS/RISK IDENTIFICATION FOR CONSTRUCTION ACTIVITIES										HIRADC/EPC/08 Rev.No: 02 DATE: 01/10/2013			
		S.NO	JOB STEP / TASK Pouring of RCC	HAZARD / ASPECT	RISK / IMPACT	R/R/N/A/N/E	LOF	IPC	SEVERITY (A)	LIKELIHOOD (B)	Risk = A*B	SIGNIFICANT	ELIMINATION	ENG. CONTROL	ADMINISTRATION & PPE
														Mandatory PPE's requirements for HSE: Safety shoes and safety Helmets Wear Full Body harness for more than 2m height Administration Requirements for HSE: Display pictorial HSE images No Alcohol/drug use at sites Tool box meeting to be conducted before site work HSE induction training for new employees Refresh induction training for old employees	Job Specific Control Measures


HEALTH

1	Pouring of Cement concrete manually or by pump	Heat	Heat Stress / Heat Cramp	R	N	N	2	3	6	N	N	N	Y	Provide shaded shelter for resting; Drinking Water ; Electrolyte Job rotation/ Job rest First Aid Kit with stretcher availability Get Medical Attention Immediately
		Cold Where Applicable	Numpness/ Frost Injury	R	N	N	2	3	6	N	N	N	Y	Provide shaded shelter for resting Warm up the body Full suit cover all is required Do not touch the materials with bare hand Use leather type hand gloves / Safety Glasses/ Face Shield and Mandatory PPE's Job rotation/ Job rest First Aid Kit with stretcher availability Get Medical Attention Immediately



WABAG		REGISTER OF HAZARDS/RISK IDENTIFICATION FOR CONSTRUCTION ACTIVITIES										HIRADC/EPC/08 Rev.No: 02 DATE: 01/10/2013			
S.NO	JOB STEP / TASK Pouring of RCC	HAZARD / ASPECT	RISK / IMPACT	R/NR/N/AN/E	LOR	IPC	SEVERITY (A)	LIKELIHOOD (B)	Risk = A*B	SIGNIFICANT	ELIMINATION	ENG. CONTROL	ADMINISTRATION & PPE	Mandatory PPE's requirements for HSE: Safety shoes and safety Helmets Wear Full Body harness for more than 2m height Administration Requirements for HSE: Display pictorial HSE Images No Alcohol/drug use at sites Tool box meeting to be conducted before site work HSE induction training for new employees Refresh Induction training for old employees	Job Specific Control Measures
2	Working at Night	Reaching out and body bending	Body Ache	R	N	N	2	3	6	N	NIL	N	Y	Avoid awkward position during manual handling Safe lifting method shall be followed to avoid sprain / strain Use mechanical aids to avoid reaching out and body bending HSE Training for Ergonomics Pictorial Posters shall be displayed	
3	Generation Cement Dust at the Batching Plant	Poor Visibility Dust	Fatigue Respiration Effect	R	Y	N	1	4	4	Y	NIL	Y	Y	Sufficient illumination at the job site and access area to avoid stress on eyes. Sufficient Job Rest and Job Rotation to avoid fatigue	Fitness for Breathing Test for Cement bag handlers Wear 3m Respiratory mask Exhaust facilities Job Rotation Job Rest
		Wet Cement Absorbed by Skin	Skin Irritation/ Dermatitis	R	Y	N	2	3	6	Y	N	Y	Y	Use tag line to hold the hoses Wear Hand gloves/ Face Shield/ Safety Goggles Gumboots and Close fitting clothes Job Rotation Refer BOCW Rules	



		REGISTER OF HAZARDS/RISK IDENTIFICATION											HIRADC/EPC/11 Rev.No: 02 DATE: 01/10/2013		
		S.No	Job Step / Task Inspection & Testing	HAZARD	RISK	R N R/ E	LOR	IPC	Severity B	Likelihood C	Risk ^a BxC	Significant	Elimination/ Substitution	Engg. Control	Administration & PPE control
1	Visual Inspection of Equipments	Snake Bite / Insect Sting	Poisoning Asphyxiation/ Fatal	R	N	N	5	2	10	Y	N	Y	Y	Y	<p>Mandatory PPE's requirements for HSE: Safety shoes and safety Helmets Wear Full Body harness for more than 2m height Administration Requirements for HSE: Display pictorial HSE images No Alcohol/drug use at sites Tool box meeting to be conducted before site work HSE induction training for new employees Refresh induction training for old employees</p> <p>Job Specific Control Measures</p> <p>Use Machinery for bush removal around the equipment or vessels. Display the snake bite alert at the job site. Restrict the people in minimum Apply of carbolic acid prior to entry in that area <u>Administration and PPE Requirements for HSE</u> Cover All is required Gum boots / Ankle Safety Shoes/ Full handgloves at the Jungle area.</p>
		Injury from falling materials	Body Injury/ Fatal	NR	Y	N	2	2	4	N	NIL	Y	Y	Y	<p>Cordon off the area Secure materials by suitably to avoid falling Provide Choker or wedges to avoid roll out materials Use levers and place spacers (wood planks) for rotating parts Do not place hand/toe at the pinch points Alignment using mechanical aid. <u>Administration and PPE's Requirements</u> Leather type hand gloves are required</p>
		Caught in between/ Crushing at the pinch point	Body Injury	R	N	N	2	3	6	N	NIL	NIL	Y	Y	<p>Alignment using mechanical aid. <u>Administration and PPE's Requirements</u> Leather type hand gloves are required</p>
		Fall of personnel	Body Injury/ Fatal	R	Y	N	5	2	10	N	NIL	Y	Y	Y	<p>Cordon off the area with warning signs Safe Scaffolding and access ladder arrangement Access ladder with 1m extension at landing area Full body harness with double lanyard upto 6m level Full body harness, double lanyard with shock absorber for more than 6m level Refer OCP-008 Safe Scaffolding arrangement Refer OCP-009 Ladder and Stairs</p>




WABAG		REGISTER OF HAZARDS/RISK IDENTIFICATION											HIRADC/EPC/11	
													Rev.No: 02 DATE: 01/10/2013	
S.No	Job Step / Task Inspection & Testing	HAZARD	RISK	R/N/R/ E	LOR	IPC	Severity B	Likelihood C	Risk* BxC	Significant	Elimination/ Substitution	Engg. Control	Administration & PPE control	Control Measures
		Contact with O H/ Buried Power lines	Electrocution/ Fatal	R	Y	N	5	2	10	Y	NIL	N	Y	Job Specific Control Measures Safe distance shall be maintained as per IE rules in view of Voltage capacity identify and isolate the energy Maintain clear distance between OH Power lines as per IE rules. Refer OCP-013 Lock out and tag out system Permit to Work as per the OCP 021
2	Die Penetrate Testing	Fire / Explosion caused by Aerosols	Burn Injury/ Fatal	NR	Y	N	5	2	10	Y	NIL	N	Y	No Smoking No Mobile phone during DP Test Follow the MSDS
3	Pressure Testing	Bursting / Explosion by Piercing / Penetration of foreign body	Body Injury/ Fatal	R	Y	N	3	3	9	Y	N	Y	Y	Cord on off the area during pressure testing Safety Relief Valve / Burst Disc to restrict the to working pressure or design pressure Pressure regulation to limit the down pressure upto test pressure Administration and PPE Requirements for HSE Cover All is required Display of HSE posters, Caution/ Warning Signs for alert




WABAG		REGISTER OF HAZARDS/RISK IDENTIFICATION											HIRADC/EPC/11		
													Rev.No: 02 DATE: 01/10/2013		
S.No	Job Step / Task Inspection & Testing	HAZARD	RISK	R/NR/ E	LOR	IPC	Severity B	Likelihood C	Risk* BxC	Significant	Elimination/ Substitution	Engg. Control	Administration &PPE control	Mandatory PPE's requirements for HSE: Safety shoes and safety Helmets Wear Full Body harness for more than 2m height Administration Requirements for HSE: Display pictorial HSE images No Alcohol/drug use at sites Tool box meeting to be conducted before site work HSE induction training for new employees Refresh induction training for old employees	Job Specific Control Measures
4	Radiography	Handling of Radiation Isotopes Camera	Body Injury/ Fatal	N	Y	N	3	2	6	Y	N	Y	Y	Cordon off the area BARC Licence and authorization RT Level II or III Competent Certificate for the radio grapher Film Badge Facility Controlled area identification and restricted to authorized personnel Test the Curie or Rem by Calibrated Survey meter Keep the Emergency equipments for Radiation Hazard Fitness Certification for Radiographers Dosage limit shall be registered Permit to work document is required Refer OCP-021 Permit to work Preferable during evening and night after completing the days work	
5	Blow down	Hitting by flying particles	Body Injury	NR	N	N	2	2	4	N	N	Y	Y	Cordon off the area Marking the Exclusion Zone. Do not allow unauthorized entry Housekeeping after blowdown job. Pictorial Display HSE image in local language.	



REGISTER OF HAZARDS/RISK IDENTIFICATION														
												HIRADC/EPC/11 Rev.No: 02 DATE: 01/10/2013		
S.No	Job Step / Task Inspection & Testing	HAZARD	RISK	R/N/R/E	LOR	IPC	Severity B	Likelihood C	Risk* BxC	Significant	Elimination/ Substitution	Engg. Control	Administration & PPE control	
Job Specific Control Measures														
Mandatory PPE's requirements for HSE: Safety shoes and safety Helmets Wear Full Body harness for more than 2m height Administration Requirements for HSE: Display pictorial HSE images No Alcohol/drug use at sites Tool box meeting to be conducted before site work HSE induction training for new employees Refresh induction training for old employees														
HEALTH														
1	Inspection and Testing (General)	Heat	Heat Stress / Heat Cramp	R	N	N	2	3	6	N	NIL	N	Y	Provide shaded shelter for resting; Drinking Water ; Electrolyte Job rotation/ Job rest First Aid Kit with stretcher availability Get Medical Attention Immediately
		Cold Where Applicable	Numpness/ Frost Injury	R	N	N	2	3	6	N	NIL	N	Y	Provide shaded shelter for resting Warm up the body Full suit cover all is required Do not touch the materials with bare hand Use leather type hand gloves / Safety Glasses/ Face Shield and Mandatory PPE's Job rotation/ Job rest First Aid Kit with stretcher availability Get Medical Attention Immediately
		Reaching out and body bending	Body Ache	R	N	N	2	3	6	N	NIL	N	Y	Avoid awkward position during manual handling Safe lifting method shall be followed to avoid sprain / strain Use mechanical aids to avoid reaching out and body bending HSE Training for Ergonomics Pictorial Posters shall be displayed



		REGISTER OF HAZARDS/RISK IDENTIFICATION										HIRADC/EPC/11		
		Rev.No: 02		DATE: 01/10/2013		Mandatory PPE's requirements for HSE: Safety shoes and safety Helmets Wear Full Body harness for more than 2m height Administration Requirements for HSE: Display pictorial HSE images No Alcohol/drug use at sites Tool box meeting to be conducted before site work HSE induction training for new employees Refresh induction training for old employees								
S.No	Job Step / Task Inspection & Testing	HAZARD	RISK	R/N/R/E	LOR	IPC	Severity B	Likelihood C	Risk* BxC	Significant	Elimination/ Substitution	Eng. Control	Administration & PPE control	Job Specific Control Measures
2	Die Penetrate Testing	Inhalation of Aerosols	Respiratory Disease	N	Y	N	3	2	6	Y	NIL	Y	Y	Display and follow MSDS Instruction by local language Administration and PPE Requirements for HSE PPE as per the MSDS Recommended Hand gloves and respiratory Mask as per the MSDS Recommended Display of HSE posters, Caution/ Warning Signs for alerts.
3	Radiation	Exposure of Radiation	Reduce of body cells	N	Y	N	3	2	6	Y	NIL	Y	Y	Follow the BARC Radiography safety procedure Register the daily dosage received and should not exceed annual limit of BARC Wear Film Badge Emergency aids kept available readily
4	Blow down	High Noise	Ear Injury	NR	Y	N	3	3	9	Y	N	Y	Y	Cordon off the area Wear Ear Plug if more than 90 dBA and Ear muff for if more than 100 dBA Do not allow un authorized personnel Refer OCP-010 Pneumatic testing





WABAG

REGISTER OF HAZARDS/RISK IDENTIFICATION

HIRADC/EPC/14

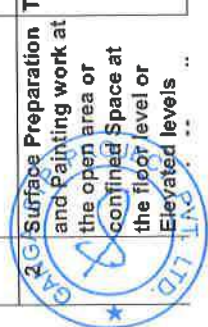
Rev.No: 02

DATE: 01/10/13

S.No	Job Step / Task PAINTING	HAZARD	RISK	R/NR/ E	LOR	IPC	Severity B	Likelihood C	Risk* BxC	Significant	Elimination/ Substitution	Engg. Control	Administration &PPE control	Job Specific Control Measures	Mandatory PPE's requirements for HSE:
1	Painting Work at the Floor level and elevated levels and Confined Space	Splasing of Paint during application	Eye Injury	R	Y	N	1	4	4	N	N	N	Y	Follow the MSDS Activities Eye wash cleaning aids availability at site Wash eyes for at least 15 minutes by plenty of water Close fitting clothes Full suit cover all Safe Scaffolding and access arrangements Refer OCP No. 19 Refer OCP No. 003 Refer OCP No. 008 &009	Safety shoes and safety Helmets Wear Full Body harness for more than 2m height Administration Requirements for HSE: Display pictorial HSE images No Alcohol/drug use at sites Tool box meeting to be conducted before site work Hse induction training for new employees Refresh Induction training for old employees
2	Volatile Organic Compound	Fire & Explosion	Burn injury	E	Y	N	3	2	6	Y	N	Y	Y	Secure the compressed air hose with structures Whip Check or Safety chain shall be attached with the Couplings Shut off the Air Supply Refer OCP No. 011 MSDS Availability at Site Store painting materials outside want of a day quantity Cover painting materials from hot sun Remove all flammable materials near by painting area Fire Extinguishers availability near by Job site HSE Training for Fire Fighting Refer OCP No. 003 for Confined Space	



WABAG		REGISTER OF HAZARDS/RISK IDENTIFICATION										HIRADC/EPC/14	
												Rev.No: 02	
												DATE: 01/10/13	
												Mandatory PPE's requirements for HSE: Safety shoes and safety Helmets Wear Full Body harness for more than 2m height	
												Administration & PPE	
												Engg. Control	
												Elimination/ Substitution	
												Significant	
												Risk* BxC	
												Likelihood C	
												Severity B	
												IPC	
												LOR	
												R/NR/E	
												RISK	
												HAZARD	
												Job Specific Control Measures	
		HEALTH											
S.No	Job Step / Task PAINTING	Heat	R	N	N	2	3	6	N	NIL	N	Y	Provide shaded shelter for resting; Drinking Water ; Electrolyte Job rotation/ Job rest First Aid Kit with stretcher availability Get Medical Attention Immediately
1	Painting work at the open area or confined Space at the floor level or Elevated levels	Heat Cramp	R	N	N	2	3	6	N	NIL	N	Y	Provide shaded shelter for resting Warm up the body Full suit cover all is required Do not touch the materials with bare hand Use leather type hand gloves / Safety Glasses/ Face Shield and Mandatory PPE's Job rotation/ Job rest First Aid Kit with stretcher availability Get Medical Attention Immediately
		Cold Where Applicable	R	N	N	2	3	6	N	NIL	N	Y	Provide shaded shelter for resting Warm up the body Full suit cover all is required Do not touch the materials with bare hand Use leather type hand gloves / Safety Glasses/ Face Shield and Mandatory PPE's Job rotation/ Job rest First Aid Kit with stretcher availability Get Medical Attention Immediately
		Reaching out and body bending	R	N	N	2	3	6	N	NIL	N	Y	Avoid awkward position during manual handling Safe lifting method to avoid sprain / strain Use mechanical aids to avoid reaching out and body bending HSE Training for Ergonomics Pictorial Posters shall be displayed
		Toxic atmosphere	R	Y	N	2	4	8	Y	NIL	Y	Y	Keep our head out of the fumes. Wear an appropriate respirator Removal of fumes with the use of ventilation may be needed, use a fan to remove fumes Exhaust duct facilities to remove fumes Job rotation/ job rest is required





WABAG

REGISTER OF HAZARDS/RISK IDENTIFICATION

HIRADC/EPC/14

Rev.No: 02

DATE: 01/10/13

S.No	Job Step / Task PAINTING	HAZARD	RISK	R/NR/E	LOR	IPC	Severity B	Likelihood C	Risk* BxC	Significant	Elimination/ Substitution	Engg. Control	Administration &PPE control	Mandatory PPE's requirements for HSE: Safety shoes and safety Helmets Wear Full Body harness for more than 2m height Administration Requirements for HSE: Display pictorial HSE images No Alcohol/drug use at sites Tool box meeting to be conducted before site work Hse induction training for new employees Refresh induction training for old employees	Job Specific Control Measures
	either by Manually or using by Compressed air (Spray Gun)	Skin absorption by painting materials	Skin Irritation/ Dermatitis	R	Y	N	2	4	8	Y	NIL	NIL	Y	Display and follow MSDS instruction for handling Administration and PPE Requirements for HSE Close fitting clothes and full suit coverall Job Rotation / Job Rest Hand gloves and respiratory Mask as per the MSDS Recommended	



WABAG		REGISTER OF HAZARDS/RISK IDENTIFICATION											HIRADC/EPC/13			
													Rev.No: 02	DATE: 01/10/2013		
S.No	Job Step / Task	HAZARD	RISK	R/NR/E	LOR	IPC	Severity B	Likelihood C	Risk BxC	Significant	Elimination/ Substitution	Engg. Control	Administration & PPE control	Job Specific Control Measures		
1	Surface cleaning and erection of scaffold with working platform for plastering work at the elevated levels , by manually	Fall of Personnel	Body Injury/ Fatal	R	Y	N	3	3	9	Y	N	Y	Y	<p>Mandatory PPE's requirements for HSE: Safety shoes and safety Helmets Wear Full Body harness for more than 2m height Administration Requirements for HSE: Display pictorial HSE images No Alcohol/drug use at sites Tool box meeting to be conducted before site work HSE induction training for new employees Refresh induction training for old employees</p>		
														<p>Job Specific Control Measures</p> <p>Cordon off the area Safe Scaffold and Working platform with access ladders as per the standard procedure Access ladders shall extend 1m at the platform level Hand rails at 1.10 m height and 6" toe guards Full body harness with lanyard up to 6m level Full body harness, lanyard and shock absorber more than 6m level Administration and PPE Requirements for HSE: Hand gloves and suitable respiratory mask as per job specific Refer OCP-008 Safe scaffolding Refer 009 - Safe Ladder</p>		
														<p>Guy rope tie off with turn buckles with anchorage at the ground level at the standard poles of the scaffold for all sides at every 6m height Tighten the loose couplings at the scaffold Ensure Cross bracing, longitudinal bracing, ledgers and putlog as per standards Refer OCP - 008 Safe scaffolding</p>		
														<p>Safe distance shall be maintained as per IE rules in view of Voltage capacity identify and isolate the energy Maintain clear distance between OH Power lines as per IE rules. Lock out and tag out system shall be provided Grounding is required for scaffold structure or any other steel structural members. Permit to Work as per the OCP No. 004 Refer OCP -013 Lock out & tag out system</p>		
														<p>Wear Eye Safety Glasses</p>		



WABAG		REGISTER OF HAZARDS/RISK IDENTIFICATION											HIRADC/EPC/13 Rev.No: 02 DATE: 01/10/2013			
		S.No	Job Step / Task Plastering	HAZARD	RISK	R/NR/E	LOR	IPC	Severity B	Likelihood C	Risk* BxC	Significant	Elimination/ Substitution	Engg. Control	Administration & PPE control	Mandatory PPE's requirements for HSE: Safety shoes and safety Helmets Wear Full Body harness for more than 2m height Administration Requirements for HSE: Display pictorial HSE Images No Alcohol/drug use at sites Tool box meeting to be conducted before site work HSE induction training for new employees Refresh induction training for old employees
2	Working at Confined Space and floor level	Darkness	Poor Visibility	R	Y	N	2	3	6	Y	N	Y	Y	Y	Adequate Lighting arrangements 24 volts shall be used for lighting for non hazardous gases atmosphere in confined space 12 volts shall be used for hazardous gas atmosphere with flame proof fittings	
3	Working at Confined Space and floor level	Lack of Ventilation	Asphyxiation	R	Y	N	3	3	9	Y	N	Y	Y	Y	Ventilate the area by artificial fan or Air blower Job Rest Job Rotation	





REGISTER OF HAZARDS/RISK IDENTIFICATION

HIRADC/EPC/13

Rev.No: 02

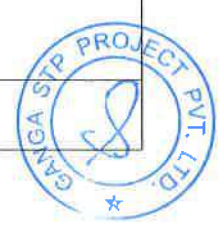
DATE: 01/10/2013

S.No	Job Step / Task Plastering	HAZARD	RISK	R/R/N/E	LOR	IPC	Severity B	Likelihood C	Risk ^a BXC	Significant	Elimination/ Substitution	Eng. Control	Administration & PPE control	Job Specific Control Measures
				R	N	N	2	3	6	NIL	N	Y		
1	Plastering works at the floor level and elevated level inside and outside	Heat	Heat Stress / Heat Cramp	R	N	N	2	3	6		NIL	N	Y	Provide shaded shelter for resting; Drinking Water ; Electrolyte Job rotation/ Job rest First Aid Kit with stretcher availability Get Medical Attention Immediately Provide shaded shelter for resting Warm up the body Full suit cover all is required Do not touch the materials with bare hand Use leather type hand gloves / Safety Glasses/ Face Shield and Mandatory PPE's Job rotation/ Job rest First Aid Kit with stretcher availability Get Medical Attention Immediately
		Cold Where Applicable	Numbness/ Frost Injury	R	N	N	2	3	6	N	NIL	N	Y	Provide shaded shelter for resting Warm up the body Full suit cover all is required Do not touch the materials with bare hand Use leather type hand gloves / Safety Glasses/ Face Shield and Mandatory PPE's Job rotation/ Job rest First Aid Kit with stretcher availability Get Medical Attention Immediately
		Reaching out and body bending	Body Ache	R	N	N	2	3	6	N	NIL	N	Y	Avoid awkward position during manual handling Safe lifting method shall be followed to avoid sprain / strain Use mechanical aids to avoid reaching out and body bending HSE Training for Ergonomics Pictorial Posters shall be displayed
2	Plastering works at the floor level and elevated level inside and outside	Wet Cement mortar absorption by Body	Eye and Skin Irritation/ Dermattis	R	N	N	2	3	6	N	NIL	NIL	Y	Display and follow MSDS instruction for handling Administration and PPE Requirements for HSE PPE as per the MSDS Recommended Helmet, Safety Shoes are mandatory Hand gloves and respiratory Mask as per the MSDS recommended

HEALTH



WABAG		LIST OF SIGNIFICANT ENVIRONMENTAL ASPECTS AND IMPACTS FOR CONSTRUCTION ACTIVITIES (EPC)													HIRADC/EPC/SIGN-OHS		
															Rev.No: 02		
															DATE: 01/10/2013		
															Mandatory PPE's requirements for HSE:		
															Safety shoes and safety Helmets		
															Wear Full Body harness for more than 2m height		
															Administration Requirements for HSE:		
															Display pictorial HSE images		
															No Alcohol/drug use at sites		
															Tool box meeting to be conducted before site work		
															Hse induction training for new employees		
															Refresh induction training for old employees		
															Job Specific Control Measures		
															Ensure that Noise level not exceeding 85 dba in the day time and 50 dba in the night time by any construction activities		
															Ear plug for less than 90 dba and Ear muff for more than 90 dba		
															Muffler facilities		
															Polythene sheet shall be laid on the ground collection, segregation and disposal as per the PCB Rules		
															Muffler facilities		
															PCB Certificate		
															Emission of Exhaust must be in upright position		
															Height of Stack as per PCB Rules		
															Use Chute line to avoid ground water contamination		
															Minimise tree cutting as far as possible.		
															Get approval from Dist. Forest Officer before cutting.		
															Develop more plantation and increasing green cover (as directed by DFO and the customer)		
															Dewatering shall be arranged and disposal of the same as directed by the customer		
															Site Specific Emergency preparedness plan shall be arranged to rescue workers from natural and neighbourhood emergencies		
S.No	Job Step / Task	ASPECT	IMPACT	M/A/N/E	LOR	FC	D/I	BC / RC	Severity A	Likelihood B	DURATION C	Risk* AXBXC	Significant	Elimination/ Substitution	Engg. Control	Administration & PPE Control	Job Specific Control Measures
1	HIRADC / EPC / 01A,02A,03A,04A,05A, 06A,07A,08A,09A,12A, 13A,14A.	Noise by construction Machinery/ Vehicles	Noise Pollution	AN	Y	N	D	N	2	3	1	6	Y	NIL	Y	Y	Ensure that Noise level not exceeding 85 dba in the day time and 50 dba in the night time by any construction activities
		Oily soaked Waste	Land Pollution	AN	Y	N	D	N	3	4	2	24	Y	NIL	Y	Y	Ear plug for less than 90 dba and Ear muff for more than 90 dba
		Emission of hazardous gas from Construction Machinery/ Vehicles	Air Pollution	N	Y	N	D	N	2	4	1	8	Y	NIL	Y	Y	Muffler facilities
2	HIRADC/EPC/02A Piling works(Rev -00)	Use of bentonite for grouting	Water Pollution	N	Y	N	D	N	3	5	2	30	Y	N	Y	Y	Polythene sheet shall be laid on the ground collection, segregation and disposal as per the PCB Rules
3	HIRADC/EPC/03A (EXCAVATION) Area clearing bush cutting & Tree cutting by Manual / Machinery & Tools	De-forestation	Loss of natural resources	AN	Y	Y	D	N	3	3	4	36	Y	NIL	Y	Y	Emission of Exhaust must be in upright position
		Seepage of Ground water	Depletion of water sources	AN	Y	Y	D	RC	3	4	3	36	Y	NIL	Y	Y	Height of Stack as per PCB Rules
		Storm related Flooding	Damage of flora and fauna/ Water Pollution by flooding/ Land Pollution/	AN	Y	Y	D	N	3	4	4	48	Y	NIL	Y	Y	Use Chute line to avoid ground water contamination



WABAG		LIST OF SIGNIFICANT ENVIRONMENTAL ASPECTS AND IMPACTS FOR CONSTRUCTION ACTIVITIES (EPC)											HIRADC/EPC/SIGN-OHS						
S.No		Job Step / Task	ASPECT	IMPACT	N/A/N/ E	LOR	FC	D/ I	BC / RC	Severity A	Likelihood B	DURATION C	Risk* AXBXC	Significant	Elimination/ Substitution	Engg. Control	Administration & PPE Control	Control	
4	HIRADC/EPC/04A Demolition	Debris from demolition	Land Pollution	Land Pollution	N	Y	N	D	N	3	4	2	24	Y	JIL	N	Y	Y	Debris removed from surfaces must be disposed of in accordance with the Centre and State regulations on solid and hazardous waste. Polythene sheet shall be laid to avoid on the ground
5	HIRADC/EPC/05A PCC	Spillage of concrete	Land Pollution	Land Pollution	N	N	Y	D	N	2	3	2	12	N	JIL	Y	Y	Y	Collection ; segregation and disposal at the designated place Use of Land fill
6	HIRADC/EPC/06A Reinforcement	Generation of Cut Bit Waste	Loss of Natural Resource	Loss of Natural Resource	N	N	N	D	RC	3	3	3	27	Y	Y	N	Y	Y	Collection ; segregation; stack at the designated area and disposal as per the instruction for re-cycle use. Display Environment caution / warning sign boards
7	HIRADC/EPC/07A Form Work	Generation of waste/scrap	Resource depletion	Resource depletion	N	N	N	D	RC	3	3	3	27	Y	N	N	Y	Y	Collection ; segregation; stack at the designated area and disposal as per the instruction for re-cycle use. Display Environment caution / warning sign boards
8	HIRADC/EPC/08A RCC	Spillage of concrete	Land Pollution	Land Pollution	N	N	Y	D	N	3	3	3	27	Y	JIL	Y	Y	Y	Collection ; segregation and disposal at the designated place Use designated Land fill
9	HIRADC/EPC/09A Fabrication of steel structures	Nitrogen oxide and Ozone by welding fumes	Air Pollution	Air Pollution	N	Y	N	D	BC	2	4	1	8	Y	JIL	N	Y	Y	Provide Exhaust fans in enclosed areas.
10	HIRADC/EPC/11A Visual Inspection Die Penetration Testing	Generation of Empty Containers (Die & Penetrant) VOC Emission	Land Pollution	Land Pollution	N	Y	N	D	N	2	4	3	24	Y	JIL	Y	Y	Y	Collection; Segregation and Disposal as per the Hazardous Waste Management Rules Exhaust fan with duct facilities



WABAG		LIST OF SIGNIFICANT ENVIRONMENTAL ASPECTS AND IMPACTS FOR CONSTRUCTION ACTIVITIES (EPC)											HIRADC/EPC/SIGN-OHS			
													Rev.No: 02			
													DATE: 01/10/2013			
													Mandatory PPE's requirements for HSE:			
													Safety shoes and safety Helmets			
													Wear Full Body harness for more than 2m height			
													Administration Requirements for HSE:			
													Display pictorial HSE images			
													No Alcohol/drug use at sites			
													Tool box meeting to be conducted before site work			
													Hse induction training for new employees			
													Refresh induction training for old employees			
													Job Specific Control Measures			
													Dispose at the designated area			
													Ensure that Noise level not exceeding 85 dba in the day time and 50 dba in the night time by any construction activities			
													Ear plug for less than 90 dba and Ear muff for more than 90 dba			
													Muffler facilities			
													Follow the BARC Radiography safety procedure			
													Register the daily dosage received and should not exceed annual limit of BARC			
													Emergency aids kept available readily			
													Monitoring Air Ambient Quality as per the PCB Rules			
													Collection : segregation and disposal as per the local PCB rules			
													Polythene sheet shall be laid on the ground			
													Waste Cement Mortar collection, segregation and disposal at the designated place			
													Polythene sheet shall be laid on the ground			
													collection, segregation and disposal as per the PCB Rules			
													Collection; Segregation and Disposal as per the Hazardous Waste Management Rules			
S.No	Job Step / Task	ASPECT	IMPACT	N/A/N/ F	LOR	IPC	D/ BC / RC	Severity A	Likelihood B	DURATION C	Risk* AXBXC	Significant	Elimination/ Substitution	Eng. Control	Administration & PPE control	Control
	Pressure Testing (Hydraulic / Pneumatic)	Water Usage and Drain	Land Pollution	AN	Y	N	RC	2	3	2	12	Y	NIL	Y	Y	Y
	Blow Down	Noise	Noise Pollution	AN	Y	N	N	2	3	1	6	Y	NIL	Y	Y	Y
	Isotopic Waste	Gamma rays emmissi	Air Pollution	AN	Y	N	N	2	1	1	2	Y	NIL	N	Y	Y
11	HIRADC/EPC/12A Erection of electrical equipments	Emission of lead fumes	Air Pollution	N	Y	N	N	2	4	1	8	Y	NIL	Y	Y	Y
	Cable Joining	Solder's Waste	Land Pollution	N	Y	N	N	2	3	1	6	Y	NIL	Y	Y	Y
12	HIRADC/EPC/13A Plastering	Spillage of Cement Mortar on earth	Land Pollution	N	Y	N	BC	2	4	1	8	Y	NIL	Y	Y	Y
13	HIRADC/EPC/14A Painting	Paint or other chemicals spillage on earth	Land Pollution	N	Y	N	N	2	4	1	8	Y	NIL	Y	Y	Y
	Empty Paint Tins		Land Pollution	N	Y	N	N	2	4	3	24	Y	NIL	Y	Y	Y



WABAG		LIST OF SIGNIFICANT ENVIRONMENTAL ASPECTS AND IMPACTS FOR CONSTRUCTION ACTIVITIES (EPC)										HIRADC/EPC/SIGN-OHS														
												Rev.No: 02														
												DATE: 01/10/2013														
												Mandatory PPE's requirements for HSE:														
												Safety shoes and safety Helmets														
												Wear Full Body harness for more than 2m height														
												Administration Requirements for HSE:														
												Display pictorial HSE images														
												No Alcohol/drug use at sites														
												Tool box meeting to be conducted before site work														
												Hse induction training for new employees														
												Refresh induction training for old employees														
												Job Specific Control Measures														
												Exhaust fan with duct facilities														
S.No	Job Step / Task	ASPECT	IMPACT	N / M / E	Y	LOR	N	IPC	DI	N	BC / RC	2	Severity A	4	Likelihood B	2	DURATION C	16	Risk* AxBxC	Y	Significant	Elimination/ substitution	Engg. Control	Administration & PPE control	Y	
		Toxic Atmosphere	Air Pollution	N	Y		N			N																





LIST OF SIGNIFICANT SAFETY / HEALTH HAZARDS AND RISKS FOR CONSTRUCTION ACTIVITIES (EPC)

HIRADC/EPC/SIGN-OHS
Rev.No: 00
DATE: 01/10/2013

S.No	Job Step / Task Significant	HAZARD	RISK	R/NR/ F	FOR	IPC	Severity B	Likelihood C	Risk ² BXC	Significant	Elimination / Substitution	Fngg. Control	Administration & PPE control	Job Specific Control Measures
1	Piling & Sheeting (HIRA/EPC/02) Fixing of Tripod Stand and operation of air hammer	Injury by fall of Tripod / hitting by hammer by connection break	Body Injury	R	Y	N	5	2	10	Y	N	Y	Y	<p>Mandatory PPE's requirements for HSE: Safety shoes and safety Helmets Wear Full Body harness for more than 2m height Administration Requirements for HSE: Display pictorial HSE images No Alcohol/drug use at sites Tool box meeting to be conducted before site work HSE induction training for new employees Refresh induction training for old employees</p> <p>Job Specific Control Measures</p> <p>Cordon off the area Heavy timber sill or concrete bed or secured foundation for stability of Tripod standard lock pin at the base of each log Hammer must be securely lashed. Do not allow un authorized personnel during piling activities Tool box talks for Piling Operation to all workers by supervisor</p>
	Tripping or falling into / onto piles	Falling	Body Injury	NR	Y	N	2	3	6	Y	N	Y	Y	<p>Ensure tubular piles are elevated at least 1m from ground and marked. Ensure piles are concrete filled as soon as possible after completion of work Ensure mushroom caps are placed on to exposed reinforcement Suitable working platforms, Hand rails & Toe bores shall be provided where structural tower supports to lead a pile driving</p>
	Hammering operation	Noise	Discomfort	R	Y	N	1	5	5	Y	N	N	Y	<p>Reduce exposure time Wear ear plug Job Rotation Display Pictorial HSE image poster in local language</p>
	Welding & Oxy Acetylene Cutting for piling operation	Fire/ Explosion	Body Injury	NR	Y	N	4	2	8	Y	N	N	Y	<p>Refer HIRA for 009 Fabrication for Welding activities</p>
	Sheet piling	Fall of sheet piling on personnel	Body injury	NR	Y	N	3	3	9	Y	N	Y	Y	<p>Cordon off the area Signal man is required to guide the operator. Safe distance is to be maintained while lowering the sheets. Use sheet pile threader to safely interlock the sheet piles.</p>
	Pile testing	Collapse of load	Body Injury	NR	Y	N	3	3	9	Y	N	N	Y	<p>Cordon off the area. Provide HSE pictorial image poster Prohibited for unauthorised persons</p>



LIST OF SIGNIFICANT SAFETY / HEALTH HAZARDS AND RISKS FOR CONSTRUCTION ACTIVITIES (EPC)

HIRADC/EPC/SIGN-OHS
Rev.No: 00
DATE: 01/10/2013

S.No	Job Step / Task Significant	HAZARD	RISK	R/N/R/E	LOR	IPC	Severity B	Likelihood C	Risk* BxC	Significant	Elimination / Substitution	Eng. Control	Administration & PPE control	Job Specific Control Measures
	Pile testing (health)	Handling of Chemicals	Skin / Body Irritation	R	Y	N	2	5	10	Y	N	Y	Y	Mandatory PPE's requirements for HSE: Safety shoes and safety Helmets Wear Full Body harness for more than 2m height Administration Requirements for HSE: Display pictorial HSE Images No Alcohol/drug use at sites Tool box meeting to be conducted before site work HSE induction training for new employees Refresh induction training for old employees
2	Scaffolding (HIRADC/EPC/03a) Erection of Temporary Scaffold Structure and dismantling the same	Fall of personnel	Body Injury	R	Y	N	3	3	9	Y	N	Y	Y	Job Specific Control Measures Wear PPE's MSDS Recommendations Storage, Handling and use as per the MSDS Instructions Emergency action as per the MSDS Cord off the area Erect and dismantle as per the standard safe scaffold procedure Conduct scaffold training; Provide safe access ladders Provide safe working platform along with handrails and toe boards Don't climb using railings. Use the provided access. Provide Horizontal lifelines with turn buckles devices Wear Full body harness & double lanyards if less than 6m Wear Full body harness, double lanyards and shock absorber if more than 6m height Do not opening in any working platform except for allowing access to such working platform Personnel is necessary provide safety nets against falling Employ competent scaffold personnel with supervision Implement buddy system among workers Working platform shall be extended up to atleast 0.6m beyond the end of any wall or building. Use fresh ties and braces to compensate while dismantling Ensure proper lowering of dismantling components on duct tool box talks prior to start work Display warning signs Implement effective communication system to stop work when there is bad weather or emergency. Refer OCP -008 &009 Safe Scaffolding and ladder Refer OCP -021 - Permit to work
	Erection of Temporary Scaffold Structure and dismantling the same (CONTINUED)	Fall of Personnel (CONTINUED)	Body Injury	R	Y	N	3	3	9	Y	N	Y	Y	



WABAG		LIST OF SIGNIFICANT SAFETY / HEALTH HAZARDS AND RISKS FOR CONSTRUCTION ACTIVITIES (EPC)										HIRADC/EPC/SIGN-OHS Rev.No: 00 DATE: 01/10/2013		
S.No	Job Step / Task Significant	HAZARD	RISK	R/NR/E	LOR	IPC	Severity B	Likelihood C	Risk* BxC	Significant	Elimination / Substitution	Engg. Control	Administration & PPE control	Job Specific Control Measures
	Erection and dismantling of Scaffolding and working platforms	Injury by falling objects	Body Injury	R	Y	N	2	3	6	N	NIL	Y	Y	<p><u>Mandatory PPE's requirements for HSE:</u> Safety shoes and safety Helmets Wear Full Body harness for more than 2m height <u>Administration Requirements for HSE:</u> Display pictorial HSE images No Alcohol/drug use at sites Tool box meeting to be conducted before site work HSE induction training for new employees Refresh induction training for old employees</p> <p>Job Specific Control Measures Cordon off affected work areas Install Safety net/ screening net or wirenets Use proper toe-boards and guardrails Regular Good Housekeeping Ensure no work is carried out below the working level Ensure that there is no accumulation of debris at any elevated levels Store loose materials(ties, clamps and etc) in sacks or bags Ensure proper raising / lowering method while erection /dismantling scaffolding components Return and report defective materials to the store Display of pictorial images for falling objects</p>
	Erection and dismantling of Scaffolding and working platforms at open area / confined space	Collapse of Scaffold	Body Injury	E	Y	N	5	2	10	Y	NIL	Y	Y	<p>Cordon off the area Ensure that supported base plates sufficiently/ standard Legs are in plumb/Secure Braces/runners/cross-bracing/ planks are not overextended/under extended/to avoid Severe overloading/not be supported in overhanging caves/ gutters Remove Broken pins on frames immediately Horizontal spacing of ties: 4.8m max on alternative pairs of standards. Vertical spacing -4.2m max. on alternative lifts. Transverse diagonals: At each end of standards and not more than every tenth pair of standards along the scaffold.</p>



WABAG		LIST OF SIGNIFICANT SAFETY / HEALTH HAZARDS AND RISKS FOR CONSTRUCTION ACTIVITIES (EPC)											HIRADC/EPC/SIGN-OHS														
														Rev.No: 00		DATE: 01/10/2013											
Job Step / Task Significant		HAZARD		RISK		R/N/R/E		LOR		IPC		Severity B		Likelihood C		Risk* BxC		Significant		Elimination / Substitution		Engg. Control		Administration & PPE control		Mandatory PPE's requirements for HSE: Safety shoes and safety Helmets Wear Full Body harness for more than 2m height Administration Requirements for HSE: Display pictorial HSE images No Alcohol/drug use at sites Tool box meeting to be conducted before site work HSE induction training for new employees Refresh induction training for old employees	
S.No		Job Specific Control Measures																									
	Erection and dismantling of scaffolding and working platforms at confined space	Fall of personnel at Confined space	Body Injury	R	Y	N	3	3	9	Y	N	3	3	3	3	9	Y	Y	Y	Y	Y	Y	Y	Y	Y	Provide emergency / backup lighting Provide adequate and effective mechanical ventilation. Implement effective safe work procedures Use non-sparking work tools Conduct confined space training Ensure supervision is carried out by a competent person Provide attendant to keep watch Provide breathing apparatus & emergency equipments Refer OCP No. 3 Confined Space Refer OCP No. 21 Permit to work	
	Erection and dismantling of Scaffolding and Scaffold used by building workers of different employers	Scaffolds touching electrical line while fixing Falling	Electrocution Body Injury	NR	Y	N	3	3	9	Y	N	3	3	3	6	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Safe distance shall be maintained between the OH electrical lines and edge of the re bar as per the IE Rules Do not erect any scaffold too close to power lines Inspection and examination by a supervisor that a scaffold has previously been used by another employer	
	Scaffolding (Health)	Lack of Ventilation	Asphyxiation	R	Y	N	3	2	6	Y	N	3	2	6	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Provide adequate and effective mechanical ventilation Conduct periodic/regular gas testing in confined space Provide breathing apparatus & emergency equipment Tool box talks prior to start work Refer OCP No. 3 Confined Space Refer OCP No. 21 permit to work	



WABAG		LIST OF SIGNIFICANT SAFETY / HEALTH HAZARDS AND RISKS FOR CONSTRUCTION ACTIVITIES (EPC)											HIRADC/EPC/SIGN-OHS Rev.No: 00 DATE: 01/10/2013													
S.No	Job Step / Task Significant	HAZARD	RISK	R/NR/ n	LOR	IPC	Severity B	Likelihood C	Risk* BxC	Significant	Elimination / Substitution	Engg. Control	Administration & PPE control	HAZARD	RISK	R/NR/ n	LOR	IPC	Severity B	Likelihood C	Risk* BxC	Significant	Elimination / Substitution	Engg. Control	Administration & PPE control	
3	Confined Space (HIRADC/EPC/03b) Confined Space Civil / Mech/ E & I activities at Confined Space area (Hazardous & Non Hazardous atmosphere) and also the excavation below 1.2m level from the ground	Deficiency of oxygen in air	Asphyxiation	R	Y	N	1	5	5	Y	N	Y	Y	Deficiency of oxygen in air	Asphyxiation	R	Y	N	1	5	5	Y	N	Y	Y	Y
		Fire / Explosion by Welding sparks/ Sparks from portable hand / power tools	Body Injury / Fatal	NR	Y	N	5	1	5	Y	N	Y	Y	Fire / Explosion by Welding sparks/ Sparks from portable hand / power tools	Body Injury / Fatal	NR	Y	N	5	1	5	Y	N	Y	Y	
		Touching Damaged insulation electrical cables/ wires	Shock Injury	R	Y	N	5	2	10	Y	N	Y	Y	Touching Damaged insulation electrical cables/ wires	Shock Injury	R	Y	N	5	2	10	Y	N	Y	Y	
		Noise	Discomfort	R	Y	N	1	5	5	Y	N	N	Y	Noise	Discomfort	R	Y	N	1	5	5	Y	N	N	Y	
		Vehicle Passing by	Body Injury / Fatal	NR	Y	N	5	1	5	Y	N	Y	Y	Vehicle Passing by	Body Injury / Fatal	NR	Y	N	5	1	5	Y	N	Y	Y	



HIRADC/EPC/SIGN-OHS
Rev.No: 00
DATE: 01/10/2013

LIST OF SIGNIFICANT SAFETY / HEALTH HAZARDS AND RISKS FOR CONSTRUCTION ACTIVITIES (EPC)

S.No	Job Step / Task Significant	HAZARD	RISK	R/NR/ m	LOR	IPC	Severity B	Likelihood C	Risk* BxC	Significant	Elimination / Substitution	Eng. Control	Administration & PPE control	Job Specific Control Measures
		Engulfment by solids or liquids	Drowning	NR	Y	N	5	1	5	Y	N	Y	Y	Mandatory PPE's requirements for HSE: Safety shoes and safety Helmets Wear Full Body harness for more than 2m height Administration Requirements for HSE: Display pictorial HSE images No Alcohol/drug use at sites Tool box meeting to be conducted before site work HSE induction training for new employees Refresh induction training for old employees
		Low illumination	Poor Visibility	R	Y	N	2	2	4	Y	N	Y	Y	Keep an attendant to watch Emergency Rescue equipments available readily Toolbox talks prior to start Lock out and tag out facilities Trained first aid personnel Ensure Sufficient illumination Wear High visibility jacket
		Slip / Trip / Fall	Body Injury	R	Y	N	3	3	9	Y	N	Y	Y	Cordon off the area Provide Guard Rails with toe board Provide horizontal life lines with turn buckles devices Provide vertical grab lines with turn buckle devices Wear Full body harness with double lanyard upto 6m height Wear full body harness, double lanyard with shock absorber for more than 6m height
		Exposure to toxic or flammable atmosphere	Body injury	E	Y	N	5	2	10	Y	N	Y	Y	Follow the site emergency preparedness plans Conduct Faradic/regular gas testing in confined space Conduct mock drill Cross wind direction Assemble at emergency point and do a head count Keep first aid ready Transfer the personnel to a safe location
4	Behavioral Attitude (HIRADC/EPC/15) Using Alcohol and Drugs	Unconscious at work Confusion at work	Body Injury / Fatal	NR	Y	N	5	2	10	Y	Y	Y	Y	Send out the alcohol/ drugs users from the site Breathalyzer shall be used for monitoring HSE Pictorial Image Posters for Alcohol and Drugs Regular Tool Box Talks Follow the SITE HSE Rules as per HSE Induction Training



WABAG		LIST OF SIGNIFICANT SAFETY / HEALTH HAZARDS AND RISKS FOR CONSTRUCTION ACTIVITIES (EPC)										HIRADC/EPC/SIGN-OHS Rev.No: 00 DATE: 01/10/2013		
S.No	Job Step / Task Significant	HAZARD	RISK	R/NR/E	LOR	IPC	Severity D	Likelihood C	Risk* BxC	Significant	Elimination / Substitution	Engg. Control	Administration & PPE control	Job Specific Control Measures
														<u>Mandatory PPE's requirements for HSE:</u> Safety shoes and safety Helmets Wear Full Body harness for more than 2m height <u>Administration Requirements for HSE:</u> Display pictorial HSE images No Alcohol/drug use at sites Tool box meeting to be conducted before site work HSE induction training for new employees Refresh induction training for old employees
	Not Wearing PPE Wilfully	Violation of Mandatory Rules & Site Management Instruction	Body Injury / Fatal	R	Y	N	3	4	12	Y	N	N	Y	Follow the SITE HSE Rules as per HSE Induction Training No one allow at site without mandatory PPE's Wear Helmet and Shoes as Mandatory Wear Job Specific PPEs as per Site Management Instrn., Display Pictorial HSE Poster in local language
	Smoking at Site	Discomfort to others Fire Hazard	Body Injury	R	Y	N	3	3	9	Y	Y	Y	Y	Follow the SITE HSE Rules as per HSE Induction Training Smoke at the designated place Do not smoke while working with peer groups Display Pictorial HSE Poster in local language
	Stealing	Threatening by Sharp Tools / Gun	Body Injury / Fatal	NR	Y	N	5	1	5	Y	N	Y	Y	Fencing the periphery of the site Adequate lighting at the fencing and storage materials 24hrs Security watch Communicate Emergency contact personnel Create Alert among Security Groups by tool box talks Follow the SITE HSE Rules as per HSE Induction Training
	Using Alcohol and Drugs (Health)	Increasing blood pressure	Digestion system or Respiratory System effect	NR	Y	N	5	2	10	Y	Y	Y	Y	Sending out the alcohol/ drugs users from the site Breathalyzer shall be used for monitoring HSE Pictorial Image Posters for Alcohol and Drugs Regular Tool Box Talks Follow the SITE HSE Rules as per HSE Induction Training Motivational Programme for Health Issues
	Not Wearing Respiratory Mask Wilfully	Lungs Infection	Asphyxiation/ Unconscious	R	Y	N	3	3	9	Y	N	N	Y	Follow the SITE HSE Rules as per HSE Induction Training Wear Job Specific PPEs as per Site Management Instrn., OR MSDS Instruction Display Pictorial HSE Poster in local language



WABAG		LIST OF SIGNIFICANT SAFETY / HEALTH HAZARDS AND RISKS FOR CONSTRUCTION ACTIVITIES (EPC)										HIRADC/EPC/SIGN-OHS Rev.No: 02 DATE: 01/10/2013		
S.No	Job Step / Task Significant	HAZARD	RISK	R/NR/E	LOR	IPC	Severity B	Likelihood C	Risk* BxC	Significant	Elimination / Substitution	Engg. Control	Administration & PPE control	Job Specific Control Measures
1	Materials Handling (HIRADC/EPC/01) Unloading of Materials from Vendors to stores/yard	Injury by Fall of Materials	Body Injury	R	Y	N	3	3	9	Y	NIL	Y	Y	<p>Cordon off the area</p> <p>Use Mechanical Equipments to avoid contact manually</p> <p>Use Lifting machinery with lifting tools inspected by 3rd party</p> <p>Ensure Safe working load recommended by mfrs.</p> <p>Wedges shall be used to avoid roll out materials</p> <p>Buddy system will be arranged for safe transfer of materials if manually</p> <p>Fixing Tailing Rope While unloading.</p> <p>Administration and PPE Requirements for HSE.</p> <p>Leather type hand gloves are required</p> <p>HSE Training is required for Working at Height & Fall of Materials</p> <p>First Aid Kit and Stretcher availability</p> <p>Refer OCP No. 7 Material Lifting</p>
	Lifting of loaded Materials/ Equipments by lifting machinery, tools and tackles at Work Spot	Fall of Materials	Body Injury	R	Y	N	3	3	9	Y	NIL	Y	Y	<p>Cordon off the area with lifting sign boards by the local language.</p> <p>Post Signal man.</p> <p>Tie the load with guy rope designated.</p> <p>No person rides on suspended / standing below load ;</p> <p>3rd party inspection of Lifting machinery, tools and tackles ;</p> <p>SWL for Lifting Machinery, tools and tackles ;</p> <p>Hoist Limit Switches, Boom Limit Switches and Swinging distance. Condition of Slings free from broken or knot or bird cage and functioning of safety latches.</p> <p>Counter- weights shall be ensured; Ensure the Center of Gravity while rigging</p> <p>Refer BOCW Rules No. 64 Refer OCP No. 21 & OCP No. 7</p>
	Raising Boom While lifting or movement of lifting / construction machinery	Contact with OH Power lines	Electrocution	R	Y	N	5	3	15	Y	NIL	Y	Y	<p>Maintain Safe Distance from OH Lines</p> <p>Lock out and tag out system if necessary</p> <p>Permit to work Refer OCP No. 4 & OCP 21</p>



WABAG		LIST OF SIGNIFICANT SAFETY / HEALTH HAZARDS AND RISKS FOR CONSTRUCTION ACTIVITIES (EPC)										HIRADC/EPC/SIGN-OHS Rev.No: 02 DATE: 01/10/2013		
S.No	Job Step / Task Significant	HAZARD	RISK	R/NR/ P	LOR	IPC	Severity B	Likelihood C	Risk ² BxC	Significant	Elimination / Substitution	Eng. Control	Administration & PPE control	Job Specific Control Measures
	Construction of Scaffold with working platform for alignment of lifting materials	Collapse of scaffold	Body Injury	E	Y	N	2	3	6	Y	NIL	NIL	Y	<p>Mandatory PPE's requirements for HSE:</p> <p>Safety shoes and safety Helmets</p> <p>Wear Full Body harness for more than 2m height</p> <p>Administration Requirements for HSE:</p> <p>Display pictorial HSE images</p> <p>No Alcohol/drug use at sites</p> <p>Tool box meeting to be conducted before site work</p> <p>HSE Induction training for new employees</p> <p>Refresh induction training for old employees</p> <p>Job Specific Control Measures</p> <p>Scaffold shall be erected as per the scaffold procedure</p> <p>Scaffold shall be secured by a guy rope to secure</p> <p>Proper Tie off with the permanent Structures</p> <p>Refer BOCW Rules No. 188</p> <p>Refer OCP No.8</p>
	Working at Height while Positioning of lifting materials etc.,	Fall of person from height	Body Injury	NR	Y	N	3	3	9	Y	NIL	Y	Y	<p>Provide Guard Rails</p> <p>Erection of Safe Scaffold & Working platform</p> <p>Administration and PPE's Requirements</p> <p>Ladder type hand gloves are required</p> <p>HSE Training is required for working at height and Fall of Materials</p> <p>Full body harness with double lanyard upto 6m level; Full body harness, double lanyard and shock absorber if more than 6m level</p> <p>Safety Net and Horizontal or Vertical life line where fixing of hardarrication is difficult / impossible</p> <p>Refer OCP No.8 Safe Scaffolding</p> <p>Refer OCP No. 9 Ladder & Stair</p> <p>Refer OCP No. 21 Permit to work</p> <p>Refer BOCW Rules No.196</p>



WABAG		LIST OF SIGNIFICANT SAFETY / HEALTH HAZARDS AND RISKS FOR CONSTRUCTION ACTIVITIES (EPC)										HIRADC/EPC/SIGN-OHS Rev.No: 02 DATE: 01/10/2013		
S.No	Job Step / Task Significant	HAZARD	RISK	R/N/R/E	LOR	IPC	Severity B	Likelihood C	Risk BxC	Significant	Elimination / Substitution	Engg. Control	Administration & PPE control	Job Specific Control Measures
2	Excavation (HIRADC/EPC/O3) Excavation at the ground level/ Confined Space / near by Undermining Structures	Collapse of soil/ Cave In	Fatal	R	Y	N	5	3	15	Y	NIL	Y	Y	Slipping/bechng/shoring shall be provided based on soil condition at the site No vehicle movement with in the safe distance of 1.5m No dumping excavated material within the 1.5m safe distance from the edge of the excavation at all the sides Inspection by the Civil Engineer is required Permit to Work as per the OCP No. 021 Safe Accessibility such as ladder with 1m extension / Backfilling or shoring shall be provided to avoid Cave in Hard Barrier on all the sides of the excavation Administration and PPE Requirements for HSE Refer OCP-003 Working in confined space. Refer OCP-009 Safe use of Ladders Refer OCP -20 Excavation Refer OCP -21 Permit to work
	Excavation at the ground level/ Confined Space / near by Undermining Structures	Injury from falling materials or Machinery Fall of personnel	Body injury / Fatal Fatal	R	Y	N	5	3	15	Y	NIL	Y	Y	Hard barrication around all the sides of excavations Stopper is required to restrict the vehicle / machinery movements No materials dumping with safe distacne of 1.5m at the edge of the excavation Sufficient Lighting at Site Permit to Work as per the OCP 020 Provide ladders with 1m extension and assess for excavation above 1.5 m for every 15 meter. Scaffold/ Stairway with side handrails / Benching shall be provided Refer OCP-008 Safe Ladder use Refer OCP 009 Safe Scfolding Refer BOCW Rules 2006



LIST OF SIGNIFICANT SAFETY / HEALTH HAZARDS AND RISKS FOR CONSTRUCTION ACTIVITIES (EPC)

HIRADC/EPC/SIGN-OHS
Rev.No: 02
DATE: 01/10/2013

S.No	Job Step / Task Significant	HAZARD	RISK	R/N/R/ F	FOR	IPC	Severity B	Likelihood C	Risk* BxC	Significant	Elimination / Substitution	Engg. Control	Administration & PPE control	Control Measures
		Engulfment by Water Ingress Ground water Table / Rain Water	Strangulation Drowning	R	Y	N	5	2	10	Y	NIL	Y	Y	<p>Job Specific Control Measures</p> <p>Ensure continuous dewatering for maintaining water level below the working level.</p> <p>Suspend the excavation during heavy rain and flood.</p> <p>No excavation after flooding and shall be inspected and authorised prior to start of work</p> <p>Availability of Rescue aid at site</p> <p>Permit to Work as per the OCP 021</p>
		Contact with O H/ Buried Power lines	Electrocution	R	Y	N	3	3	9	Y	NIL	N	Y	<p>Safe distance shall be maintained as per IE rules in view of Voltage capacity identify and isolate the energy</p> <p>Maintain clear distance between OH Power lines as per IE rules.</p> <p>Display the Pictorial Image of OH Powerlines</p> <p>Lock out and tag out system shall be provided</p> <p>Permit to Work as per the OCP No. 004</p> <p>Refer OCP-021 Permit to work</p>
	Excavation by manual & machinery near by Public area and Undermining structures	Fall of structures / Personnel	Body Injury/ Fatal	R	Y	N	3	3	9	Y	Y	Y	Y	<p>Substitution- Trenchless Excavation</p> <p>Adjacent structures shall be ensured by the Civil Engineer</p> <p>Fencing / Guarding in public places to prevent pedestrians and vehicles falling into them.</p> <p>Provide adequate guarding, signage, lighting and warning notices on all footpaths, cycle tracks or roads.</p> <p>Cover the trenches near the residential area to prevent fall of person</p> <p>Secure the near by structures or undermining structures with suitable shoring or Sheet Piling</p> <p>Display the Pictorial Images</p> <p>Permit to Work as per the OCP No. 021</p>



WABAG		LIST OF SIGNIFICANT SAFETY / HEALTH HAZARDS AND RISKS FOR CONSTRUCTION ACTIVITIES (EPC)										HIRADC/EPC/SIGN-OHS Rev.No: 02 DATE: 01/10/2013				
S.No	Job Step / Task Significant	HAZARD	RISK	AN	R/N/R/ E	LOR	IPC	Severity B	Likelihood C	Risk* BxC	Significant	Elimination / Substitution	Eng. Control	Administration & PPE control	Mandatory PPE's requirements for HSE: Safety shoes and safety Helmets Wear Full Body harness for more than 2m height Administration Requirements for HSE: Display pictorial HSE images No Alcohol/drug use at sites Tool box meeting to be conducted before site work HSE induction training for new employees Refresh induction training for old employees	Job Specific Control Measures
	Rock Blasting by using detonation	Flying debris	Body Injury/ Fatal	AN		Y	N	3	3	9	Y	NIL	Y	Y		Cordon off the area around the blasting sites. License & authorisation from PESO for Supply, Transportation, Storage and Shot firers Safe storage and handling of explosives as per the PESO No blasting before sunrise/ after sunset. Post Signal Men, Red flag and warning lights at the blasting sites. Ambulance, Stretcher, Fire Extinguisher/ Fire Brigade and First aiders availability at site. Safe Distance between blasting point and Detonator charging shelter as per the Explosive rules. No one is allowed to enter the blasting area until it is cleared off. Refer OCP-021 Permit to work Refer OCP-014 Controlled blasting
	Back Filling after Excavations	Uncontrolled explosion (mis-firing, delayed explosion, etc) Hit by Machines Pinch Point at Tail Gate	Body Injury Fatal	E		Y	N	3	4	12	Y	NIL	N	Y		No one is allowed to enter the mis fire area until it is cleared off Refer OCP-014 Controlled blasting Cordon off the swinging area A person to guide the machinery during reversing with High Visibility Jacket. Sufficient lighting during night time Administration and PPE Requirements for HSE. Cover All is required Display of HSE posters, Caution/ Warning Signs for alerts Refer OCP-021 Permit to work Refer OCP-020 Safe excavation



WABAG		HIRADC/EPC/SIGN-OHS Rev.No: 02 DATE: 01/10/2013												
LIST OF SIGNIFICANT SAFETY / HEALTH HAZARDS AND RISKS FOR CONSTRUCTION ACTIVITIES (EPC)		Mandatory PPE's requirements for HSE: Safety shoes and safety Helmets Wear Full Body harness for more than 2m height Administration Requirements for HSE: Display pictorial HSE images No Alcohol/drug use at sites Tool box meeting to be conducted before site work HSE induction training for new employees Refresh induction training for old employees												
S.No	Job Step / Task Significant	HAZARD	RISK	R/N/R/E	LOR	IPC	Severity B	Likelihood C	Risk* BxC	Significant	Elimination / Substitution	Engg. Control	Administration & PPE control	Job Specific Control Measures
	Excavation (Health)	Noise by Construction machinery / Vehicles	Discomfort	R	Y	N	1	4	4	Y	NIL	Y	Y	Ensure that Noise level not exceeding 85dba Use Ear plug for greater than 85 dba Use Ear Muff for greater than 100 dba Woolfler Facilities Display pictorial image poster by local language.
3	Demolition HIRADC/EPC/04	Fall of Personnel from height	Body Injury/ Fatal	R	Y	N	3	3	9	Y	NIL	Y	Y	Safe Scaffold and Working platform with access ladders as per the standard procedure Access ladders shall extend 1m at the platform level Hand rails at 1.10 m height and 6" toe guards Full body harness, lanyard and shock absorber more than 6m level Safe working platform around edge of the demolishing area Opening shall be covered suitably Coping used for debris removal shall not be located near to the access. Administration and PPE Requirements for HSE. Wear Safety glass, Face shield, Hand gloves & respiratory masks while demolishing Pictorial HSE Image Poster displayed by the local language. Refer OCP-008 Scaffolding arrangement Refer OCP-009 ladder & Stairs



WABAG		LIST OF SIGNIFICANT SAFETY / HEALTH HAZARDS AND RISKS FOR CONSTRUCTION ACTIVITIES (EPC)										HIRADC/EPC/SIGN-OHS Rev.No: 02 DATE: 01/10/2013			
S.No	Job Step / Task Significant	HAZARD	RISK	R/NR/ m	LOR	IPC	Severity B	Likelihood C	Risk* BxC	Significant	Elimination / Substitution	Engg. Control	Administration & PPE control	Mandatory PPE's requirements for HSE: Safety shoes and safety Helmets Wear Full Body harness for more than 2m height Administration Requirements for HSE: Display pictorial HSE Images No Alcohol/drug use at sites Tool box meeting to be conducted before site work HSE induction training for new employees Refresh induction training for old employees	Job Specific Control Measures
		Injury from falling materials	Body Injury/ Fatal	R	Y	N	3	3	9	Y	NIL	Y	Y		Hard barrier around the area Marking of Exclusion Zones Ensure the structure age before demolition Ensure the stability of the structure and type of construction and provide necessary supporting arrangement accordingly. Covered walkways Storage of materials shall not be in the access ways Caution and warning signs should be posted Protection shall be taken on fragile surface or partially demolished floors that are in hanging condition Consider the weight of removed material or machinery equipments on floors above the ground level while demolishing
		Un controlled Collapse	Body Injury / Fatal	E	Y	N	5	2	10	Y	NIL	Y	Y		Cordon off the area Caution / Warning signs are required to give alerts on near by structures. Un guarded walls / beams/ columns or other structure shall be protected due to wind pressure or Vibration. Hard barrier around the area Marking of Exclusion Zones
		Tools operated by electric power	Shock	R	Y	N	3	3	9	Y	NIL	Y	Y		Ensure the cable insulation or MCB or ELCB Facilities Refer OCP- 013 Lock out and Tag out system for Isolation Refer OCP-004 Electrical maintenance
		Tools operated by Pneumatic	Body Injury	R	Y	N	3	3	9	Y	NIL	Y	Y		Ensure Hose whip checks or hose coupling safety locks or both are fitted to Hose. Safety cables are to be used to support the weight of elevated hoses Refer OCP-011 Pneumatic tool handling



HIRADC/EPC/SIGN-OHS Rev.No: 02 DATE: 01/10/2013														
LIST OF SIGNIFICANT SAFETY / HEALTH HAZARDS AND RISKS FOR CONSTRUCTION ACTIVITIES (EPC)														
S.No	Job Step / Task Significant	HAZARD	RISK	R/N/R/E	LOR	IPC	Severity B	Likelihood C	Risk* BxC	Significant	Elimination / Substitution	Engg. Control	Administration & PPE control	Mandatory PPE's requirements for HSE: Safety shoes and safety Helmets Wear Full Body harness for more than 2m height Administration Requirements for HSE: Display pictorial HSE images No Alcohol/drug use at sites Tool box meeting to be conducted before site work HSE induction training for new employees Refresh induction training for old employees
Job Specific Control Measures														
		Contact with OH/ Buried Power lines	Electrocution/ Fatal	R	Y	N	5	2	10	Y	NIL	N	Y	Safe distance shall be maintained as per IE rules in view of Voltage capacity identify and isolate the energy Maintain clear distance between OH Power lines as per IE rules. Refer OCP-013 Lock out and tag out system shall be provided Refer OCP-004 Electrical Maintenance
	Mechanical Demolition Powershovel, Bucket bull Dozer	Injury by Fall of materials or hitting by Mechanical method	Body Injury/ Fatal	NR	Y	N	5	3	15	Y	NIL	Y	Y	Hard barrier shall be provided Radius of exclusionzone will be 1.5 times height of such affected portion. SW Shall be maintained if the line of travel of bucket Height of structure for demolishing shall not more than 24m Radius for demolishing by swinging weight shall be 1.5 times height of the structure. Warning signs by the local language that No person enter other than demolishers.
	Demolition (Health)	Noise	Deafness/ Discomfort	R	Y	N	2	3	6	Y	NIL	NIL	Y	Wear Ear plug during the operation
		Vibration	Hand - Arm Vibration Syndrome	R	Y	N	3	3	9	Y	NIL	NIL	Y	Wear Leather Gloves Cover all Required Job Rest / Job Rotation is required
		Dust	Respiratory Illness	R	Y	N	3	3	9	Y	NIL	NIL	Y	Wear Dust Mask
	4 RCC (HIRADC/EPC/05) Handling of Cement Concrete from transit mixer by buddy system at the ground level or elevated level or confined space	Using Wet Portland Cement	Burn Injury	R	Y	N	2	3	6	Y	NIL	Y	Y	Use Portable Hand trolley for shifing of concrete Wear Close-fitting Clothes Cover all is required Gumboots, 3m filter Nose mask / hand gloves & Goggles Display of HSE posters for alerts for cement hazards Permit to work OCP -021



WABAG		LIST OF SIGNIFICANT SAFETY / HEALTH HAZARDS AND RISKS FOR CONSTRUCTION ACTIVITIES (EPC)										HIRADC/EPC/SIGN-OHS Rev.No: 02 DATE: 01/10/2013		
S.No	Job Step / Task Significant	HAZARD	RISK	R/N/R/ F	LOR	IPC	Severity B	Likelihood C	Risk* BxC	Significant	Elimination / Substitution	Engg. Control	Administration & PPE control	Job Specific Control Measures
		Fall of Personnel or Materials or Machinery	Body Injury	R	Y	N	2	3	6	Y	NIL	Y	Y	Mandatory PPE's requirements for HSE: Safety shoes and safety Helmets Wear Full Body harness for more than 2m height Administration Requirements for HSE: Display pictorial HSE images No Alcohol/drug use at sites Tool box meeting to be conducted before site work HSE induction training for new employees Refresh induction training for old employees
	Vibrating PCC	Vibrator operated by power	Shock Injury	R	Y	N	2	5	10	Y	N	Y	Y	Safe Scaffold Refer OCP -008 Safe Access Ladder Refer OCP -009 Confined Space Refer OCP -003 Use Portable Hand trolley for shifting of concrete Clean the slippage concrete immediately Wear Close-fitting Clothes Cover all is required Gumboots, 3m filter Nose mask / hand gloves & Goggles Display of HSE posters for alerts for falling hazards
	Vibrating PCC (Health)	Vibration effect	Numbness / White finger	R	Y	Y	3	3	9	Y	N	N	Y	Good condition of cable Insulation MCB and ELCB Facilities Electrically Insulated Valves Refer OCP - 004 Electrical maintenance Refer BOCW Rules 103. Job Rest Job Rotation Wear Hand gloves
	Vibrating PCC	Noise	Discomfort	R	Y	N	1	3	3	Y	N	Y	Y	Ensure Noise Level not exceeding 85 dba Wear Ear Plug Job Rotation
	Handling of PCC	Using Wet Portland Cement	Skin Irritation/ Dermatitis	R	Y	N	2	4	8	Y	N	Y	Y	Wear Close-fitting Clothes Cover all is required Gumboots, 3m filter Nose mask / hand gloves & Goggles Display of HSE posters for alerts for falling hazards



HIRADC/EPC/SIGN-OHS
Rev.No: 02
DATE: 01/10/2013

LIST OF SIGNIFICANT SAFETY / HEALTH HAZARDS AND RISKS FOR CONSTRUCTION ACTIVITIES (EPC)

S.No	Job Step / Task Significant	HAZARD	RISK	R/N/R/E	LOR	IPC	Severity B	Likelihood C	Risk* BxC	Significant	Elimination / Substitution	Eng. Control	Administration & PPE control	Mandatory PPE's requirements for HSE: Safety shoes and safety Helmets Wear Full Body harness for more than 2m height Administration Requirements for HSE: Display pictorial HSE images No Alcohol/drug use at sites Tool box meeting to be conducted before site work HSE induction training for new employees Refresh induction training for old employees	Job Specific Control Measures
5	Reinforcement (HIRADC/EPC/06) Cutting and fixing the reinforcement bars members by manually at the ground level; height work and confined space	Missing of body earthing for the cutting machine Caught in between (Rotating Parts) Entanglement between the re-bars while tying insitu (Confined Space)	Shock injury Hand & Finger injury, Foot Injury Body Injury	R R	Y Y	N N	3 3	3 3	9 9	Y Y	NIL NIL	Y NIL	Y Y	Earthing Pits Resistance Value, Rating of fuses & electrical cables, WCB and ELCB as per the IE Rules HSE Caution / Warning Sign boards are required Refer OCP -004 Electrical maintenance Refer OCP - 013 Lock out and Tagout. Provide a guard for rotating parts HSE Caution/ Warning Signs shall be displayed Access and egress facilities at the confined space area (eg., ladder or Access platform) Ladder/ Scaffolding / Suitable working platform shall be arranged for erection of re bar materials Permit to work system for working at height that is more than 2m Full body harness is required when the work is more than 2m height Good communication between the work groups while taking rebars between each other especially at height Refer OCP- 008 Safe scaffolding Refer OCP -003 Safe working in confined space Refer OCP -021 Permit to work	Barriade the re-bar swinging area. No unauthorized personnel into the re- bar swinging area Safe distance shall be maintained between the OH electrical lines and edge of the re bar as per the IE Rules Wear Leather Gloves Keep emergency Rescue Aids Refer OCP No. 4 & OCP No. 13



WABAC		LIST OF SIGNIFICANT SAFETY / HEALTH HAZARDS AND RISKS FOR CONSTRUCTION ACTIVITIES (EPC)										HIRADC/EPC/SIGN-OHS Rev.No: 02 DATE: 01/10/2013		
S.No	Job Step / Task Significant	HAZARD	RISK	R/N/R/E	LOR	IPC	Severity B	Likelihood C	Risk+ BxC	Significant	Elimination / Substitution	Engg. Control	Administration & PPE control	Job Specific Control Measures
														<p>Mandatory PPE's requirements for HSE: Safety shoes and safety Helmets Wear Full Body harness for more than 2m height Administration Requirements for HSE: Display pictorial HSE images No Alcohol/drug use at sites Tool box meeting to be conducted before site work HSE induction training for new employees Refresh induction training for old employees</p>
6	Form work (HIRADC/EPC/07) Making and fixing form work members and dismantling manually at the ground level; height work and confined space	<p>Collapse of reinforcement by heavy wind</p> <p>Missing of body earthing for the power operated tools</p> <p>Collapse of form work by heavy wind</p> <p>Entanglement between the form work while tying insitu (Confined Space)</p>	<p>Body Injury</p> <p>Shock</p> <p>Body Injury</p> <p>Body Injury</p>	E	Y	N	2	3	9	Y	NIL	NIL	Y	<p>Provide Tie rod facilities for all the sides to stable the re-bars to protect high wind Guy rope shall be provided while erecting rebar and supporting bars are required for all the sides to avoid collapse by heavy wind.</p> <p>Earthing Pits Resistance Value, Rating of fuses & electrical cables, MCB and ELCB as per the IE Rules HSE Caution / Warning Sign boards are required Refer OCP -004 Electrical maintenance Refer OCP - 013 Lock out and Tagout.</p> <p>Provide Tie rod facilities for all the sides to stable form work to protect high wind Props shall be provided while erecting form work and supporting bars are required for all the sides to avoid collapse by heavy wind.</p> <p>Follow the Confined Space HIRA Access and egress facilities at the confined space area (eg., ladder or Access platform) Ladder/ Scaffolding / Suitable working platform shall be arranged for erection of form work materials Permit to work system for working at height that is more than 2m Full body harness is required when the work is more than 2m height Good communication between the work groups while erecting form work between each other especially at height Refer OCP-008 Safe scaffolds Refer OCP-009 Safe use of ladders and Stairs Refer OCP-021 Permit to work</p>



LIST OF SIGNIFICANT SAFETY / HEALTH HAZARDS AND RISKS FOR CONSTRUCTION ACTIVITIES (EPC)														
HIRADC/EPC/SIGN-OHS Rev.No: 02 DATE: 01/10/2013														
S.No	Job Step / Task Significant	HAZARD	RISK	R/N/R/E	LOR	IPC	Severity B	Likelihood C	Risk* BxC	Significant	Elimination / Substitution	Eng. Control	Administration & PPE control	Job Specific Control Measures
		Form work touching on electrical line while fixing	Electrocution	R	Y	N	3	3	9	Y	NIL	NIL	Y	<p>Barriade the form work swinging area.</p> <p>Only authorized personnel into the form work swinging area</p> <p>Safe distance shall be maintained between the OH electrical lines and edge of the rebar as per the IE Rules</p> <p>Wear Leather Gloves</p> <p>Refer OCP-021 Permit to work</p> <p>Refer OCP-004 Electrical Maintenance</p>
	Form Work for Beams and Columns	Fall of personnel	Body injury	NR	Y	N	4	3	12	Y	NIL	N	Y	<p>Clear off the area with warning signs</p> <p>Safe Scaffolding and access ladder arrangement</p> <p>Access ladder with 1m extension at landing area</p> <p>Full body harness with double lanyard upto 6m level</p> <p>Full body harness, double lanyard with shock absorber for more than 6m level</p> <p>Horizontal Life line with turn buckle facility</p> <p>Refer OCP-008 Safe Scaffolding arrangement</p> <p>Refer OCP-009 Ladderd and Stairs</p>
7	RCC HIRADC/EPC/08	Using Wet Portland Cement	Burn Injury	R	Y	N	2	3	6	Y	NIL	Y	Y	<p>Use Portable Hand trolley for shifting of concrete</p> <p>Wear Close-fitting Clothes</p> <p>Wear all is required Gumboots, 3m filter Nose mask / hand gloves & Goggles</p> <p>Display of HSE posters for alerts for cement hazards</p> <p>Permit to work OCP -021</p>



WABAG		LIST OF SIGNIFICANT SAFETY / HEALTH HAZARDS AND RISKS FOR CONSTRUCTION ACTIVITIES (EPC)										HIRADC/EPC/SIGN-OHS Rev.No: 02 DATE: 01/10/2013			
		S.No	Job Step / Task Significant	HAZARD	RISK	R/NR/E	LOR	IPC	Severity B	Likelihood C	Risk* BxC	Significant	Elimination / Substitution	Engg. Control	Administration & PPE control
	Handling of Cement Concrete from transit mixer by buddy system at the ground level or elevated level or confined space	Injury from fall of personnel / Materials / Machinery	Body Injury	R	Y	N	2	3	9	Y	NIL	Y	Y	Y	<p>Mandatory PPE's requirements for HSE: Safety shoes and safety Helmets Wear Full Body harness for more than 2m height Administration Requirements for HSE: Display pictorial HSE images No Alcohol/drug use at sites Tool box meeting to be conducted before site work HSE induction training for new employees Refresh induction training for old employees</p> <p>Job Specific Control Measures Safe Scaffold Refer OCP -008 Safe Access Ladder Refer OCP -009 Confined Space Refer OCP -003 Use Portable Hand trolley for shifing of concrete Clean the slippage concrete immediately Wear Close-fitting Clothes Cover all is required Gumboots, 3m filter Nose mask / hand gloves & Goggles Display of HSE posters for alerts for falling hazards</p>
	Handling of Cement Concrete through Hoist at the elevated level or confined space	Injury from Fall of Material / Hitting by Uncontrolled lifting / lowering movements by (Material Hoist)	Body injury/ Fatal	R	Y	N	5	2	10	Y	NIL	Y	Y	Y	<p>3rd party certification for Hoist Wall of hoist must extend 2m above the floor or platform Safety factor at least 3 for maximum load at platform. Platform of Hoist equipped with Safety gear. Locking arrangement at the platform of hoist for workers Enclosures of wire mesh for Sides of Hoist except loading/ unloading platform. Breaking strength atleast 6 times the load to carry Personnel are not allowed to ride on hoist Electrical switches and panel protected from rain Proper earthing shall be provided Effective magnetic release brake will be automatically applied. The person who picks up the load shall use the full body harness. Upper, lower & Emergency limit switches in the hoist Emergency brake in order to main brake fails</p>



WABAG		LIST OF SIGNIFICANT SAFETY / HEALTH HAZARDS AND RISKS FOR CONSTRUCTION ACTIVITIES (EPC)											HIRADC/EPC/SIGN-OHS Rev.No: 02 DATE: 01/10/2013		
S.No	Job Step / Task Significant	HAZARD	RISK	R/N/R/E	LOR	IPC	Severity B	Likelihood C	Risk* BxC	Significant	Elimination / Substitution	Engg. Control	Administration & PPE control	Mandatory PPE's requirements for HSE: Safety shoes and safety Helmets Wear Full Body harness for more than 2m height Administration Requirements for HSE: Display pictorial HSE images No Alcohol/drug use at sites Tool box meeting to be conducted before site work HSE induction training for new employees Refresh induction training for old employees	Job Specific Control Measures
		High / Burst pressure Bursting at coupling (Delivery system) and hitting scaffold	Body Injury Fatal	R	N	Y	3	3	9	Y	N	Y	Y		<p>Training and Reading the Pump manual prior to start</p> <p>Stay clear of pressurized concrete placing area</p> <p>Provide Air Release Valve attachment near the top of pipe that carries concrete.</p> <p>Adequate Insulation shall be provided on hoses</p> <p>Attach pump nozzle by a bolted collar</p> <p>Use whipping line to hold the concrete pipe line</p> <p>Safety Wire or Spring Load arrestor shall be provided.</p> <p>Strong enough Supporting / Scaffolding shall be provided for the entire delivery line while laying at the elevated area to bear all the</p> <p>Welding workers who are on the scaffold</p> <p>Wear Face Shield and Safety Goggles.</p> <p>Refer OCP -008 Safe Scaffolding</p> <p>Refer OCP-009 Ladders</p> <p>Refer OCP -011 Pneumatic Tool Handling.</p>
		Caught in between Hopper grates/ Out rigger/ water box	Body Injury	R	N	Y	3	2	6	Y	N	N	Y		<p>Keeps handsout hopper grates, valve assembly water box</p> <p>Regular inspection on pump mechanism</p> <p>Read the Manufacturer's instruction</p>
	Working at Night (Health)	Poor Visibility	Fatigue	R	Y	N	1	4	4	Y	NIL	Y	Y		<p>Sufficient Illumination at the job site and access area to avoid stress on eyes.</p> <p>Sufficient Job Rest and Job Rotation to avoid fatigue</p>
	Generation Cement Dust at the Batching Plant	Dust	Respiration Effect	R	Y	N	2	4	8	Y	N	Y	Y		<p>Fitness for Breathing Test for Cement bag handlers</p> <p>Wear 3m Respiratory mask</p> <p>Exhaust facilities</p> <p>Job Rotation</p> <p>Job Rest</p>



WABAG		LIST OF SIGNIFICANT SAFETY / HEALTH HAZARDS AND RISKS FOR CONSTRUCTION ACTIVITIES (EPC)										HIRADC/EPC/SIGN-OHS Rev.No: 02 DATE: 01/10/2013		
S.No	Job Step / Task Significant	HAZARD	RISK	R/NR/E	LOR	IPC	Severity B	Likelihood C	Risk* BxC	Significant	Elimination / Substitution	Engg. Control	Administration & PPE control	Job Specific Control Measures
8	GAS CUTTING OF STRUCTURAL STEELS (FABRICATION) HIRADC/EPC/09	Wet Cement Absorbed by Skin Fire / Explosion by Pressurized Gas Cylinders	Skin Irritation/ Dermatitis Burn Injury / Fatal	R	Y	N	2	3	6	Y	N	Y	Y	Use tag line to hold the hoses Wear Hand gloves/ Face Shield/ Safety Goggles Gumboots and Close fitting clothes Job Rotation Refer BOCW Rules Keep Gas Cylinders at the shaded shelter Put water gunny bags on the cylinders to reduce pressure high Keep Fire extinguishers/ Fire Brigade near by Do not expose gas cylinders on hot sun Administration and PPE Requirements for HSE: Leather type hand gloves are required HSE Training is required for Gas welding and cutting Refer OCP - 006 Gas Cutting & Welding Refer OCP-021 Permit to work
		Fire / Explosion by back fire or flash back	Burn Injury / Fatal	R	Y	N	3	3	9	Y	N	Y	Y	Ensure regular inspection of following : oxygen and fuel gas Cylinders condition A cylinder valves;A pressure regulator;A flashback arre the acetylene pressure must not exceed 0.62 bar (9 psi); if a backfire does occur: 1. shut off the blowpipe valves, oxygen first and then the fuel gas; 2. Shut off the oxygen and fuel gas cylinder valves; 3. Cool the blowpipe with water, if necessary; 4. Check the equipment for damage or faults, particularly the nozzle.



WABAC

LIST OF SIGNIFICANT SAFETY / HEALTH HAZARDS AND RISKS FOR CONSTRUCTION ACTIVITIES (EPC)

HIRADC/EPC/SIGN-OHS
Rev.No: 02
DATE: 01/10/2013

S.No	Job Step / Task Significant	HAZARD	RISK	R/N/R/E	LOR	IPC	Severity B	Likelihood C	Risk+ BxC	Significant	Elimination / Substitution	Engg. Control	Administration & PPE control	Job Specific Control Measures
		Fire / Explosion by Gas leakage	Burn Injury / Fatal	R	Y	N	3	3	9	Y	N	Y	Y	<p>Mandatory PPE's requirements for HSE:</p> <p>Safety shoes and safety Helmets</p> <p>Wear Full Body harness for more than 2m height</p> <p>Administration Requirements for HSE:</p> <p>Display pictorial HSE images</p> <p>No Alcohol/drug use at sites</p> <p>Tool box meeting to be conducted before site work</p> <p>HSE induction training for new employees</p> <p>Refresh induction training for old employees</p> <p style="text-align: center;">Job Specific Control Measures</p> <p>Provide adequate ventilation</p> <p>Repair or replace the component When the leak is found. Any detergent should be flushed off with clean water to remove any corrosive salts.</p> <p>Never look for gas leaks with a naked flame.</p> <p>If a cylinder leaks when the valve is closed, the cylinder should be taken outside to a ventilated area, away from sources of ignition (naked flames, sparks, electric lights and motors, etc)</p> <p>Notify the supplier immediately.</p> <p>Cap protection always for avoid valves damage</p> <p>Secure cylinders by upright condition by trolley with chains</p> <p>Refer OCP-006 Gas cutting and welding</p>
		Splash of molten metal	Burn injury	R	Y	N	2	3	6	N	N	Y	Y	<p>Screen is required to avoid splattering of molten metal</p> <p>Leather Apron shall be used</p>
	Cutting of structural steel members by Hacksaw	Crushing of hand/palm / fingers between hammer and chisel	Body injury	R	Y	N	3	3	9	N	N	Y	Y	<p>Keep away Hand and fingers when holding the chisel</p> <p>Use Long Handle to hold chisel while remove bending or tents</p> <p>Head position Shall be always at the sides while hammering</p> <p>Inspect the hammer and chisel without mushroom edges and power tools safety prior to use them.</p> <p>Provide the wooden members or cushion effect materials at the ground to avoid materials jumpoff.</p> <p>Administration and PPE Requirements for HSE</p> <p>Leather type hand gloves are required</p> <p>HSE Training is required for hand tools safety</p>



WABAG		LIST OF SIGNIFICANT SAFETY / HEALTH HAZARDS AND RISKS FOR CONSTRUCTION ACTIVITIES (EPC)											HIRADC/EPC/SIGN-OHS Rev.No: 02 DATE: 01/10/2013		
S.No	Job Step / Task Significant	HAZARD	RISK	R/N/R/E	LOR	IPC	Severity B	Likelihood C	Risk* BxC	Significant	Elimination / Substitution	Engg. Control	Administration & PPE control	Job Specific Control Measures	Mandatory PPE's requirements for HSE: Safety shoes and safety Helmets Wear Full Body harness for more than 2m height Administration Requirements for HSE: Display pictorial HSE images No Alcohol/drug use at sites Tool box meeting to be conducted before site work HSE induction training for new employees Refresh induction training for old employees
	Arc Welding by using electrical powered welding machine	Touching live electrical parts	Electrocution	R	Y	N	5	3	15	N	N	Y	Y	Ensure that earthing pits resistance value, fuse rating, Body earthing of welding mc, cables insulation and ELCB device to avoid shock Turn off power supply when not in use Do not use cables that are worn or broken. Do not wrap cables around body Electrodes are removed from the holders when not in use Wet welding mc thoroughly dried and tested before being used. Administration and PPE Requirements for HSE Proper Face protection HSE Training is required for Welding safety Refer OCP-004 Electrical Maintenance Refer OCP-013 Lock out Tag out on energized systems	
	Alignment, Erection & Fixing of structural members at the ground level and elevated levels	Fire by welding near by flammable material Caught in between at the pinch point	Burn Injury / Fatal Body Injury	R	Y	N	3	3	9	Y	N	Y	Y	Remove all flammable materials from area of welding Do not weld around flammable liquids A fire extinguisher shall be available when welding, cutting or heating Use levers and place spacers (wood planks) before lifting. Do not place hand/toe at the pinch points Alignment using mechanical aid. Use of leverage for final alignment Administration and PPE's Requirements Leather type hand gloves are required HSE Training is required for caught in between at pinch points	



WABAG

LIST OF SIGNIFICANT SAFETY / HEALTH HAZARDS AND RISKS FOR CONSTRUCTION ACTIVITIES (EPC)

HIRADC/EPC/SIGN-OHS
 Rev.No: 02
 DATE: 01/10/2013

S.No	Job Step / Task Significant	HAZARD	RISK	R/N/R/F	LOR	IPC	Severity B	Likelihood C	Risk* BxC	Significant	Elimination / Substitution	Engg. Control	Administration & PPE control	Job Specific Control Measures
		Injury from fall of Materials	Body Injury/Fatal	E	Y	N	3	3	9	Y	NIL	NIL	Y	Mandatory PPE's requirements for HSE: Safety shoes and safety Helmets Wear Full Body harness for more than 2m height Administration Requirements for HSE: Display pictorial HSE images No Alcohol/drug use at sites Toolbox meeting to be conducted before site work HSE induction training for new employees Refresh induction training for old employees
		Slip / Trip / Fall	Body Injury / Fatal	R	Y	N	3	3	9	Y	N	Y	Y	Job Specific Control Measures Equipments shall be secured suitably by a lifting machinery and lifting tools Third party inspection certification for lifting machinery and lifting tools and tackles Loose materials shall be secured Guy ropes shall be provided to support of structural members to avoid collapse during high winds Filing of bolts and nuts at least 70% with the structural members shall be ensured where it is applicable. Refer OCP - 007 Lifting and Handling Log walk by sitting position shall be allowed on structural beam No one allowed to walk on beam by standing position Horizontal Life lines with turn buckles devices Vertical grab life lines with anchorage for vertical steel members Access ladder and walkway scaffold platform shall be arranged Administration and PPE's Requirements : Wearing Nose mask Leather type hand gloves are required PPE Training is required for Ergonomics and Rigging work Full Body harness required Refer OCP-008 Safe Scaffolding Refer OCP-009 Safe use of ladder
	Fabrication (Health)	Fumes and gases exposure	Asphyxiation/ Respiratory effect	R	Y	N	2	4	8	Y	NIL	N	Y	Keep our head out of the fumes. Wear an appropriate respirator Removal of fumes with the use of ventilation may be needed, use a fan to remove fumes



WABAG		LIST OF SIGNIFICANT SAFETY / HEALTH HAZARDS AND RISKS FOR CONSTRUCTION ACTIVITIES (EPC)										HIRADC/EPC/SIGN-OHS Rev.No: 02 DATE: 01/10/2013			
S.No	Job Step / Task Significant	HAZARD	RISK	R/N/R/F	OR	IPC	Severity B	Likelihood C	Risk* BxC	Significant	Elimination / Substitution	Engg. Control	Administration & PPE control	Mandatory PPE's requirements for HSE: Safety shoes and safety Helmets Wear Full Body harness for more than 2m height Administration Requirements for HSE: Display pictorial HSE images No Alcohol/drug use at sites Tool box meeting to be conducted before site work HSE induction training for new employees Refresh induction training for old employees	Job Specific Control Measures
		UV / Infrared Radiation/ Intense Visible Light	"Arc Eye" / Skin Burn Injury	R	Y	N	2	4	8	Y	NIL	N	Y		No time shall the arc be observed without eye protection, safety glasses and with side shields and proper shade or filter Leather Apron is required
		Ozone and nitrogen oxide produced by UV Welding Arc	Lungs infection/ Head ache / Chest pain	R	Y	N	2	3	6	Y	NIL	N	Y		Wear Respiratory mask Job rotation Job rest Protective Screen / adequate ventilation is required
9	Grit blasting HIRADC/EPC/10	Hitting Caused by Burst of hoses.	Body injury	R	Y	N	3	3	9	N	NIL	Y	Y		TRANSPORTATION AND LIFTING OF MATERIALS REFER HIRA -EPC 14 Rev-02 Cordon off the area Ensure working pressure of a blast hose shall not exceed the Manufacturers Specification. Provide Pressure Relief Valve Hose from the pot to the blast nozzle is kept as straight Avoid Sharp Curves.
	Grit blasting at the ground level or at elevated levels (Including Confined Space)	(Excessive Air Pressure)	Body injury	R	Y	N	3	3	9	N	NIL	Y	Y		Ensure Hose whip checks or hose coupling safety locks Safety cables are used to support the weight of elevated hoses Pin holes are not taped in the blast hose. Nozzle holders and couplings fit snugly on the blast hose. Dead man control switch shall be used at the blast nozzle.
		Static Electricity caused by abrasive media	Static electricity	R	Y	N	2	2	4	N	NIL	Y	Y		Blast hoses shall be with anti-static rubber linings Proper bonding and grounding Refer OCP -004



HIRADC/EPC/SIGN-OHS
Rev.No: 02
DATE: 01/10/2013

LIST OF SIGNIFICANT SAFETY / HEALTH HAZARDS AND RISKS FOR CONSTRUCTION ACTIVITIES (EPC)

S.No	Job Step / Task Significant	HAZARD	RISK	R/NR/E	LOR	IPC	Severity B	Likelihood C	Risk* BxC	Significant	Elimination / Substitution	Eng. Control	Administration & PPE control	Mandatory PPE's requirements for HSE: Safety shoes and safety Helmets Wear Full Body harness for more than 2m height Administration Requirements for HSE: Display pictorial HSE images No Alcohol/drug use at sites Tool box meeting to be conducted before site work HSE induction training for new employees Refresh induction training for old employees	Job Specific Control Measures
		Noise	Ear Plug / Ear muff	R	Y	N	2	4	4	N	NIL	N	Y	Ear discharge from blast nozzle: 112 to 119 dBA (Ear muff) Apply air inside operator's helmet: 94 to 102 dBA (Ear Muff) Abrasive blasting cabinets: 90 to 101dBA (Ear Muff) Air compressors: 85 to 88 dBA(Ear Plug) Maximum noise levels up to 145 dBA when the grit pot runs out of abrasive.(Ear Muff)	Ear discharge from blast nozzle: 112 to 119 dBA (Ear muff) Apply air inside operator's helmet: 94 to 102 dBA (Ear Muff) Abrasive blasting cabinets: 90 to 101dBA (Ear Muff) Air compressors: 85 to 88 dBA(Ear Plug) Maximum noise levels up to 145 dBA when the grit pot runs out of abrasive.(Ear Muff)
10	Visual Inspection (HIRADC/EPC/11)	Injury from falling materials	Body Injury/ Fatal	NR	Y	N	2	2	4	N	NIL	Y	Y	Caution off the area Secure materials by suitably to avoid falling Provide Choker or wedges to avoid roll out materials	Caution off the area Secure materials by suitably to avoid falling Provide Choker or wedges to avoid roll out materials
		Fall of personnel	Body Injury/ Fatal	R	Y	N	5	2	10	N	NIL	Y	Y	Caution off the area with warning signs Safe Scaffolding and access ladder arrangement Access ladder with 1m extension at landing area Full body harness with double lanyard upto 6m level Full body harness, double lanyard with shock absorber for more than 6 m level Refer OCP-008 Safe Scaffolding arrangement Refer OCP-009 Ladder and Stairs	Caution off the area with warning signs Safe Scaffolding and access ladder arrangement Access ladder with 1m extension at landing area Full body harness with double lanyard upto 6m level Full body harness, double lanyard with shock absorber for more than 6 m level Refer OCP-008 Safe Scaffolding arrangement Refer OCP-009 Ladder and Stairs
		Contact with O H/ Buried Power lines	Electrocution/ Fatal	R	Y	N	5	2	10	Y	NIL	N	Y	Safe distance shall be maintained as per IE rules in view of Voltage capacity identify and isolate the energy Maintain clear distance between OH Power lines as per IE rules. Refer OCP-013 Lock out and tag out system Permit to Work as per the OCP 021	Safe distance shall be maintained as per IE rules in view of Voltage capacity identify and isolate the energy Maintain clear distance between OH Power lines as per IE rules. Refer OCP-013 Lock out and tag out system Permit to Work as per the OCP 021
	Die Penetrate Testing	Fire / Explosion caused by Aerosols	Burn Injury/ Fatal	NR	Y	N	5	2	10	Y	NIL	N	Y	No Smoking No Mobile phone during DP Test Follow the MSDS	No Smoking No Mobile phone during DP Test Follow the MSDS



WABAG		LIST OF SIGNIFICANT SAFETY / HEALTH HAZARDS AND RISKS FOR CONSTRUCTION ACTIVITIES (EPC)											HIRADC/EPC/SIGN-OHS Rev.No: 02 DATE: 01/10/2013		
		S.No	Job Step / Task Significant	HAZARD	RISK	R/N/R/E	LOR	IPC	Severity B	Likelihood C	Risk* BxC	Significant	Elimination / Substitution	Engg. Control	Administration & PPE control
	Pressure Testing	Bursting / Explosion by Piercing / Penetration of foreign body	Body Injury/ Fatal	R	Y	N	3	3	9	Y	N	Y	Y	Y	Cordon off the area during pressure testing Safety Relief Valve / Burst Disc to restrict the to working pressure or design pressure Pressure regulation to limit the down pressure upto test pressure Administration and PPE Requirements for HSE Cover All is required Display of HSE posters, Caution/ Warning Signs for alert
	Radiography	Handling of Radiation Isotopes Camera	Body Injury/ Fatal	N	Y	N	3	2	6	Y	N	Y	Y	Y	Cordon off the area BARC Licence and authorization RT Level II or III Competent Certificate for the radio grapher Film Badge Facility Controlled area identification and restricted to authorized personnel Test the Curie or Rem by Calibrated Survey meter Keep the Emergency equipments for Radiation Hazard Fitness Certification for Radiographers Dosage limit shall be registered Refer OCP-021 Permit to work Preferable during evening and night after completing the days work
	Die Penetrate Testing (Health)	Inhalation of Aerosols	Respiratory Disease	N	Y	N	3	2	6	Y	NIL	Y	Y	Y	Display and follow MSDS Instruction by local language Administration and PPE Requirements for HSE PPE as per the MSDS Recommended Hand gloves and respiratory Mask as per the MSDS Recommended Display of HSE posters, Caution/ Warning Signs for alerts.



WABAG		HIRADC/EPC/SIGN-OHS Rev.No: 02 DATE: 01/10/2013												
LIST OF SIGNIFICANT SAFETY / HEALTH HAZARDS AND RISKS FOR CONSTRUCTION ACTIVITIES (EPC)		Mandatory PPE's requirements for HSE: Safety shoes and safety Helmets Wear Full Body harness for more than 2m height Administration Requirements for HSE: Display pictorial HSE images No Alcohol/drug use at sites Tool box meeting to be conducted before site work HSE induction training for new employees Refresh induction training for old employees												
S.No	Job Step / Task Significant	HAZARD	RISK	R/N/R/E	LOR	IPC	Severity B	Likelihood C	Risk* BxC	Significant	Elimination / Substitution	Eng. Control	Administration & PPE control	Job Specific Control Measures
	Radiation	Exposure of Radiation	Reduce of body cells	N	Y	N	3	2	6	Y	NIL	Y	Y	Follow the BARC Radiography safety procedure Register the daily dosage received and should not exceed annual limit of BARC Wear Film Badge Emergency aids kept available readily
	Blow down	High Noise	Ear Injury	NR	Y	N	3	3	9	Y	N	Y	Y	CORDON off the area Wear Ear Plug if more than 90 dBA and Ear muff for if more than 100 dBA Do not allow un authorized personnel Refer OCP-010 Pneumatic testing
11	Erection of electrical equipments (HIRADC/EPC/12) Pulling of Cable by Winch	Caught In between at the pinch point	Hand Injury	R	Y	N	2	3	6	Y	NIL	Y	Y	Wear Leather Hand Gloves Refer BOCW Rules No. 59
	Cable joining (Health)	Emmission of Lead fumes	Asphyxiation /Respiratory illness	R	Y	N	2	3	6	Y	NIL	N	Y	Wear respiratory masks Job Rotation Display HSE images for Lead Hazards



WABAG		LIST OF SIGNIFICANT SAFETY / HEALTH HAZARDS AND RISKS FOR CONSTRUCTION ACTIVITIES (EPC)											HIRADC/EPC/SIGN-OHS Rev.No: 02 DATE: 01/10/2013	
S.No	Job Step / Task Significant	HAZARD	RISK	R/N/R/E	LOR	IPC	Severity B	Likelihood C	Risk ² BxC	Significant	Elimination / Substitution	Engg. Control	Administration & PPE control	Job Specific Control Measures
12	Plastering (HIRADC/EPC/13)	Fall of Personnel	Body Injury/ Fatal	R	Y	N	3	3	9	Y	N	Y	Y	Cordon off the area Safe Scaffold and Working platform with access ladders as per the standard procedure Access ladders shall extend 1m at the platform level Hand rails at 1.10 m height and 6" toe guards Full body harness with lanyard up to 6m level Full body harness, lanyard and shock absorber more than 6m level <u>Administration and PPE Requirements for HSE:</u> Hand gloves and suitable respiratory mask as per job specific Refer OCP-008 Safe scaffolding Refer 009 - Safe Ladder
	Surface cleaning and erection of scaffold with working platform for plastering work at the elevated levels, by manually	Collapse of Scaffold by high wind loads	Body Injury/ Fatal	E	Y	N	3	3	9	Y	N	Y	Y	Guy rope tie off with turn buckles with anchorage at the ground level at the standard poles of the scaffold for all sides at every 6m height Tighten the loose couplings at the scaffold Safe distance shall be maintained as per IE rules in view of Voltage capacity Identify and isolate the energy Maintain clear distance between OH Power lines as per IE rules. Lock out and tag out system shall be provided Grounding is required for scaffold structure or any other steel structural members. Permit to Work as per the OCP No. 004 Refer OCP -013 Lock out & tag out system
		Contact with OH Powerline	Shock/Body Injury/ Fatal	R	Y	N	5	2	10	Y	NIL	N	Y	
		Splashing of Cement Mortars	Eye Injury	R	Y	N	1	2	2	N	NIL	N	Y	Wear Eye Safety Glasses






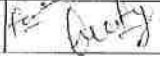
WABAG		LIST OF SIGNIFICANT SAFETY / HEALTH HAZARDS AND RISKS FOR CONSTRUCTION ACTIVITIES (EPC)											HIRADC/EPC/SIGN-OHS Rev.No: 02 DATE: 01/10/2013		
S.No	Job Step / Task Significant	HAZARD	RISK	R/NR/E	LOR	IPC	Severity B	Likelihood C	Risk BxC	Significant	Elimination / Substitution	Engg. Control	Administration & PPE control	Mandatory PPE's requirements for HSE: Safety shoes and safety Helmets Wear Full Body harness for more than 2m height Administration Requirements for HSE: Display pictorial HSE Images No Alcohol/drug use at sites Tool box meeting to be conducted before site work HSE induction training for new employees Refresh induction training for old employees	Job Specific Control Measures
	Working at Confined Space and floor level	Darkness	Poor Visibility	R	Y	N	2	3	6	Y	N	Y	Y	1. Adequate Lighting arrangements 2. volts shall be used for lighting for non hazardous gases atmosphere in confined space 1. volts shall be used for hazardous gas atmosphere with flame proof fittings	Adequate Lighting arrangements 2. volts shall be used for lighting for non hazardous gases atmosphere in confined space 1. volts shall be used for hazardous gas atmosphere with flame proof fittings
13	Painting (HIRADC/EPC/014) Painting Work at the Floor level and elevated levels and Confined Space	Lack of Ventilation	Asphyxiation	R	Y	N	3	3	9	Y	N	Y	Y	1. ventilate the area by artificial fan or Air blower Job Rest Job Rotation	1. ventilate the area by artificial fan or Air blower Job Rest Job Rotation
		Splicing of Paint during application	Eye Injury	R	Y	N	1	4	4	N	N	N	Y	Follow the MSDS Activities Wash eyes for at least 15 minutes by plenty of water Wear eye protection Wear protective clothing Refer OCP No. 19 Refer OCP No. 003 Refer OCP No. 008 & 009	Follow the MSDS Activities Wash eyes for at least 15 minutes by plenty of water Wear eye protection Wear protective clothing Refer OCP No. 19 Refer OCP No. 003 Refer OCP No. 008 & 009
		Swirling or bursting of hoses during spray application	Body injury	NR	Y	N	2	2	4	Y	N	N	Y	Secure the compressed air hose with structures Whip Check or Safety chain shall be attached with the Couplings Shut off the Air Supply Refer OCP No. 011	Secure the compressed air hose with structures Whip Check or Safety chain shall be attached with the Couplings Shut off the Air Supply Refer OCP No. 011
	Volatile Organic Compound	Fire & Explosion	Burn injury	E	Y	N	3	2	6	Y	N	Y	Y	1. SDS Availability at Site 2. Store painting materials outside want of a day quantity 3. Cover painting materials from hot sun 4. Remove all flammable materials near by painting area 5. Fire Extinguishers availability near by job site 6. HSE Training for Fire Fighting 7. Refer OCP No. 003 for Confined Space	1. SDS Availability at Site 2. Store painting materials outside want of a day quantity 3. Cover painting materials from hot sun 4. Remove all flammable materials near by painting area 5. Fire Extinguishers availability near by job site 6. HSE Training for Fire Fighting 7. Refer OCP No. 003 for Confined Space



WABAG		LIST OF SIGNIFICANT SAFETY / HEALTH HAZARDS AND RISKS FOR CONSTRUCTION ACTIVITIES (EPC)										HIRADC/EPC/SIGN-OHS Rev.No: 02 DATE: 01/10//2013			
S.No	Job Step / Task Significant	HAZARD	RISK	R/N/R/m	LOR	IPC	Severity B	Likelihood C	Risk* BxC	Significant	Elimination / Substitution	Engg. Control	Administration & PPE control	Mandatory PPE's requirements for HSE: Safety shoes and safety Helmets Wear Full Body harness for more than 2m height Administration Requirements for HSE: Display pictorial HSE images No Alcohol/drug use at sites Tool box meeting to be conducted before site work HSE induction training for new employees Refresh induction training for old employees	Job Specific Control Measures
	Painting (Health)	Toxic atmosphere	Asphyxiation/ Respiratory effect	R	Y	N	2	4	8	Y	NIL	Y	Y		Keep our head out of the fumes. Wear an appropriate respirator Removal of fumes with the use of ventilation may be needed, use a fan to remove fumes Exhaust duct facilities to remove fumes Job rotation/ job rest is required
		Skin absorption by painting materials	Skin Irritation/ Dermatitis	R	Y	N	2	4	8	Y	NIL	NIL	Y	Display and follow MSDS instruction for handling Administration and PPE Requirements for HSE Close fitting clothes and full suit coverall Job Rotation / Job Rest Hand gloves and respiratory Mask as per the MSDS Recommended	



ANNEXURE – 5

 WABAG	COMMON MANAGEMENT PROCEDURES	Procedure number CMP- 14	Approved by Pankaj Sachdeva	
IDENTIFICATION OF ASPECTS/ IMPACTS AND HAZARDS/RISKS	Rev. No. : 01	Reviewed by Benny John		
	Date: 05-01-2018	Prepared by S. Jayachitra		

1.0 OBJECTIVE:

To identify the Occupational Health, Safety (OHS) Hazards/Risks and the Environmental Aspects /Impacts (ASIM) of all activities, products & Services rendered by the company and to identify the significant aspects and risks to effect control measures to mitigate the impact on environment and reduce the risk potential for Occupational Health and Safety of workmen

2.0 SCOPE:

This procedure covers all activities, products and services of the Company as mentioned in system HSE-SCO .

3.0 HSE MANUAL REFERENCE

HSE- 6.1,6.1.2/4.3.1 Identification of Environmental aspects/ Impacts and Hazards and Risks.

4.0 PROCEDURE:

4.1 PLANNING :- Action to address risks and opportunities.

4.1.1 The planning on Environmental aspects/ impacts and identification of Hazards and Risk review shall be carried out to the process(es) as applicable to establish, implement and maintain the HSE requirements such as General, Environment aspects, Compliance Obligations and Planning action and the status of compliance with respect to as per the contract and at the company level.

4.1.2 The following requirements must be covered in the Planning of HSE Management System at EPC Sites and O&M Plants and Offices as well.

- a. Planning and determine the HSE Risks and its opportunities of internal and external issues as per the contract scope.
- b. Planning and determine the interested parties needs and expectations along with compliance obligations as per the contract scope.
- c. Planning and determine the significant Hazards/ Environment aspects and also includes if any changes / modified in products or services or activities and an abnormal and foreseeable emergency situations as well.
- d. Planning and determine the compliance obligations related to HSE as per the contract scope.
- e. Planning action to address the significant environment aspects, Hazards and its risks and opportunities and the relevant Compliance obligations as well.
- f. Planning on communication of significant Environmental aspects / Hazards and risks among the various levels and functions as appropriate.
- g. Ensure that the aforesaid requirements maintained by a documented information to ensure that they are carried out as per the planning.





COMMON MANAGEMENT PROCEDURES

Procedure number
CMP- 14

Approved by

Pankaj Sachdeva

IDENTIFICATION OF ASPECTS/ IMPACTS AND HAZARDS/RISKS

Rev. No. : 01

Reviewed by

Benny John

Date: 05-01-2018

Prepared by

S. Jayachitra

- h. Identified external hazards which could adversely affect the Occupational health and safety of operating personnel within the workplace and which are under the direct control of the company
- i. Occupational Health and Safety Hazards/Risks associated with infrastructure, equipment and materials at the workplace, whether provided by the company or others;
- j. Design of work areas, processes, installations, machinery / equipment, operating procedures and work organization, including their adaptation to human capabilities.

4.1.3 For identification of Environmental Aspects/Impacts and OHS Hazards/Risks, the following are to be followed,

- a. Select an activity, product or service, which should be large enough for a meaningful examination and small enough to be sufficiently understood.
- b. Identify as many Environmental Aspects/Impacts and Occupational health & safety hazards/Risks as possible associated with the selected activity, product or service.
- c. Identify the actual and potential, positive and negative Environmental Impacts and OHS Risks possible for each identified Environmental Aspect/ OHS Hazard.

4.1.4 For identification of Occupational Health and Safety Hazards/Risks, the initial review shall also cover thermal, radiation, fire & explosion, accidental fall from heights, biological, ergonomic, chemical, electrical and various other health hazards.

Examples: Aspects/Impacts, Hazards/Risks

Activity/ Product/ Services	Aspect	Impact	Hazard	Risk
Handling Hazardous chemical	Accidental spill	Land/water pollution	Chemical hazard	Burn injury Exposure to chemical fumes
Poor maintenance of vehicles	High Emission of gas	Air pollution	High Noise	Hearing impairment
			Toppling	Bodily Injury
DG Operations	Diesel Usage	Resource depletion	Flammable Vapour	Burn injury/ asphyxiation
	Diesel Spill	Land pollution Resource loss	Slip, trip fall	Bodily injury
	Waste oil	Land /water pollution	Waste Oil Handling	dermatitis
RCC mixing	Dust emission	Air pollution	Dust. hazard Noise hazard	Lungs congestion Hearing impairment
	High sound	--Do--		

4.2 EVALUATION OF SIGNIFICANT IMPACTS/RISKS:

4.2.1 Head of the Departments/Team Leaders/Project Managers/RCMs/Plant Managers along with their associates shall identify the OHS Hazards/Risks and Environmental Aspect/ Impacts and evaluate their significance by considering the following,



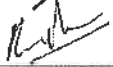
a) Legislative Concern (LOR):

Environmental Aspects/Impacts and Occupational Hazards/Risks which are covered by the existing applicable Acts/Rules/Regulation of Central or State Government **Shall be considered significant.**

b) Interested Party concern (IPC):

Feedback received on HSE, by employees or feedback received from other interested parties on HSE related issues form the basis to identify the interested party concern.



	COMMON MANAGEMENT PROCEDURES	Procedure number CMP- 14	Approved by Pankaj Sachdeva	
IDENTIFICATION OF ASPECTS/ IMPACTS AND HAZARDS/RISKS	Rev. No. : 01	Reviewed by Benny John		
	Date: 05-01-2018	Prepared by S. Jayachitra		

Where a significant number of employees (i.e. more than 25 % of the employees working in the EPC Site or O&M Plant) have express their concern on an HSE issue, it shall be taken into consideration as significant.

Any critical or major HSE issue discussed in the HSE committee meeting and addressed in the minutes for taking corrective action, could be considered for significant.

c) Resource Concern (RC):

Aspects which have the potential to optimize the resource use like, e.g. energy, water, steel, process chemical, cement etc. could be identified under the Resource concern. Head of the Departments/Team Leaders//Project Managers/RCMs/Plant Managers may identify such aspects and decide the resource conservation potential associated with it.

Where potential exists to save Rs. 1,00,000 or more in O&M and Rs.5,00,000 or more in EPC, for an aspect per instance, it could be considered as significant.

In case of natural resources like water or oil or energy, suitable limits on consumption can be set based on the current consumption levels, beyond which the aspect could be considered as significant.

d) Business concern (BC):

If in the opinion of MD & CEO/MR(HSE)/India Clusters any **Environmental Aspect/OHS Hazards, which are likely to have an adverse effect on the business potential or could cause an impact on the reputation /image of the company or its policies including HSE Policy such Aspect/Hazard could be considered as significant.**

For e.g. Loss to company's image e.g. legal non- compliance, major repetitive incidents etc.,

- a) Repetitive incidents leading to fatality which could dent the image of the company.

- 4.2.2 For all Environmental Aspects/Impacts & OHS Hazards/Risks, other than those which are considered under LOR, IPC,RC and BC., the criteria for evaluation of Environmental Aspects/Impacts & OHS Hazards/Risks is given in Annexure-1,
- 4.2.3 **The criteria on Probability of occurrence and Severity OHS Hazards/Risks and the Probability of occurrence, Severity and duration is given in Annexure-1. Any Environmental Aspects/impacts having a total score of 27 (i.e. product of severity, likely hood of occurrence and duration) and above or OHS Hazards/Risks having a total score of 9 (i.e. product of severity and likely hood of occurrence) and above or which has severity score of 4 and above shall be considered as significant.**
- 4.2.4 **Aspects/impacts and OHS Hazards/Risks associated with potential emergency situations shall be identified as significant.**
- 4.3 The identified significant Aspects/OHS hazards shall be considered for setting Objectives & Targets, including those which are necessary to ensure legal compliance.
- 4.4 **Aspects/OHS Hazards which are found not significant based on the OHSE Policy given under Cl.5.2/4.2 shall be mitigated through the control measures identified against the specific Aspect/OHS hazards and/or through the Operational Control Procedures**

GUIDELINES ON HAZARDS CATEGORISATION





COMMON MANAGEMENT PROCEDURES

Procedure number
CMP- 14

Approved by

Pankaj Sachdeva

IDENTIFICATION OF ASPECTS/ IMPACTS AND HAZARDS/RISKS

Rev. No. : 01

Reviewed by

Benny John

Date: 05-01-2018

Prepared by

S. Jayachitra

Sl. No.	Hazard category	Examples
1	Physical Hazard	Bodily injury, cuts, fracture,
2	Chemical Hazard	Chemical Burns,
3	Mechanical Hazard	Entrapment ,entanglement, caught in, impact
4	Electrical Hazard	Electrical shock, electrocution
5	Biological hazard	Viral infection, dermatitis,
6	Ergonomics	Back ache, back pain , stiff neck
7	Health hazard	Respiratory diseases, asphyxiation,
8	Heat Hazard	Burn injury, heat stress
9	Cold hazard	Burn, blisters
10	Noise and vibrations	Hearing impairment and white finger, numbness
9	Behavioural Hazards	Horseplay, violence at work, safety violation, pass by, PPE violation, stress

ANNEXURE - 1 TABLE ON CRITERIA FOR ASSESSING THE SIGNIFICANCE OF ENVIRONMENTAL

ASPECT/ IMPACT and OCCUPATIONAL HEALTH & SAFETY, HAZARD/ RISK

PARAMETER	SCORE VALUE				
	1	2	3	4	5
A) Severity Score for Aspects & Impacts and OHS Hazards & Risks					
For OCCUPATIONAL HEALTH	First Aid Only	Medical Treatment	Hospita- lisation	Temporary disruption	Chronic Disease
For SAFETY	First Aid Only	Medical Treatment	Lost Time injury	Partial Disability	Death or permanent disability
For ENVIRONMENT	Localised within the location of working	Localised within the work place	Localised within the Site/Plant	~1 km from the boundary of the Site/ Plant	< 10 kms. from boundary of Site/ Plant
B) Probability Score for Aspects & Impacts and OHS Hazards & Risks					
LIKELY HOOD OF OCCURENCE	May occur, only in rare & exceptional circumstances.	Unlikely to occur but could happen	Possible, likely to occur at some part of the time	Likely to occur frequently	Almost certain to occur under most circumstances
For Environmental Aspects /Impacts only					
C) DURATION	Few minutes	Less than 8 hour	Less than a day	Less than a month	More than a month

GUIDELINES:

OCCUPATIONAL HEALTH

First Aid: Rendered at site by trained First aiders (non-medicos)

Medical Treatment: Out patient treatment given at a Clinic/Hospital/dispensary by nursing staff/Doctor

Hospitalisation: In-patient treatment resulting in loss of man days

Temp. Disruption: Unable to perform the specific job temporarily might require job restrictions or job change

(For e.g. exposure during radiography)



**COMMON MANAGEMENT PROCEDURES**Procedure number
CMP- 14

Approved by

Pankaj
Sachdeva**IDENTIFICATION OF ASPECTS/ IMPACTS AND HAZARDS/RISKS**

Rev. No. : 01

Reviewed by

Benny John

Date: 05-01-2018

Prepared by

S. Jayachitra

Chronic Disease: Cannot perform the job any more (For e.g. T.B, Bronchitis & Asthma,etc)

SAFETY

First Aid: Rendered at site by trained First Aiders (non-medicos)

Medical Treatment: Out patient treatment given at a Clinic/Hospital/dispensary by nursing staff/Doctor

Lost Time: Absence from the job for more than 48 Hrs (reportable to the regulators)

Partial disability: Dismemberment

Fatal: Permanent dismemberment /disablement or fatality/ death.

5.0 RECORDS:

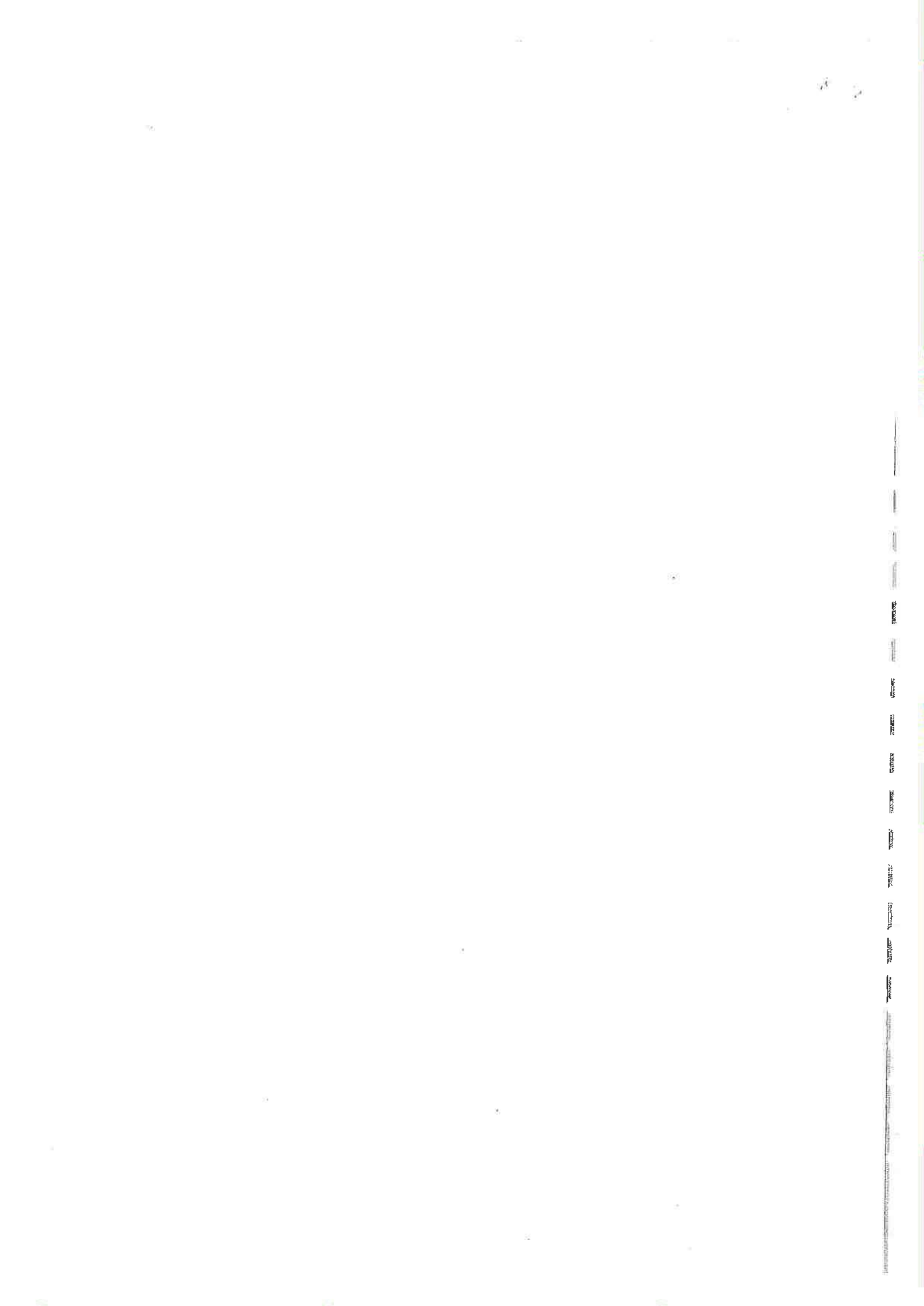
The Register of Aspect/Impact, Hazards/Risks and list of significant Aspects/Hazards to be maintained up to date

- 1) Register of Aspects/Impacts & Hazards/Risk Identification for EPC in Doc No. HIRADC/EPC/XX and,
- 2) Register of Aspects/Impacts & Hazards/Risk Identification for O&M in Doc No. HIRADC/O&M/XX

6.0 CMP 14 - REVISION HISTORY:

Rev. No.	Effective date	Nature of revisions effected
01	05-01-2018	Procedures are reviewed with current existing process and to align with CMP procedures
00	20-10-2016	ISO 14001:2015 requirements are reviewed and added in the procedure





WABAG		LIST OF SIGNIFICANT ENVIRONMENTAL ASPECTS AND IMPACTS FOR CONSTRUCTION ACTIVITIES (EPC)											HIRADC/EPC/SIGN-OHS				
S.No		Job Step / Task	ASPECT	IMPACT	N/A/N/E	LOR	IPC	DI	BC / RC	Severity A	Likelihood B	DURATION C	Risk' AXBXC	Significant	Elimination/ Substitution	Engg. Control	Administration &PPE control
1	HIRADC / EPC / 01A,02A,03A,04A,05A,06A,07A,08A,09A,12A,13A,14A.	Noise by construction Machinery/ Vehicles	Noise Pollution		AN	Y	N	D	N	2	3	1	6	Y	NIL	Y	Y
		Oily soaked Waste	Land Pollution		AN	Y	N	D	N	3	4	2	24	Y	NIL	Y	Y
		Emission of hazardous gas from Construction Machinery/ Vehicles	Air Pollution		N	Y	N	D	N	2	4	1	8	Y	NIL	Y	Y
2	HIRADC/EPC/02A Piling works(Rev -00)	Use of bentonite for grouting	Water Pollution		N	Y	N	D	N	3	5	2	30	Y	N	Y	Y
3	HIRADC/EPC/03A (EXCAVATION) Area clearing bush cutting & Tree cutting by Manual / Machinery &Tools	De-forestation	Loss of natural resources		AN	Y	Y	D	N	3	3	4	36	Y	NIL	Y	Y
		Seepage of Ground water	Depletion of water sources		AN	Y	Y	D	RC	3	4	3	36	Y	NIL	Y	Y
		Storm related Flooding	Damages of flora and fauna/ Water Pollution by flooding/ Land Pollution/		AN	Y	Y	D	N	3	4	4	48	Y	NIL	Y	Y

Rev.No: 02
DATE: 01/10/2013
Mandatory PPE's requirements for HSE:
Safety shoes and safety Helmets
Wear Full Body harness for more than 2m height
Administration Requirements for HSE:
Display pictorial HSE images
No Alcohol/drug use at sites
Tool box meeting to be conducted before site work
Hse induction training for new employees
Refresh induction training for old employees

Job Specific Control Measures
Ensure that Noise level not exceeding 85 dba in the day time and 50 dba in the night time by any construction activities
Ear plug for less than 90 dba and Ear muff for more than 90 dba
Muffler facilities
Polythene sheet shall be laid on the ground collection, segregation and disposal as per the PCB Rules
Muffler facilities
PCB Certificate
Emission of Exhaust must be in upright position
Height of Stack as per PCB Rules
Use Chute line to avoid ground water contamination
Minimise tree cutting as far as possible.
Get approval from Dist. Forest Officer before cutting.
Develop more plantation and increasing green cover (as directed by DFO and the customer)
Dewatering shall be arranged and disposal of the same as directed by the customer
Site Specific Emergency preparedness plan shall be arranged to rescue workers from natural and neighbourhood emergencies



LIST OF SIGNIFICANT ENVIRONMENTAL ASPECTS AND IMPACTS FOR CONSTRUCTION ACTIVITIES (EPC)

S.No	Job Step / Task	ASPECT	IMPACT	N/A/N/E	LOR	FC	DM	BC / RC	Severity A	Likelihood B	DURATION C	Risk* AXBXC	Significant	Elimination / Mitigation	Engg. Control	Administration & PPE Control	Control
4	HIRADC/EPC/04A Demolition	Debris from demolition	Land Pollution	N	Y	N	D	N	3	4	2	24	Y		N	Y	<p>Job Specific Control Measures</p> <p>Debris removed from surfaces must be disposed of in accordance with the Centre and State regulations on solid and hazardous waste. Polythene sheet shall be laid to avoid on the ground</p>
5	HIRADC/EPC/05A PCC	Spillage of concrete	Land Pollution	N	N	Y	D	N	2	3	2	12	N		Y		<p>Collection ; segregation and disposal at the designated place Use of Land fill</p>
6	HIRADC/EPC/06A Reinforcement	Generation of Cut Bit Waste	Loss of Natural Resource	N	N	N	D	RC	3	3	3	27	Y		N	Y	<p>Collection ; segregation; stack at the designated area and disposal as per the instruction for re-cycle use. Display Environment caution / warning sign boards</p>
7	HIRADC/EPC/07A Form Work	Generation of waste/scrap	Resource depletion	N	N	N	D	RC	3	3	3	27	Y		N	Y	<p>Collection ; segregation; stack at the designated area and disposal as per the instruction for re-cycle use. Display Environment caution / warning sign boards</p>
8	HIRADC/EPC/08A RCC	Spillage of concrete	Land Pollution	N	N	Y	D	N	3	3	3	27	Y		Y	Y	<p>Collection ; segregation and disposal at the designated place Use designated Land fill</p>
9	HIRADC/EPC/09A Fabrication of steel structures	Nitrogen oxide and Ozone by welding fumes	Air Pollution	N	Y	N	D	BC	2	4	1	8	Y		N	Y	<p>Provide Exhaust fans in enclosed areas.</p>
10	HIRADC/EPC/11A Visual Inspection Die Penetration Testing	Generation of Empty Containers (Die & Penetrant) VOC Emission	Land Pollution Air Pollution	N	Y	N	D	N	2	4	3	24	Y		Y	Y	<p>Collection; Segregation and Disposal as per the Hazardous Waste Management Rules Exhaust fan with duct facilities</p>





LIST OF SIGNIFICANT ENVIRONMENTAL ASPECTS AND IMPACTS FOR CONSTRUCTION ACTIVITIES (EPC)

HIRADC/EPC/SIGN-OHS

Rev.No: 02

DATE: 01/10/2013

Mandatory PPE's requirements for HSE:
 Safety shoes and safety Helmets
 Wear Full Body harness for more than 2m height
 Administration Requirements for HSE:
 Display pictorial HSE images
 No Alcohol/drug use at sites
 Tool box meeting to be conducted before site work
 Hse induction training for new employees
 Refresh induction training for old employees

Job Specific Control Measures


S.No	Job Step / Task	ASPECT	IMPACT	N/A/N/E	LOR	FC	D/I	BC / RC	Severity A	Likelihood B	DURATION C	Risk* AXBC	Significant	Elimination/ Substitution	Engg. Control	Administration & PPE control	Control	
	Pressure Testing (Hydraulic / Pneumatic)	Water Usage and Drain	Land Pollution	AN	Y	N	D	RC	2	3	2	12	Y	NIL	Y	Y	Y	Dispose at the designated area
	Blow Down	Noise	Noise Pollution	AN	Y	N	D	N	2	3	1	6	Y	NIL	Y	Y	Y	Ensure that Noise level not exceeding 85 dba in the day time and 50 dba in the night time by any construction activities Ear plug for less than 90 dba and Ear muff for more than 90 dba Muffler facilities
	Isotopic Waste	Gamma rays emmissi	Air Pollution	AN	Y	N	D	N	2	1	1	2	Y	NIL	N	Y	Y	Follow the BARC Radiography safety procedure Register the daily dosage received and should not exceed annual limit of BARC Emergency aids kept available readily
11	HIRADC/EPC/12A Erection of electrical equipments	Emission of lead fumes	Air Pollution	N	Y	N	D	N	2	4	1	8	Y	NIL	Y	Y	Y	Monitoring Air Ambient Quality as per the PCB Rules
	Cable Joining	Solder's Waste	Land Pollution	N	Y	N	D	N	2	3	1	6	Y	NIL	Y	Y	Y	Collection ; segregation and disposal as per the local PCB rules
12	HIRADC/EPC/13A Plastering	Spillage of Cement Mortar on earth	Land Pollution	N	Y	N	D	BC	2	4	1	8	Y	NIL	Y	Y	Y	Polythene sheet shall be laid on the ground Waste Cement Mortar collection, segregation and disposal at the designated place
13	HIRADC/EPC/14A Painting	Paint or other chemicals spillage on earth Empty Paint Tins	Land Pollution	N	Y	N	D	N	2	4	1	8	Y	NIL	Y	Y	Y	Polythene sheet shall be laid on the ground collection, segregation and disposal as per the PCB Rules Collection; Segregation and Disposal as per the Hazardous Waste Management Rules



WABAG		LIST OF SIGNIFICANT ENVIRONMENTAL ASPECTS AND IMPACTS FOR CONSTRUCTION ACTIVITIES (EPC)										HIRADC/EPC/SIGN-OHS																	
												Rev.No: 02																	
												DATE: 01/10/2013																	
												Mandatory PPE's requirements for HSE:																	
												Safety shoes and safety Helmets																	
												Wear Full Body harness for more than 2m height																	
												Administration Requirements for HSE:																	
												Display pictorial HSE images																	
												No Alcohol/drug use at sites																	
												Tool box meeting to be conducted before site work																	
												Hse induction training for new employees																	
												Refresh induction training for old employees																	
												Job Specific Control Measures																	
												Exhaust fan with duct facilities																	
S.No	Job Step / Task	ASPECT	IMPACT	N /AN/ E	Y	LOR	N	IPC	D	D/	N	BC / RC	2	Severity A	4	Likelihood B	2	DURATION C	16	Risk* AXBXC	Y	Significant	Y	IL	Engg. Control	Y	Administration & PPE		
		Toxic Atmosphere	Air Pollution																										



ANNEXURE – 6


 <small>responsible solutions for a better life.</small>	<h2>Job Safety Analysis</h2>	ISO 45001:2018 (CI 8.1.5)
	A-815-00 Revision number :	Date:

JOB SAFETY ANALYSIS PROCEDURE

Contents

1.0	Introduction	2
2.0	Relevance of JSA	3
3.0	Methodology.....	3
3.1	Stage 1: What is important to know while “selecting the job”?.....	3
3.2	Stage 2: How to break the job into "basic steps"?.....	4
3.3	Stage 3: How to "identify potential hazards"?.....	5
3.4	Stage 4: How to "determine preventive measures?"	6
3.4.1	Eliminate the hazard	6
3.4.2	Contain the hazard.....	6
3.4.3	Revise work procedures.....	6
3.4.4	Reduce the exposure	6
4.0	Roles and responsibilities.....	7
4.1	Management Responsibilities (includes all personnel with a supervisory role).....	7
4.2	Health & Safety (H&S) Professional Responsibilities	8
4.3	Employee Responsibilities	9
5.0	JSA Communication and Presentation.....	9
6.0	JSA Reviews.....	10
7.0	JSA Documentation and Recordkeeping.....	11
8.0	TRAINING	11
9.0	List of JSAs.....	11



	Job Safety Analysis	ISO 45001:2018 (CI 8.1.5)
	A-815-00 Revision number :	Date:

1.0 Introduction

A **job safety analysis (JSA)** is a **procedure** which helps integrate accepted safety and health principles and practices into a particular task or job operation. In a **JSA**, each basic step of the job is to identify potential hazards and to recommend the safest way to do the job. Methodology is based on the idea that safety is an integral part of every job and not a separate entity. In this document, only health and safety aspects will be considered.

One of the methods used in this example is to observe a worker actually perform the job. The major advantages of this method include that it does not rely on individual memory and that observing or performing the process prompts the recognition of hazards. For infrequently performed or new jobs, observation may not be practical. One approach is to have a group of experienced workers and supervisors complete the analysis through discussion. An advantage of this method is that more people are involved in a wider base of experience and promoting a more ready acceptance of the resulting work procedure. Members of the health and safety committee must also participate in this process.

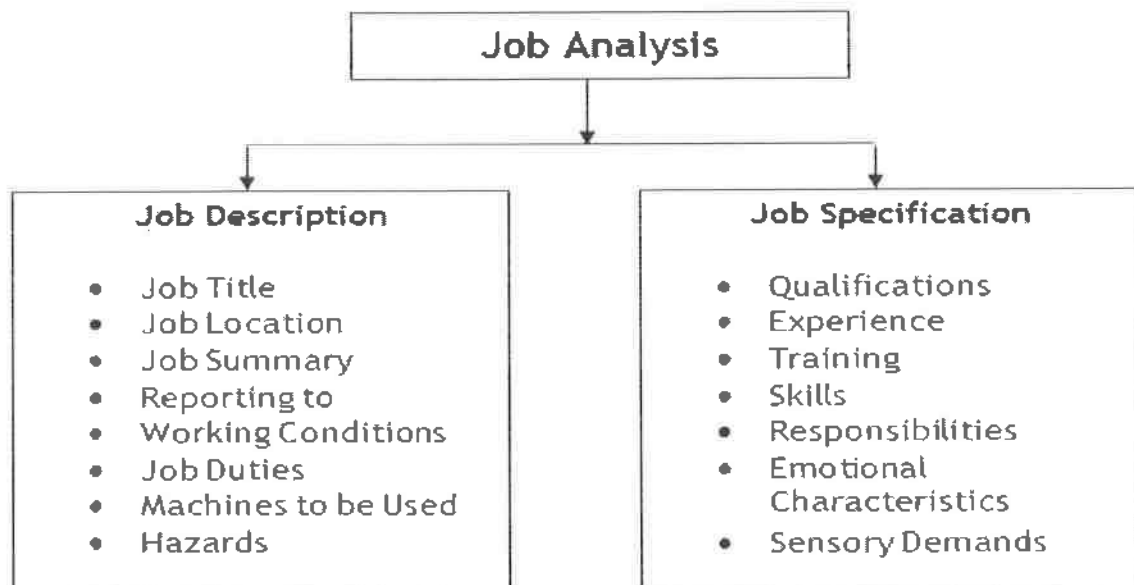



Fig-1 (JSA Job description and Job specification)

 WABAG sustainable solutions for a better life.	Job Safety Analysis	ISO 45001:2018 (Cl 8.1.5)
	A-815-00 Revision number :	Date:

2.0 Relevance of JSA

Initial benefits from developing a JSA will become clear in the preparation stage.

- The analysis process may identify previously undetected hazards and increase the job knowledge of those participating.
- Safety and health awareness is raised, communication between workers and supervisors is improved, and acceptance of safe work procedures is promoted.
- A JSA can form the basis for regular contact between supervisors and workers.
- It can serve as a teaching aid for initial job training and as a briefing guide for infrequent jobs.
- It may be used as a standard for health and safety inspections or observations.
- In particular, a JSA will assist in completing comprehensive accident investigation.

3.0 Methodology

Four basic stages in conducting a JSA are:


- 1) selecting the job to be analyzed
- 2) breaking the job down into a sequence of steps
- 3) identifying potential hazards
- 4) determining preventive measures to overcome these hazards

3.1 Stage 1: What is important to know while “selecting the job”?

Ideally, all jobs should be subjected to a JSA. Each JSA will require revision whenever equipment, raw materials, processes, or the environment change. For these reasons, it is usually necessary to identify which jobs are to be analyzed. Even if analysis of all jobs is planned, this step ensures that the most critical jobs are examined first.

Factors to be considered in setting a priority for analysis of jobs include:

- **Accident frequency and severity:** jobs where accidents occur frequently or where they occur infrequently but result in serious injuries.
- **Potential for severe injuries or illnesses:** the consequences of an accident, hazardous condition, or exposure to harmful products are potentially severe.
- **Newly established jobs:** due to lack of experience in these jobs, hazards may not be evident or anticipated.

	Job Safety Analysis	ISO 45001:2018 (Cl 8.1.5)
	A-815-00 Revision number :	Date:

- Modified jobs: new hazards may be associated with changes in job procedures.
- Infrequently performed jobs: workers may be at greater risk when undertaking non-routine jobs, and a JSA provides a means of reviewing hazards.

3.2 Stage 2: How to break the job into "basic steps"?

After a job has been chosen for analysis, the next stage is to break the job into steps. A job step is defined as a segment of the operation necessary to advance the work. See examples below.

Care must be taken not to make the steps too general. Missing specific steps and their associated hazards will not help. As an example, the job of changing a flat tire will be used in this document.

An important point to remember is to keep the steps in their correct sequence. Any step which is out of order may miss serious potential hazards or introduce hazards which do not actually exist.


Job steps are recorded in the left hand column, as shown here:

Sequence of Events	Potential Accidents or Hazards	Preventive Measures
Park vehicle		
Remove spare and tool kit		
Pry off hub cap and loosen lug bolts (nuts)		
And so on.....		

This part of the analysis is usually prepared by knowing or watching a worker do the job. The observer is normally the immediate supervisor. However, a more thorough analysis often happens by having another person, preferably a member of the health and safety committee, participate in the observation. Key points are less likely to be missed in this way. The job should be observed during normal times and situations.

When completed, the breakdown of steps should be discussed by all the participants (always including the worker) to make that all basic steps have been noted and are in the correct order.



 <small>WABAG</small> <small>WATER & POWER CONSULTANTS</small>	<h2>Job Safety Analysis</h2>	ISO 45001:2018 (CI 8.1.5)
	A-815-00 Revision number :	Date:

3.3 Stage 3: How to "identify potential hazards"?

Once the basic steps have been recorded, potential hazards must be identified at each step. Based on observations of the job, knowledge of accident and injury causes, and personal experience, list the things that could go wrong at each step.

A second observation of the job being performed may be needed. Since the basic steps have already been recorded, more attention can now be focused on each potential hazards. At this stage, no attempt is made to solve any problems which may have been detected.

To help identify potential hazards, the job analyst may use questions such as these (this is not a complete list):


- Can any body part get caught in or between objects?
- Do tools, machines, or equipment present any hazards?
- Can the worker make harmful contact with moving objects?
- Can the worker slip, trip, or fall?
- Can the worker suffer strain from lifting, pushing, or pulling?
- Is the worker exposed to extreme heat or cold?
- Is excessive noise or vibration a problem?
- Is there a danger from falling objects?
- Is lighting a problem?
- Can weather conditions affect safety?
- Is harmful radiation a possibility?
- Can contact be made with hot, toxic, or caustic products?
- Are there dusts, fumes, mists, or vapours in the air?

Potential hazards are listed in the middle column of the worksheet, numbered to match the corresponding job step.

For example:

Sequence of Events	Potential Accidents or Hazards	Preventive Measures
Park vehicle	a) Vehicle too close to passing traffic b) Vehicle on uneven, soft ground c) Vehicle may roll	
Remove spare and tool kit	a) Strain from lifting spare	



	Job Safety Analysis	ISO 45001:2018 (Cl 8.1.5)
	A-815-00 Revision number :	Date:

Pry off hub cap and loosen lug bolts (nuts)	a) Hub cap may pop off and hit you wrench may slip	b) Lug
And so on.....	a) ...	

Again, all participants should jointly review this part of the analysis.

3.4 Stage 4: How to "determine preventive measures?"

The final stage in a JSA is to determine ways to eliminate or control the hazards identified. The generally accepted measures, in order of preference, are:

3.4.1 Eliminate the hazard

Elimination is the most effective measure. These techniques should be used to eliminate the hazards:

- Choose a different process
- Modify an existing process
- Substitute with less hazardous product
- Improve environment (e.g., ventilation)
- Modify or change equipment or tools

3.4.2 Enclose the hazard


If the hazard cannot be eliminated, contact might be prevented by using enclosures, machine guards, worker booths or similar devices.

3.4.3 Create work prohibitions

Consideration might be given to modifying steps which are hazardous, changing the sequence of steps, or adding additional steps (such as locking out energy sources).

3.4.4 Remove the exposure



 WABAG <small>WATER AND WASTE SOLUTIONS FOR A BETTER LIFE</small>	Job Safety Analysis	ISO 45001:2018 (CI 8.1.5)
	A-815-00 Revision number :	Date:

These measures are the least effective and should only be used if no other solutions are possible. One way of minimizing exposure is to reduce the number of times the hazard is encountered. The use of appropriate personal protective equipment may be required. To reduce the severity of an incident, emergency facilities, such as eyewash stations, may need to be provided.

For example:

Sequence of Events	Potential Accidents or Hazards	Preventive Measures
Park vehicle	a) Vehicle too close to passing traffic b) Vehicle on uneven, soft ground c) Vehicle may roll	a) Drive to area well clear of traffic. Turn on emergency flashers b) Choose a firm, level parking area c) Apply the parking brake; leave transmission in PARK; place blocks in front and back of the wheel diagonally opposite to the flat
Remove spare and tool kit	a) Strain from lifting spare	a) Turn spare into upright position in the wheel well. Using your legs and standing as close as possible, lift spare out of truck and roll to flat tire.
Pry off hub cap and loosen lug bolts (nuts)	a) Hub cap may pop off and hit you b) Lug wrench may slip	a) Pry off hub cap using steady pressure b) Use proper lug wrench; apply steady pressure slowly
And so on.....	a) ...	a) ...

4.0 Roles and responsibilities


4.1 Management Responsibilities (includes all personnel with a supervisory role)

Project Management Responsibilities

4.1.1 Provide the mechanism for adequate training of all applicable personnel to identify hazards associated with the tasks they may perform and to designate the appropriate control measures.

4.1.2 Empower applicable personnel with the ability to mitigate, or make recommendations on appropriate control measures for site-specific hazards and potential hazards.



	Job Safety Analysis	ISO 45001:2018 (CI 8.1.5)
	A-815-00 Revision number ;	Date:

4.1.3 Verify that applicable employees are trained in the JSA process.

4.1.4 Confirm that Frontline Supervisors are trained on communication of JSAs.

4.1.5 Actively participate in and support the JSA process/activity while visiting a site/project (where applicable).

4.1.6 Perform objective assessments on the quality of JSAs preparation and communication. Provide recommendations and support to continuously improve their effectiveness (where applicable).

4.1.7 Stop Work Authority/Responsibility – Immediately stop and correct perceived unsafe or hazardous activities.

Frontline Supervisor Responsibilities

4.1.8 Review the JSAs that are applicable to the work/project.

4.1.9 Assess and evaluate applicable on-site personnel to ensure that they understand the JSA process.

4.1.10 Prepare comprehensive and detailed JSAs.

4.1.11 Encourage crew involvement in preparation of JSAs.

4.1.12 Communicate the JSA before the scheduled tasks are performed.

4.1.13 Conduct appropriate reviews and revisions to JSAs and communicate changes to field personnel.

4.1.14 Stop Work Authority/Responsibility – Immediately stop and correct perceived unsafe or hazardous activities.


4.2 Health & Safety (H&S) Professional Responsibilities

4.2.1 Provide technical support for preparation and communication of JSA guidelines.

4.2.2 Develop, coordinate, conduct and/or approve JSA training.

4.2.3 Evaluate the effectiveness of the JSA program and make recommendations for improvement (when necessary).



 <small>WABAG</small> <small>Just one's Satisfaction for a better life.</small>	<h2>Job Safety Analysis</h2>	ISO 45001:2018 (CI 8.1.5)
	A-815-00 Revision number :	Date:

4.2.4 Review completed JSAs to evaluate thoroughness and/or the appropriate level of communication and control measures/mitigations.

4.2.5 Stop Work Authority/Responsibility – Immediately stop, report, and correct perceived unsafe or hazardous activities.

4.2.6 Actively participate in and support the JSA process/activity while visiting a site/project (where applicable).

4.3 Employee Responsibilities

4.3.1 Follow the procedures described in these guidelines.

4.3.2 Complete the JSA-related training associated with job assignments and responsibilities.

4.3.3 Participate in the development and communication of JSAs, as applicable to assigned tasks and job responsibilities.

4.3.4 Report to the Supervisor any recognized hazard that cannot be immediately corrected.

4.3.5 Review JSAs when conditions change (e.g., weather, scope of the task, nearby activity), and make appropriate changes to potential hazards and/or control measures.


5.0 JSA Communication and Presentation

- The JSA should be communicated verbally and in detail with all crew personnel onsite, and then subsequently to any/all other individuals who visit or perform work on that site, before engaging in the work activity.

- Encourage the field personnel to openly discuss the JSA. By giving applicable field personnel a way to participate in safety decisions, their engagement can lead to improved hazard awareness and understanding of safe work practices.

- Frontline Supervisors should encourage the crew to actively participate. Asking questions and seeking input from crew members helps to create an environment where the entire crew is actively engaged in the JSA process.



 <small>WABAG</small> <small>Waste-to-Energy, for a Better Life.</small>	<h2>Job Safety Analysis</h2>	ISO 45001:2018 (CI 8.1.5)
	A-815-00 Revision number :	Date:

- Front-line supervision (Crew Leaders or Foremen) are the key individual responsible for the success of crew safety, compliance, quality and production. Therefore, they should have the ability to communicate and engage their crew in developing, communicating and executing safe work plans.

- After the Crew Leader explains in detail the task that is to be performed, encourage team members to point out the potential hazards and their proposed mitigation or control measures. This encourages crew engagement and communication.

- Be mindful of the primary language(s) of the field personnel. Training, presentations, daily communications, forms, handouts, etc. need to be communicated so that all field personnel understand.

- During the JSA discussion, give field personnel an opportunity to share examples of good catches, near misses, etc. to learn from experience and prevent potential reoccurrence.

6.0 JSA Reviews

6.1 The JSA MUST be reviewed by all personnel entering the active work area, including but not limited to, field personnel, contractor management, owner company representatives, inspection staff, vendors, guests/visitors onsite, etc.


6.2 The initial review shall take place prior to the start of any work task.

6.3 A recommended Best Management Practice (BMP) is to review the JSA again after any break or interruption (e.g., weather, stop work, conditional change, lunch etc.) .

6.4 Reviews should also take place any time conditions or work activities change, for example:

- If the equipment sustains damage;
- After a safety related incident (e.g., injury, accident, or near miss);
- When the job is altered; or
- Upon identification of a new hazard(s).



 <small>WABAG</small> <small>Water & Wastewater Solutions for a Better World</small>	<h2>Job Safety Analysis</h2>	ISO 45001:2018 (CI 8.1.5)
	A-815-00 Revision number :	Date:

7.0 JSA Documentation and Recordkeeping

7.1 All JSAs should be signed by all applicable crew members and visitors.

7.2 All JSAs should be turned in on a daily basis.

7.3 Remember “If it’s not documented, it didn’t happen.”

8.0 TRAINING

8.1 All employees should receive awareness training on the JSA process.

8.2 Contractor’s employees and/or on-site employees must have appropriate training and qualifications to identify hazards and understand the information presented in a JSA.

9.0 List of JSAs





Job Safety Analysis

ISO 45001:2018

(Cl 8.1.5)

A-815-00 Revision number :

Date:

Serial No.	Description	Reference No.	Page Nos.
I	Civil Works		
1	Demolition work of digesters		
2	Rock blasting		
3	Excavation		
4	Piling works		
5	Shuttering/De-shuttering		
6	Concreting		
7	Scaffolding		
8	Work at height		
9	Pipe laying		
II	Mechanical Works		
10	Bar bending and cutting		
11	Lifting and shifting by cranes		
12	Welding		
13	Confined space entry		
III	Electrical Work		
14	Cable laying, glanding and termination works		



 WABAG <small>WABAG GROUP OF COMPANIES</small>	Job Safety Analysis INDEX	ISO 45001:2018 (CI 8.1.5)
	A-815-00 Revision number :	Date:


S No.	Description	Reference No.
I	Civil Works	
1	Demolition work of digesters	A-815-JSA-004
2	Rock blasting	A-815-JSA-010
3	Excavation	A-815-JSA-002
4	Piling works	A-815-JSA-007
5	Shuttering/De-shuttering	A-815-JSA-012
6	Concreting	A-815-JSA-001
7	Scaffolding	A-815-JSA-011
8	Work at height	A-815-JSA-008
9	Pipe laying	A-815-JSA-009
II	Mechanical Works	
10	Bar bending and cutting	A-815-JSA-014
11	Lifting and shifting by cranes	A-815-JSA-005
12	Welding	A-815-JSA-013
13	Confined space entry	A-815-JSA-003
III	Electrical Work	
14	Cable laying, glanding and termination works	A-815-JSA-006



 <small>we are always on hand out for a better life.</small>	Job Safety Analysis Concreting	ISO 45001:2018 (CI 8.1.5)
	A-815-JSA-001 Revision number : 00	Date:

NAME OF JOB SITE:				ISSUED DATE:			
NAME OF ACTIVITY:		CONCRETING		REVISION NO. AND DATE:			
DATE:				JSA NO:			
MINIMUM REQUIRED PERSONAL PROTECTIVE EQUIPMENT (SEE CRITICAL ACTIONS FOR TASK-SPECIFIC REQUIREMENTS)							
Safety Helmet	Full body apron	SCBA (if required)	Hand Gloves (Cut resistance)	Dust Mask			
Safety Shoe	High visibility reflective Vest	Ear Plug/Muff	Safety Goggles	Others			
Note to Team leader: Work must not start until all hazards are discussed; controls are in place; and all signatures are obtained.							
Sl. No.	ACTIVITY	SUB-ACTIVITY	RISK INVOLVED IN THE ACTIVITY	CONTROL MEASURES FOR SPECIFIED ACTIVITY	ACTION BY		
General information: <ul style="list-style-type: none"> All employees (Staff and workmen) must wear hard hats on site. A supply of dust masks shall be kept on hand to fill workmen requests. All employees shall wear safety glasses. Workmen handling the pump will wear appropriate hand gloves. All employees on site must wear approved, hi-visibility safety vests, to make them visible to the equipment operators. Display pictorial safety images, posters at prominent places surrounding the area of work. Deploy trained and experienced foreman for safely completion of work under his guidance /supervision. 							
1	Concreting	Cement mixing	Concrete burns	Hand gloves, boots and all necessary ppe must be worn and after cement handling ointment should be put on.	Civil supervisor/ engineer		
2	Concreting	Cement handling (dry bags)/Ready mix concrete	Silicosis	Face mask ,boots,gloves must be provided to all workers doing cement handling, periodical medical supervision,avoid scattering of empty bags to control environmental impact.Ensure competency of Transit Mixture driver and availability of banksman with mandatory PPEs,reverse horn availability,ensure the effectiveness of parking brake as well as stopper on tyres while shifting RMC from TM to concrete pump.			



	Job Safety Analysis Concreting	ISO 45001:2018 (Cl 8.1.5)
	A-815-JSA-001 Revision number : 00	Date:

3	Concreting	Shifting of concrete by manually or concrete pump	Ergonomics,fall of object	Job rotation,Job specific PPEs,appropriate posture as well as avoiding of excessive weight to avoid back & neck injury,maintaing good house keeping,ensure access unobstructed and appropriate,engage experienced personnel, ensure certification of concrete pump,inspect concrete pipeline on regular basis with rigid support,training and display pictoral posters.
4	Concreting	Pouring concrete	Concrete splashing/spillage	Wear safety goggles, proper signalling and clearing of end point of concrete pipeline to be done properly to avoid more splashing,avoid spillage of concrete to control environmental impacts.
5	Concreting	Erection of formwork / working platform	Fall from height (object/person)	Scaffold erected on firm levelled surface with base plate, erected on a plumb, sufficient bracing,tying with permanent structure at 6m interval
6	Concreting	Supporting vertical members/pannels of walls	Fall of object	Regular clamp inspection before concreting
7	Concreting	Concrete pouring and application of vibrator (Diesel / power operated)	Electrical shocks/electrocution /Diesel Splash	Connected through RCCB (30mA), effective body earthing, proper insulation, correct cable in use, use safety goggles during operation as well as pouring of Diesel.
8	Concreting	General	Fall of object	Awareness on the peripheral condition like condition of tree and structures at boundary and the precautionary measures to overcome the same



	Job Safety Analysis Concreting	ISO 45001:2018 (CI 8.1.5)
	A-815-JSA-001 Revision number : 00	Date:

All crew members must print/sign their name below to acknowledge their understanding of the JSA.

Sl. No.	Name	Designation	Signature	Remarks

JSA Conducted by:

Date:

Signature of Team Leader:

Date:





Job Safety Analysis Excavation


ISO 45001:2018
(Cl 8.1.5)

A-815-JSA-002 Revision number : 00

Date:


NAME OF JOB SITE:				ISSUED DATE:			
NAME OF ACTIVITY:		EXCAVATION		REVISION NO. AND DATE:			
DATE:				JSA NO:			
MINIMUM REQUIRED PERSONAL PROTECTIVE EQUIPMENT (SEE CRITICAL ACTIONS FOR TASK-SPECIFIC REQUIREMENTS)							
Safety Helmet	Full body apron	SCBA (if required)	Hand Gloves (Cut resistance)	Dust Mask			
Safety Shoe	High visibility reflective Vest	Ear Plug/Muff	Safety Goggles	Others			
Note to Team leader: Work must not start until all hazards are discussed; controls are in place; and all signatures are obtained.							
Sl. No.	ACTIVITY	SUB-ACTIVITY	RISK INVOLVED IN THE ACTIVITY	CONTROL MEASURES FOR SPECIFIED ACTIVITY	ACTION BY		
General information:							
<ul style="list-style-type: none"> All employees (Staff and workmen) must wear hard hats on site. A supply of dust masks shall be kept on hand to fill workmen requests. All employees shall wear safety glasses. Workmen handling the pump will wear appropriate hand gloves. All employees on site must wear approved, hi-visibility safety vests, to make them visible to the equipment operators. Display pictorial safety images, posters at prominent places surrounding the area of work. Deploy trained and experienced foreman for safely completion of work under his guidance /supervision. 							
1	Pre-excavation	Obtain PTW	Injury/damage as a result of incorrect information. Unauthorized personnel.	Obtain the correct PTW. Only authorized personnel allowed. All personnel to be properly trained and inducted.	Supervisor/ Engineer		
2		Survey of area	Underground utilities, sudden accumulation of water	Detailed survey the excavated area for confirmation whether any underground services in excavated areas. Must consider overhead lines, trees, electrical poles during pipe line excavation for prevent major accidents.	Site incharge		
3		Preparation of site	Slip ,trip fall hazard	Proper light arrangement should be made in excavated areas before excavation specially at night work. Adequate dumping space should be require around excavated area before excavation.	Site engineer		



	Job Safety Analysis Excavation	ISO 45001:2018 (Cl 8.1.5)
	A-815-JSA-002 Revision number : 00	Date:

4		Preparation of access/egress	Vehicular hazard	Excavated site should be free & safe for easy movement of vehicle. No vehicle movement nearby 2m from the excavated pit. Competent operator/driver shall be identified for all vehicles and equipment.	
5			Poisonous chemicals, flora, fauna	Ensure that the excavated site should be free from poisonous chemicals etc.	
6	During excavation	Vehicle movement (dumper)	Unsafe operations leading to accidents	Excavator bucket should be move in a safer way , otherwise it will be causes an accident. Also chose the appropriate excavator according to the depth of cutting. Banksman should be guided the excavator operator properly for self movement of excavator	
7	During excavation	Excavating manually	Risk of injury in eyes,heat stress, dust allergy, skin allergy etc	Those person who are engage in excavation should wear helmet, safety shoe, goggles, gloves mask etc	
8	During excavation		Soil caving/collpase	Soil test are require for proper excavation like type of soil, strength, etc. Benching/shoring/sloping to be implemented as per soil condition. Good condition of wooden and steel shoring materials should be arranged at site. Excavated material should be dumped minimum 2 mtr away from excavated edge. The dumpers must be perked minimum 3 mtr away from excavated edge for prevention of falling.The excavated area should be check regularly to ensure the condition of site. Stairs, ladders must be ready at site whenever required. Barricading is a very	



	Job Safety Analysis Excavation	ISO 45001:2018 (Cl 8.1.5)
	A-815-JSA-002 Revision number : 00	Date:

				important factor after excavation. Safety tape should be use for barricading purpose. Guard rails can be provided where it is required. Sign board , warning lights, reflector tape & red flag must be provide at site for preventing major incident.	
9	Post-excavation	-----	Sidewall not free from crackline	Regularly look after the site for ensure any crackline at site after excavation.	Site engineer

All crew members must print/sign their name below to acknowledge their understanding of the JSA.

Sl. No.	Name	Designation	Signature	Remarks

JSA Conducted by:

Date:

Signature of Team Leader:

Date:





Job Safety Analysis Confined Space

ISO 45001:2018
(Cl 8.1.5)

A-815-JSA-003 Revision number : 00

Date:

NAME OF JOB SITE:				ISSUED DATE:			
NAME OF ACTIVITY:		CONFINED SPACE ACTIVITY		REVISION NO. AND DATE:			
DATE:				JSA NO:			
MINIMUM REQUIRED PERSONAL PROTECTIVE EQUIPMENT (SEE CRITICAL ACTIONS FOR TASK-SPECIFIC REQUIREMENTS)							
Safety Helmet	Full body apron	SCBA (if required)	Hand Gloves (Cut resistance)	Dust Mask			
Safety Shoe	High visibility reflective Vest	Ear Plug/Muff	Safety Goggles	Others			
<p>Note to Team leader: Work must not start until all hazards are discussed; controls are in place; and all signatures are obtained.</p>							
Sl. No.	ACTIVITY	SUB-ACTIVITY	RISK INVOLVED IN THE ACTIVITY	CONTROL MEASURES FOR SPECIFIED ACTIVITY	ACTION BY		
<p>General information:</p> <ul style="list-style-type: none"> All employees (Staff and workmen) must wear hard hats on site. A supply of dust masks shall be kept on hand to fill workmen requests. All employees shall wear safety glasses. Workmen handling the pump will wear appropriate hand gloves. All employees on site must wear approved, hi-visibility safety vests, to make them visible to the equipment operators. Display pictorial safety images, posters at prominent places surrounding the area of work. Deploy trained and experienced foreman for safely completion of work under his guidance /supervision. 							
1	Pre-entry	Obtain PTW	<ul style="list-style-type: none"> Injury/damage as a result of incorrect information. Unauthorized personnel. 	<ul style="list-style-type: none"> Obtain the correct PTW. Only authorized personnel allowed. All personnel to be properly trained and inducted. 	Supervisor/ Engineer		
		Site Survey and arrangements for carrying out the activities inside confined space	<ul style="list-style-type: none"> Lack of Knowledge of safe work practices Impact of multiple activities going on at site Slip, trip and falls. Improper tools Struck by objects Over confidence Lack of supervision 	<ul style="list-style-type: none"> All staff and workers must be provided with plant specific training for work, job specific training apart from general induction training. Tool Box Talk shall be Conducted prior to start the activity involving all the crew members by site engineer/supervisor TBT shall be properly filled out 	Supervisor/ Engineer, Safety Engineer		



	Job Safety Analysis Confined Space	ISO 45001:2018 (Cl 8.1.5)
A-815-JSA-003 Revision number : 00		Date:

				<p>and readily available at site with documentation</p> <ul style="list-style-type: none"> • Engage only skilled, Authorized & validated persons to carry out the job • Always use right tools for the job and ensure tools are free from any damage or defects • Ensure people are not taking food at site and taking rest here & there and under /beside the heavy Equipment, vehicles, instruments etc. • People shall be aware of emergency situation and what to do during actual emergency- Escape routes shall be clear of any obstructions and will know to persons • Call Security in need for snakes/wild animal • Hard-Hats, Safety Goggles, Long shirts and pants, Safety shoes, Leather apron ,Face guard, Welding helmet and Leather Hand gloves , Ear plugs • Overall housekeeping of the area shall be maintained good with clearance of the accesses-proper cable management to be ensure. • Persons without having confined space Training must 	
--	--	--	--	---	--



Job Safety Analysis Confined Space

ISO 45001:2018
(Cl 8.1.5)

A-815-JSA-003 Revision number : 00

Date:

			<p>not enter into confined space.</p> <ul style="list-style-type: none"> • Trained and skilled Confined Space attendant must be posted at the entrance of Hole • Trained rescue team must be formed and stayed outside the confined space to respond to any emergency. • There must have frequent communication with the persons working inside the confined space with suitable means by outside persons • Reduce exposure to sharp edges. Handle materials very carefully and ensure it is not striking any nearby persons. • Be alert while working, avoid hasty activity and maintain good coordination and cooperation • Right tools for the job shall be ensured • Enter into the site with the help of a person who is well familiar with the site and jobs. Avoid entering here & there.
		<ul style="list-style-type: none"> • Energized equipment 	<ul style="list-style-type: none"> • Ensure the confined space is positively isolated from all sources of energy hydraulic, pneumatic, electrical



Job Safety Analysis Confined Space

ISO 45001:2018
(Cl 8.1.5)

A-815-JSA-003 Revision number : 00

Date:

			<ul style="list-style-type: none"> Pressurized fluid Pyrophoric deposition Flammable and /or toxic atmosphere 	<p>,etc)</p> <ul style="list-style-type: none"> Use multilock and tag for isolation carried out. Ensure the space is depressurized and content is drained out. Ensure the deposition (sludge) is water wetted. Ensure the confined space is flushed, purged and thoroughly ventilated as required. 	
2	During Entry	Confined Space Entry & Work (Inside Pipe line, Tank & vessel)	<ul style="list-style-type: none"> Presence of Toxic /poisonous/ inert Gases/ H2s gas Presence of flammable vapour Oxygen deficiency Oxygen enrichment Awkward position during entry& works Ergonomic Hazards Falling through the holes / floor openings Presence of Bacteria / germs Presence of insects / vermin Discomfort while working inside confined space Fire & Explosion Hazards Electrical Shock / Burn hazards 	<ul style="list-style-type: none"> Ensure confined space is cleaned, purged and isolated from all energy sources (Mechanical, Electrical etc.) before from starting entry & works into confined space. Obtain required permit from concerned authority of Reliance and ensure strictly & effectively following and maintaining the Permit to work system Only medically fit person and free from any illness / sickness/ intoxication & medication shall be engaged to enter & work inside confined space. Ensure person are trained on the subject to enter & work inside confined space and process authorization card. All openings of the 	Supervisor/ Engineer





Job Safety Analysis Confined Space

ISO 45001:2018
(Cl 8.1.5)

A-815-JSA-003 Revision number : 00

Date:

				<p>confined space shall be clear of proper air circulation and only one opening with appropriate signage shall be designated for entry & exit.</p> <ul style="list-style-type: none">• Confined space entry and exit point shall be made for comfortable entry and exit wherever possible, it should be clear of any obstacles.• Gas monitoring shall be done and recorded and ensure entry into confined space is safe and no atmospheric hazards are present.• Provision of providing sufficient ventilation through mechanical (forced & exhaust) and natural means shall be ensured.• Frequent checking of ventilation for its workability to be done.• Sufficient illumination shall be ensured inside confined space, 24V power supply through step down transformers may must be adopted for illumination as required.• TBT Shall be conducted by line supervisor / Engineer with the crew members explaining the job, associated hazards and control measure & documentation of TBT.• Knowledgeable & trained confined space attendant shall be deployed during the course activity along with registration of IN & OUT time for men & tools. People shall submit their badge to	
--	--	--	--	--	--





Job Safety Analysis Confined Space

ISO 45001:2018
(Cl 8.1.5)

A-815-JSA-003 Revision number : 00

Date:

				<p>attendant before entering.</p> <ul style="list-style-type: none"> • People must maintain proper position and posture while working inside confined space • Time to time Rest pause shall be given to the persons working inside confined space • Ensure people are not taking rest inside confined space • Trained rescue team equipped with emergency rescue kit shall be kept ready. • Fire extinguisher in good condition shall be kept ready and people shall know the fire hydrant points. • Ensure periodically gas testing/monitoring is conducted and recorded & the result shall conform the following: • Oxygen Level between 19.5 % TO 21.5 %, it must not be less than 19.5% and more than 23.5 % • LEL / UEL must be 0% • Carbon Mono-Oxide within 50 PPM MAX • Carbon Di-Oxide within 00 PPM MAX • H2S must be within 0 PPM • Trained & skilled fire watch shall be deployed for the prevention of any type of fire • People must wear mandatory PPEs including breathing apparatus may be used as required. • All electrical cable and gadget shall be free from defect and protected from any damage. 	
--	--	--	--	---	--





Job Safety Analysis Confined Space

ISO 45001:2018
(Cl 8.1.5)

A-815-JSA-003 Revision number : 00

Date:

				<ul style="list-style-type: none"> Electrical installations and gadgets shall be of appropriate ratings and validated by concerned authority with the display of Stickers Electrical connections shall be through 30mA workable ELCB/RCCB All electrical installations shall be provided with appropriate earthing Ensure frequent inspections of electrical equipment / installations are done including earthing / earth pits and maintenance of records Protect damaging of electrical cables and all the accesses and pathways are clear of any obstacles Proper Cable management and dressing shall be ensured Any floor opening near the work area shall be securely and effectively covered People working near the floor opening must wear FBH with the anchorage of Lanyard hooks to the fixed and stable structure along with other mandatory PPEs No materials shall be kept near the edges of floor opening To avoid excess heat generation, plan the work accordingly and priority works shall be one first sequentially Overall housekeeping of the are shall be maintained well Close monitoring of the activity shall be ensured. Hot work and other relevant activity shall be 	
--	--	--	--	--	--



 <small>World's Best Employer, for a Better Job.</small>	Job Safety Analysis Confined Space	ISO 45001:2018 (Cl 8.1.5)
	A-815-JSA-003 Revision number : 00	Date:

				<p>followed as per relevant JSA as mentioned in subsequent activity Ref.</p> <ul style="list-style-type: none"> • People must wash their hands properly before taking foods and maintain good hygienic condition specially while working in drains and muddy areas • Rubber Gumboot shall be provided and ensure the usage of the same while working in muddy areas • People shall never play with wild animals, insects, snakes. If such biting occurs take immediate medical helps • Use sticks to strike nearby drive/move away wild animals • Inform security for presence of any Snake /wild animals • After completion of jobs, check no equipment / tools are lying inside confined space. • Fire extinguisher, Compressed Gas cylinders & any other equipment etc. shall be kept outside the confined space • In dusty are and in noisy areas dust mask and ear plug shall be worn along with other PPES • Close the permit as per Procedures and requirements 	
3	Re-Entry/ Completion		<ul style="list-style-type: none"> • Left unattended for re-entry • Foreign material left inside 	<ul style="list-style-type: none"> • Barricade the confined space and post warning notice. • Ensure there is no tool, equipment, rags or other material is left inside. 	Engineer/ Safety



4	General	Working in Bad Weather Condition	<p>Impact of hot climatic condition leading to</p> <ul style="list-style-type: none"> • Discomfort • Sun Burn • Slipperiness due to Sweating • Sweating – Loss of Body fluid leading to heat Exhaustion, Heat • Cramp and Heat Stroke • Lost temper • Rain and ingress of water in confined space 	<ul style="list-style-type: none"> • Persons with illness and medically unfit should not be engaged at work with special focus on high risk activities like W@H, Confined Space etc. • Impact of hot work environment shall be made understand to all the employees in daily TBT • Providing rest shed in work areas. • Taking breaks in rest sheds on regular intervals during the course of activity • Provide adequate supply of cool drinking water and encourage persons to drink much water. • Job rotation for physically demanding task. • Do most demanding task on cooler part of the day. • Every persons shall drink penalty of water. • Close supervision of the job and interacting with the work force • Provide ORS to the workforce in hot weather conditions • Reporting any 	Supervisor/ Engineer
---	---------	----------------------------------	--	---	-------------------------





Job Safety Analysis Confined Space

ISO 45001:2018
(Cl 8.1.5)

A-815-JSA-003 Revision number : 00

Date:

				<p>illness to the supervisor concerned</p> <ul style="list-style-type: none"> • Medical immediately for any health ailment / illness • Avoid conflicts , engaging right person to right job with planning • Clean the hands before holding any item with proper grip. • Activity shall not be started water accumulation is removed from the area • Judging the area for safe workability and decision shall be taken accordingly by the management for working • Ensure there is no snake, wild animals , insects are present in the confined pace after the removal / drain out of water • Gas monitoring shall be done to check the atmospheric condition 	
			<p>Habits</p> <ul style="list-style-type: none"> • Adopting short cut method, negligence, wrong perception, absent mind, using cell phone. 	<ul style="list-style-type: none"> • Daily TBT shall be conducted with workers. • Explaining the benefit of following safety rules , • All these personal issues like illness, sickness, medication sleeplessness, irritation 	<p>Supervisor/ Engineer/ Safety</p>



Job Safety Analysis Confined Space

ISO 45001:2018
(Cl 8.1.5)

A-815-JSA-003 Revision number : 00

Date:

			<p>Personal Problem:</p> <ul style="list-style-type: none"> • Family problem, less of concentration, forgetfulness. <p>Work Related</p> <ul style="list-style-type: none"> • Night shift, over time 	<p>etc. shall be discussed in TBT. Training & motivation</p> <ul style="list-style-type: none"> • Right person shall be engaged in right job • Same person should not be allowed to continue in night shift also. • More than 12 hours work should not be carried out. • People shall be asked to take rest in designated rest shelter only and no one should take rest under or side the heavy equipment • Horse play during work shall be stopped as that make persons excited / absent minded/distracted which lead to accident • People shall not panic during any emergency and assemble in assembly point only • Sufficient illumination shall be provided while working at Night shift 	
			<p>Impact of hot climatic condition leading to</p> <ul style="list-style-type: none"> • Discomfort • Sun Burn • Slipperiness due to Sweating • Sweating – Loss of Body fluid leading to heat Exhaustion, Heat Cramp and Heat Stroke • Lost temper 	<ul style="list-style-type: none"> • Persons with illness and medically unfit should not be engaged at work with special focus on high risk activities like W@H, Confined Space etc. • Impact of hot work environment shall be made understand to all the employees in daily TBT • Providing rest shed in work areas. 	<p>Supervisor/ Engineer/ safety</p>

 <small>Without compromise, for a better life.</small>	Job Safety Analysis Confined Space	ISO 45001:2018 (Cl 8.1.5)
	A-815-JSA-003 Revision number : 00	Date:

				<ul style="list-style-type: none"> • Taking breaks in rest sheds on regular intervals during the course of activity • Provide adequate supply of cool drinking water and encourage persons to drink much water. • Job rotation for physically demanding task. • Do most demanding task on cooler part of the day. • Every persons shall drink penalty of water. • Close supervision of the job and interacting with the work force • Provide ORS to the workforce in hot weather conditions • Reporting any illness to the supervisor concerned • Medical immediately for any health ailment / illness • Avoid conflicts , engaging right person to right job with planning • Clean & mop hands before holding any item with proper grip. 	
--	--	--	--	--	--

All crew members must print/sign their name below to acknowledge their understanding of the JSA.

Sl. No.	Name	Designation	Signature	Remarks



 <small>Water & Air Pollution Control Solutions for a better life.</small>	Job Safety Analysis Confined Space	ISO 45001:2018 (Cl 8.1.5)
	A-815-JSA-003 Revision number : 00	Date:


JSA Conducted by:

Date:

Signature of Team Leader:

Date:



 <small>sustainable solutions for a better life</small>	Job Safety Analysis Demolition of Digester	ISO 45001:2018 (Cl 8.1.5)
	A-815-JSA-004 Revision number : 00	Date:

NAME OF JOB SITE:		ISSUED DATE:	
NAME OF ACTIVITY:	DEMOLITION OF DIGESTER	REVISION NO. AND DATE:	
DATE:		JSA NO:	

MINIMUM REQUIRED PERSONAL PROTECTIVE EQUIPMENT (SEE CRITICAL ACTIONS FOR TASK-SPECIFIC REQUIREMENTS)

Safety Helmet	Full body apron	SCBA (if required)	Hand Gloves (Cut resistance)	Dust Mask
Safety Shoe	High visibility reflective Vest	Ear Plug/Muff	Safety Goggles	Others

Note to Team leader: Work must not start until all hazards are discussed; controls are in place; and all signatures are obtained.

Sl. No.	ACTIVITY	SUB-ACTIVITY	RISK INVOLVED IN THE ACTIVITY	CONTROL MEASURES FOR SPECIFIED ACTIVITY	ACTION BY
---------	----------	--------------	-------------------------------	---	-----------

General information:

- All employees (Staff and workmen) must wear hard hats on site.
- A supply of dust masks shall be kept on hand to fill workmen requests.
- All employees shall wear safety glasses.
- Workmen handling debris from the demolition will wear appropriate hand gloves.
- All employees on site must wear approved, hi-visibility safety vests, to make them visible to the equipment operators.
- Display pictorial safety images, posters at prominent places surrounding the area of work.
- Deploy trained and experienced foreman for safely completion of work under his guidance /supervision.
- Permission in written must be taken from legal authority (respecting legal law & regulations as per central / state / client /PMC)

1	Preparatory operations	<ul style="list-style-type: none"> • Legal requireme nt / permission /authorizat ion • Soil grading / bush cleaning / tree cutting if required • Survey • Mobilizati on • Communic ation 	<ul style="list-style-type: none"> • Rodents, Snake, insects bite etc. • Falling hazard • Sharp edges • Collapse of Structure • Collapse of a Portion of the Structure • Water, Sewer, Cable Damage • Short circuit/ electrocution • Fire Hazards 	<ul style="list-style-type: none"> • Route marking must be done carefull, planning for bush cleaning /cutting should be done by mechanically, man can enter with full sleeve shirt & pant (boiler suit) and full gum boots, permission for tree cutting shall be taken from environment dept., client if cutting is necessary , soil grading to be done by mechanically. • The Competent Person shall survey the integrity of the structure prior to the start of demolition operations. • Follow all local laws and regulations. Leave special work to the specialist. • All required permits shall be obtained. • Realize the hazards related to what you do. Don't ever take hazards lightly. • Locate, shut off, cap, or otherwise control all utilities. • All glass shall be broken out and removed to the proper disposal container. • Fire extinguishers shall be available on site and Emergency Services numbers shall be posted /displayed. • Work zone must be completely fenced temporary in and of a sufficient distance away from sidewalks to 	Site in-Charge/ engineer
---	------------------------	---	---	--	--------------------------



				<ul style="list-style-type: none"> remove any hazard to the public. A certified exterminator will treat the entire building in accordance with governing health regulations. Site specific work plan, accident prevention plan, escape route map shall be available and display at prominent places. All utility lines (including electrical, gas, water and sewer) at property line and remove universal was stream (i.e. light bulbs and ballast). Utility lines will be capped at the property line. Any overhead power lines will be de-energized or protected. Arrange / use only 24 volt lamp inside the digester. Communicate! Tell other people what you are about to do, so that they do not place you or themselves at risk. Any work must never be done alone. Always keep people informed of what you are doing when and where. Keep strong communication. Advice site manager, when you leave site. A man power register shall be maintained daily with witness by gang leader /foreman A specific HIRA shall be prepared and circulated to all. Use Self contained breathing apparatus for entering into the digester (if required). 	
2	Cleaning of Digester (if necessary)	<ul style="list-style-type: none"> Entry process Gas monitoring Isolation procedures Cleaning 	<ul style="list-style-type: none"> Atmospheric Biological Physical Mechanical Chemical 	<ul style="list-style-type: none"> Ensure safe access / egress to Digester Gas test must be monitoring by multi-gas tester If oxygen concentration is less than 19.5% and hydrogen sulphide (H₂S) concentration is more than 10 ppm, Methane (CH₄) concentration is 1000 ppm TLV for 8 hours but Methane gas is highly flammable in 5 % is LFL/LEL and 15 % is UFL/UEL in atmosphere, use forced ventilation to ventilate the tank before entering it. Post warning signs and labels Follow confined space entry testing and permitting procedures. If feasible, use sample ports to test for atmospheric contaminants inside the tank. Isolate, close, secure, divert, de-energize, lockout and apply tags-plus applications to all valves, piping and associated equipment. Smoking and open flames should not be allowed in the vicinity of digesters, in digestion control buildings, or in any other areas or structures used in the sludge digestion system. Never use your fingers or hands to remove a manhole lid. Always use a tool specifically designed for this purpose. Cautiously and deliberately remove bolts and nuts off manholes and piping, while staying alert to any immediate change of conditions, and be prepared to take necessary action. Use appropriate tools and standard operating procedures. Install and use adequate exhaust ventilation devices, ducting, lighting, and tank-cleaning equipment. Immediately following the piping being broken or the 	Site In-charge / Safety Engineer





Job Safety Analysis Demolition of Digester

ISO 45001:2018
(Cl 8.1.5)

A-815-JSA-004 Revision number : 00

Date:

				<p>tank opened, apply or insert ducting to begin exhaust ventilation. Pipe all exhausts downwind, overboard, or away from workmen.</p> <ul style="list-style-type: none"> Cover and isolate all work areas with disposable plastic sheeting to prevent possible contamination (if necessary), Flush tanks and piping systems; pump and drain all residual products. Dispose of or re-wash rubber boots, gloves, eye goggles, face shields and respirators with a disinfectant solution, wash contaminated clothing separately. Do not enter other spaces while still wearing contaminated clothing. Keep ready breathing apparatus, ladder, rope, full body harness with double lanyards and other equipment for use in evacuating or rescuing workers in the event of an emergency. Explosion-proof lights and non-spark tools should be used in confined spaces. Stationing of Safety Guards. Ensure that nobody falls from ladders (including metal rungs) and that tools are not dropped from ground level. Regulate the use, storage and disposal of all combustible materials / substances. When you work on ladders or scaffolding, use extreme caution to prevent falls. Full body harness with shock absorber should be used to prevent falls. The equipment normally used is portable electric hand lamps of permissible types, electric cap lamps and explosion proof flash lights. Replace the air in oxygen deficient and hazardous spaces with fresh air using exhaust fan and exhaust ducts on continuous basis. Ventilation also includes the method of exhausting the air, but generally the method of blowing in air is more effective. Tools and equipment should be lowered into a manhole by means of a bucket or a basket. Special anti-skid shoes with metal cladding over the "fingers" portion should be provided to the workers. Wear a properly fitted pair of rubber gloves and boots, or an approved substitute that will provide protection from infection. 	
3	Demolition of structure	<ul style="list-style-type: none"> Hydraulic hammer operation Removal of debris Dust control 	<ul style="list-style-type: none"> Structure Collapse Equipment collapse Falling Debris Pollution Housekeeping Fire Slips/Trips/Falls Falling/Flying 	<ul style="list-style-type: none"> PTW for demolition shall be issued prior to effective inspection Proceed with demolition in a systematic manner, working from the top of the structure downwards. Any worker signaling the operator shall be in plain sight of the operator at all times. Agree with your colleagues on site on the use of hand signals. Do not assume any knowledge of signals. Common sense is the most important part of safety in standard hammer applications. All workers shall remain at least 6 m away from the equipment used to perform the demolition. Only 	Site In-charge / Safety Engineer





Job Safety Analysis Demolition of Digester

ISO 45001:2018
(Cl 8.1.5)

A-815-JSA-004 Revision number : 00

Date:

			<ul style="list-style-type: none"> • Debris • Dust • Inhalation • Eye Injuries • Cuts / Scrapes / Abrasions • Struck By • Caught Between 	<p>workers necessary to the operation shall be permitted in the work zone during this operation.</p> <ul style="list-style-type: none"> • Barrier / caution tape will be used to demarcate the demolition zone. • Only operate equipment when in fit condition. Beware of sharp edges of parts. • Improper installation, operation or maintenance as well as faulty handling practice could cause major accident or severe injury. • Read and follow the instructions in the operator's manual. • Improper installation, operation or maintenance could cause death or severe injury • Ensure competent operator should operator the equipment (Excavator Rock Hammer) • Do not use the Hammer is outside the technical limits as described in the technical specification. This applies especially to carrier weight, hydraulic oil pressure and oil flow. • Hammer or lifting eye on hammer must not be used to lift external loads. • Hammer must not be used in intoxicated condition (alcohol, drugs), when tired or when otherwise in unfit condition (fever or illness). • Operating equipment outside limits of use: Do not use equipment on carrier with insufficient lifting capacity! Do not operate equipment under water! Do not operate equipment outside other limits of use. • Stop immediately, when you observe failure on structures or hydraulic leak! • Keep yourself and by standers out of hazard zone for host machine. • Do not use the hammer or the hammer's tool for lifting of objects. In most cases the safe lifting capacity of the excavator is extensively utilized with the weight of hammer, bracket and tool. • Do not lifts load over people. No one shall be under the hoisted load. • Do not lift people and never ride the hoisted load. • Avoid side pull of the load. Make sure you take up the slack slowly. Start and stop carefully. • Lifting tools & tackles with basket shall be used for material lifting / shifting purpose with TPI of the lifting tools & tackles. • Lift load a few centimeters and verify it before proceeding. Make sure the load is well balanced. Check for any loose items. • Never leave the suspended load unattended. Maintain load control at all times. • Never lift the load over the rated capacity. • Inspect all lifting equipment before use. Do not use twisted or damaged lifting equipment. • Protect lifting equipment from sharp corners. Obey all local safety instructions. 	
--	--	--	---	---	--



Job Safety Analysis Demolition of Digester

ISO 45001:2018
(Cl 8.1.5)

A-815-JSA-004 Revision number : 00

Date:

				<ul style="list-style-type: none"> Water will be sprayed to keep down the dust from the demolition. Water will not be allowed to accumulate and cause a hazardous condition. Drainage for temporary water use will be provided. Structural framing members shall not be removed until all stories above them have been demolished and removed. Framing members will be removed separately. See attached for route and location of nearest Hospital. Have fire extinguishers on hand during work. Make sure all workers are aware of the location of fire extinguishers. In case of fire, use proper fire extinguisher and/or water hose on all SMALL, centrally located fires. Hot Work Permit will be requested as necessary Water jet/sprinkling system applied to controlling of huge dust and protect to environmental impacts. All work must be done under effective supervision and safety monitoring. Ensure availability of first aid facilities with emergency vehicle in working period. 	
Disposal		<ul style="list-style-type: none"> Material handling Removal of debris /transportation Exposure of the Public to Falling Debris Removal of temporary fencing 	<ul style="list-style-type: none"> Ergonomics Falling of materials Sharp edges /pinch points Overloading / Vehicular hazards Dust 	<ul style="list-style-type: none"> Ensure safe road / access for shifting of materials as well as an emergency Debris removal will not begin until the removal can be safely performed without exposure to structural collapse or falling debris. Mechanical system applied to removal of debris after demolition if possible Concrete debris and metal scraps will be removed to a separate container as well as store separately with safe manner. Workers shall be instructed to possess heightened awareness of their surroundings both during the demolition and removal of debris. Water jet/sprinkling system applied to controlling of huge dust and protect to environmental impacts. Man restricted while removal process as well as under the suspended load while mechanical arrangements. Ensure vehicle safety and speed limit not more than 10 km/h Avoid excessive load during shifting of debris / metal scraps as well as projected parts from the vehicle which can lead injury /vehicle accident. Use Tarpaulin or other sheets for covering of debris during shifting / transporting by the usage of dumper /truck etc. Ensure traffic control system by banks man, additional personnel deployed in every corner of road for safe transportation, use dark eye, display board and proper illumination in night time. 	Site In-charge / Safety Engineer

 <small>Water & Sewerage Control for a Better Life</small>	Job Safety Analysis Demolition of Digester	ISO 45001:2018 (CI 8.1.5)
	A-815-JSA-004 Revision number : 00	Date:

All crew members must print/sign their name below to acknowledge their understanding of the JSA.

Sl. No.	Name	Designation	Signature	Remarks

Note: Multi Gas detector must be ensured before any survey and calibration certificate for the detector should be present.

JSA Conducted by:

Date:

Signature of Team Leader:

Date:



 <small>W A B A G</small> <small>MAKING IT EASIER For a better life.</small>	Job Safety Analysis Lifting by Crane	ISO 45001:2018 (Cl 8.1.5)
	A-815-JSA-005 Revision number : 00	Date:

NAME OF JOB SITE:		ISSUED DATE:			
NAME OF ACTIVITY:		REVISION NO. AND DATE:			
DATE:		JSA NO:			
MINIMUM REQUIRED PERSONAL PROTECTIVE EQUIPMENT (SEE CRITICAL ACTIONS FOR TASK-SPECIFIC REQUIREMENTS)					
Safety Helmet	Full body apron	SCBA (if required)	Hand Gloves (Cut resistance)	Dust Mask	
Safety Shoe	High visibility reflective Vest	Ear Plug/Muff	Safety Goggles	Others	
Note to Team leader: Work must not start until all hazards are discussed; controls are in place; and all signatures are obtained.					
Sl. No.	ACTIVITY	SUB-ACTIVITY	RISK INVOLVED IN THE ACTIVITY	CONTROL MEASURES FOR SPECIFIED ACTIVITY	ACTION BY
General information: <ul style="list-style-type: none"> All employees (Staff and workmen) must wear hard hats on site. A supply of dust masks shall be kept on hand to fill workmen requests. All employees shall wear safety glasses. Workmen handling the pump will wear appropriate hand gloves. All employees on site must wear approved, hi-visibility safety vests, to make them visible to the equipment operators. Display pictorial safety images, posters at prominent places surrounding the area of work. Deploy trained and experienced foreman for safely completion of work under his guidance /supervision. 					
1	Obtain PTW		<ul style="list-style-type: none"> Injury/damage as a result of incorrect information. Unauthorized personnel. 	<ul style="list-style-type: none"> Obtain the correct PTW. Only authorized personnel allowed. All personnel to be properly trained and inducted. 	Supervisor/ Engineer
2	TBT		<ul style="list-style-type: none"> Unauthorized access/egress, working platform, unsafe conditions 	<ul style="list-style-type: none"> All personnel to be inducted. Ensure all approved controls and prevention measures are discussed and JSA is discussed with all persons involved. All persons to attend daily TBT prior to the commencement of work. All workers should 	Supervisor/ Engineer





Job Safety Analysis Lifting by Crane

ISO 45001:2018
(CI 8.1.5)

A-815-JSA-005 Revision number : 00

Date:

				wear proper PPE.	
3	Identify work area		<ul style="list-style-type: none"> Risk of injury due to low awareness of work activities and area condition. Unsafe access. 	<ul style="list-style-type: none"> Work area pre inspection. Provide proper access. 	Supervisor/ Engineer
4	Overhead powerlines		<ul style="list-style-type: none"> Risk of electrical injury due to electrical shock. Electrocution Burns due to electrical shock. Falls due to electrical shock. 	<ul style="list-style-type: none"> Required to maintain proper work distances. Provide proper access. Area should not be wet because electric hazards can be made worse if the worker, equipment or location is wet. 	Site Incharge
5	Lifting area preparation		<ul style="list-style-type: none"> Improper access Personal injury Uneven ground movement Bad housekeeping. Scattered materials. Slip,Trip Excavation and trenches 	<ul style="list-style-type: none"> Area should be clear from any debris. Material must be segregated. Housekeeping must be done prior to start the job and after its completion. Adequate access. Ensure area is properly prepared for job. Ground must be leveled properly. Provide proper barricades. Provide signage. Provide spill tray for flammable oils. Provide adequate fire extinguisher. Follow the monthly color code. Maintain safe distance from excavation and 	Supervisor/ Engineer



Job Safety Analysis Lifting by Crane

ISO 45001:2018
(CI 8.1.5)

A-815-JSA-005 Revision number : 00

Date:

				trenches.	
6	Material preparation		<ul style="list-style-type: none"> • Personal injury • Improper access • Sharp edges • Hand injury • Pinch point • Hit by objects • Rolling over of stack pipes • Slip, trip hazard • Property damage • Falling objects • Scattered pipe materials • Fire • Mechanical failure • Lifting tackle failure • Caught in between • Vision blocked 	<ul style="list-style-type: none"> • Pre inspection of crane equipment prior to the start of job. • Ensure crane is third party certified. • Follow safe operating procedures • Proper supervision from immediate supervisor. • Prepare proper signage and barricade prior to lifting job. • Use PPE,s as per requirement. • Ensure that the overhead objects has been properly placed and tied off. • Material should be properly stacked. • Pipes must be in proper place and in piperacks. • Good housekeeping. • Ensure proper fire extinguisher is available in the area. • Ensure the slings and lifting gear is third party certified and valid. • Ensure out rigging pad is available and no defects. • Follow monthly colour code. • Operator vision must be clear. 	Supervisor/ Engineer





Job Safety Analysis Lifting by Crane

ISO 45001:2018
(Cl 8.1.5)

A-815-JSA-005 Revision number : 00

Date:

				<ul style="list-style-type: none"> • Proper communication must be there between operator and rigger. 	
7	Lifting work (by means of crane)		<ul style="list-style-type: none"> • Uneven ground pavement • Falling objects, pipes. • Struck by/hit by • Crane overload • Inadequate access • Crane overturning • Property damage • Mechanical failure • Uncontrolled movement of lifted objects • Improper communication between operator and rigger • Oil spill • Slip, trip • Pinch point • Personal injury • Failure of lifting equipment. • Collision of lifting objects • Vision blocked • Live cable • Vision blocked 	<ul style="list-style-type: none"> • Only competent rigger allowed to perform job. • Only qualified crane operator can perform job. • Ensure the ground pavement is leveled. • Provide proper barricade and signage. • Ensure clear visibility between rigger and operator. • Provide oil spill tray • Ensure proper sling position • Inspect lifting gear prior to use • Don't put hands in between two objects. • Use two tag lines. • No people should stand beneath lifted objects. • Maintain safe distance from lifted objects. • Be sure no overhead objects within boom range. • Crane load chart must be strictly followed. • Use wooden wedge block. • Ensure no hydraulic 	Supervisor/ Engineer



				leakage of crane.	
8	Chain block and rigging gear		<ul style="list-style-type: none"> Irregular inspection on all lifting tackles Wear and tear of ropes. Mechanical failure Chain block failure. 	<ul style="list-style-type: none"> Wire rope shall be provided properly for SWL and manufacturer. Inspections shall be done by authorized personnel and by the safety department shall keep records. SWL stamp shall be provided by manufacturer. Only trained persons may use electric or pneumatic tools. Don't use defective tools. Ensure proper rigid mounting. Lift slowly Don't overload chain block. Remove damage , banding crate materials, nails and dispose properly. 	Supervisor/ Engineer
9	Housekeeping		<ul style="list-style-type: none"> Waste disposal Fire Slip,trip Crushed by EOT crane 	<ul style="list-style-type: none"> Provide trash for work areas for maintaining. All containers should be labeled Clean spill immediately. And report. Maintain safe distance from live box bar. Stay away from crane. 	Supervisor/ Engineer

 <small>www.wabag.com</small> for a better life	Job Safety Analysis Lifting by Crane	ISO 45001:2018 (Cl 8.1.5)
	A-815-JSA-005 Revision number : 00	Date:

All crew members must print/sign their name below to acknowledge their understanding of the JSA.

Sl. No.	Name	Designation	Signature	Remarks

JSA Conducted by:

Date:

Signature of Team Leader:

Date:





Job Safety Analysis Cable Laying

ISO 45001:2018
(Cl 8.1.5)

A-815-JSA-006 Revision number : 00

Date:

NAME OF JOB SITE:		ISSUED DATE:			
NAME OF ACTIVITY:		REVISION NO. AND DATE:			
DATE:		JSA NO:			
MINIMUM REQUIRED PERSONAL PROTECTIVE EQUIPMENT (SEE CRITICAL ACTIONS FOR TASK-SPECIFIC REQUIREMENTS)					
Safety Helmet	Full body apron	SCBA (if required)	Hand Gloves (Cut resistance)		
Safety Shoe	High visibility reflective vest	Ear Plug/Muff	Safety Goggles		
			Dust Mask		
			Others		
Note to Team leader: Work must not start until all hazards are discussed; controls are in place; and all signatures are obtained.					
Sl. No.	ACTIVITY	SUB-ACTIVITY	RISK INVOLVED IN THE ACTIVITY	CONTROL MEASURES FOR SPECIFIED ACTIVITY	ACTION BY
General information:					
<ul style="list-style-type: none"> All employees (Staff and workmen) must wear hard hats on site. A supply of dust masks shall be kept on hand to fill workmen requests. All employees shall wear safety glasses. Workmen handling the pump will wear appropriate hand gloves. All employees on site must wear approved, hi-visibility safety vests, to make them visible to the equipment operators. Display pictorial safety images, posters at prominent places surrounding the area of work. Deploy trained and experienced foreman for safety completion of work under his guidance /supervision. 					
1	Pre-job preparations	Awareness among the work force Issuance of Permit to Work (Where required)	Incompetence, Lack of knowledge, Improper communication among the crew & supervisor PTW not properly issued/risk not individuated	<ul style="list-style-type: none"> Safety Induction to be completed prior to commencing work. JSA to be discussed during the Daily TBT meeting. Follow work method statement and JSA. Assembly Points to be identified and discussed during the TBT Meeting. Plot plan showing assembly points to be attached to the JSA. Trained & authorized equipment operators, to be in possession of a valid (3rd party training certificate and a valid driving license). Trained & authorized banks man. Only trained & authorized personnel will be applying PTW. Permit issuer & Permit 	Site engineer, site safety



	Job Safety Analysis Cable Laying	ISO 45001:2018 (CI 8.1.5)
	A-815-JSA-006 Revision number : 00	Date:

			PTW issued not at job location PTW copies not properly distributed/traced	receiver to conduct a joint inspection of the area prior issuing the permit. <ul style="list-style-type: none"> PTW must be filled out correctly prior to submission. Permit to work form must be signed off by permit issuer & permit receiver. Notification to other contractors working nearby. Approved PTW must be displayed at work place in to permit box. PTW coordinator to trace properly all permits. 	
2	Unloading of cables and placement of truck.	Unloading the cable drum from trailer by Crane or Boom truck. Placement of Crane/Boom truck	Injury and/or fatality due fall of cable drum, mechanical failure or crane Failure of lifting tools & tackles. Crane/Boom truck Topple	<ul style="list-style-type: none"> Ensure crane, lifting tools/tackles inspected & color coded by authorized & trained persons. Ensure authorized operator and rigger for the work. Daily inspection of crane by operator & documented, reviewed by equipment supervisor. Ensure validity of third party certificates for crane & lifting tools, tackles. No one is allowed under the suspended load. Never overloaded the lifting tools, tackles and equipment beyond its SWL. Double tag line should be ensured. Ensure outrigger pads are placed at firm soil, level and having good strength to take load. Crane/Boom truck 	Site engineer, Store incharge, site safety





Job Safety Analysis Cable Laying

ISO 45001:2018
(Cl 8.1.5)

A-815-JSA-006 Revision number : 00

Date:

			<p>Un-authorized entry into lifting area.</p> <p>Rollover of drum</p> <p>Cut injury/ Pinch</p> <p>Damage of cable due to improper handling</p>	<p>outriggers must be fully extended.</p> <ul style="list-style-type: none"> • Cable drum unloading should be in controlled speed. • No obstructions for crane swing radius. • Follow wind speed as per client procedure. • Ensure barricade for swing radius of crane using two layers of red "DO NOT ENTER" barricading tape. • Ensure Banks man all the time with equipments. • No unauthorized entry in the unloading area shall be ensured. <ul style="list-style-type: none"> • Ensure sufficient wooden wedge for cable drum. • Removal of wooden cover with protruding nails. • Ensure only single drum should lifted/lowered at a time. 	
3	Handling of drums	Transportation of cable drums	Injury , fatality and/or property damage due fall of cable drums	<ul style="list-style-type: none"> • Ensure vehicle speed limit below 20 km/hr at internal site roads & 40 Km./hr at external site roads. • Persons should not stand behind the trolley. • Obey Traffic rules & regulations, instructions & signage at site. • Maintain vehicle condition is good condition. • Do not overload the truck/trailer vehicle. • Don't use mobile while driving. 	Site engineer ,Site safety, Store incharge



 <small>technical solutions for a better life.</small>	Job Safety Analysis Cable Laying	ISO 45001:2018 (CI 8.1.5)
	A-815-JSA-006 Revision number : 00	Date:

				<ul style="list-style-type: none"> • Only authorized Flagman shall give signal to the operator • Ensure sufficient wooden wedge for cable drum. • Ensure all cable drums has been tied with belt 	
--	--	--	--	---	--



		Placing of Jack & Spindle and loading the cable drum on jack and spindle	Fall of cable drum Trapping injuries Overloading Improper securing & imbalanced load, may fall down Poor hand signal to the operator Suspended load	<ul style="list-style-type: none"> • Area shall be compacted if required use wooden pad. • Avoid loose and uneven floor below jacks. • Ensure Test certificate for Jack & spindle. • While placing the drum on the jacks proper care should be taken to avoid unbalance. • Cable drum should be placed on jacks according to the arrow direction of unwinding. • Jacks capacity shall be checked with respect to cable drum. • Damaged cable drums should not be used. • Check the SWL of the crane with maximum boom length & radius to work. • Check the SWL of the slings & shackles • Use correct slinging procedures. • Ensure Authorized riggers. • Depute only experienced & authorized signal man having high visibility jacket and whistle. • Minimum two tag line for the load during lifting. • Signal man is not to be allowed to hold the tag line. • No one is allowed under the suspended 	
--	--	---	--	---	--



 <p>WABAG Sustainable solutions. For a better life.</p>	<p>Job Safety Analysis Cable Laying</p>	<p>ISO 45001:2018 (Cl 8.1.5)</p>
<p>A-815-JSA-006 Revision number : 00</p>		<p>Date:</p>

				<p>load.</p>	
--	--	--	--	--------------	--





Job Safety Analysis Cable Laying

ISO 45001:2018
(Cl 8.1.5)

A-815-JSA-006 Revision number : 00

Date:

		<p>Rotating the cable drum manually in the jack for unwinding the cable.</p>	<p>Injury to the person</p> <p>Cable drum fall along with jack & spindle.</p>	<ul style="list-style-type: none">• Only trained & skilled work force shall be assigned.• Ensure Personnel's wearing suitable hand gloves /foot wear/safety goggle/safety helmet and visible jacket.• Follow proper posture for handling of cables.• Avoid cable twisting at all the times.• Supervisor should be asses the weight of centre gravity and determine the number of persons required to carry out the work safely.• Good housekeeping shall be maintained.• No unauthorized entry into the work areas.• Only trained & skilled work force shall be assigned.• All working force should be kept in safe distance.• Use appropriate persons to rotate the drum smoothly.	
--	--	--	--	--	--



 <small>Water & Power Engineering. Not a better life.</small>	Job Safety Analysis Cable Laying	ISO 45001:2018 (CI 8.1.5)
	A-815-JSA-006 Revision number : 00	Date:

4	Cable laying at higher elevation	Scaffolding erection	Use of substandard materials Slips, Trips and Falls Person/material falling from height Scaffolding not inspected Entry of unauthorized personnel during erection/dismantling	<ul style="list-style-type: none"> • Ensure standard scaffold materials as per site scaffolding procedure & inspected by competent person before use. • Scaffolds shall only be erected, dismantled and modified by trained & authorized scaffolders. • Ensure proper scaffold tag at the access point. • Ensure all scaffold material are stacked & stored properly. • Ensure safe lifting & storage of scaffolding components. • Excess materials should not be loaded on the platform. • Loose materials should not be kept on the scaffolding platform. • Ensure no other activity is carried out below/around the affected area. • Always secure at least one point of Dual Lanyard at rigid Support above 2 M height. • Use full body harness with shock absorbers with double lanyard & ensure 100 % tie-off. • Ensure Body harnesses inspected by the individual prior to wearing the harness & also current color coding. • Maintain clear access all the times • Scaffolding shall be inspected daily by a 	Site engineer , Scaffolding Inspector and site safety
---	----------------------------------	----------------------	---	---	--





Job Safety Analysis Cable Laying


ISO 45001:2018
(Cl 8.1.5)

A-815-JSA-006 Revision number : 00

Date:

				<p>competent person and corrective measures shall be taken.</p> <ul style="list-style-type: none"> • Provide proper scaffolding tag after inspection. • Barricade the area & ensure sign boards. • Provide watch person to control the unauthorized entry. 	
		Cable pulling & dressing at higher elevation	Injury and/or fatality due to fall & slip of persons from height	<ul style="list-style-type: none"> • Ensure continuous supervision during work. • Provide WAH training for the crew working above 2 M height. • Ensure use of green tagged scaffold only. • Full body harness with twin lanyard to be worn & secured above 2 M height. • Anchor/Secured/fixd the lanyard on guardrail or firm structure to avoid free fall. • Never anchor the safety harness with unsecured ledgers/ standard/ladder. • All the tools & cable rollers shall be secured by rope to avoid any unexpected fall. • No loose materials shall be kept upon the cable tray. • Avoid working at high temperature, night, heavy wind & rain. • Ensure a person 	



	Job Safety Analysis Cable Laying	ISO 45001:2018 (CI 8.1.5)
	A-815-JSA-006 Revision number : 00	Date:

			<p>ascending or descending from ladder should always face the ladder.</p> <ul style="list-style-type: none"> • Ensure during climbing or descending a ladder, the rungs should be held firmly hand over hand. • If no anchorage point provide proper life line. • Fall arrester system shall be inspected by competent person. • Fix cable rollers along the route in case of long distance cables. • Daily inspect rollers has been tied in the trays to avoid fall from the height. • Avoid cable twisting at all the times. • Ensure sufficient persons are deployed for cable pulling work. 		
5	Mechanical cable laying	Cable laying by winch machine Rotating the cable drum manually in	Mechanical failure Injury to the persons & damage to the winch machine	<ul style="list-style-type: none"> • Ensure cable winch certified by 3rd party & validity of certificate is available. • Ensure cable pulling winch machine inspected & current color coded by authorized persons. • All tools& equipments should be checked before job start for any damage. • Daily inspection of all equipments by operator & documented, reviewed by equipment supervisor. • Proper counter weight to be arranged to winch machine. • Ensure proper barricading near winch machine. • Signalman with flag to be 	Site Engineer, Site safety, P&M Incharge



		the jack for unwinding the cable	Cable drum fall along with jack & spindle	<p>arrange during cable pulling</p> <ul style="list-style-type: none"> No unauthorized entry into the work areas. Only trained & skilled work force shall be assigned. All working force should be kept in safe distance. 	
6	Cable Glanding & Termination (Continuity & Meggering)	Cable Glanding & Termination (Continuity & Meggering)	<p>Cut injury to finger/hand due to improper cutting and/or defective tools.</p> <p>Electrocution</p>	<ul style="list-style-type: none"> Use cutter away from body during cable insulation removal. Use proper hand tools like cutter, knife and spanner etc. Remove cable scraps daily from the work site. Maintain always good housekeeping. Ensure that the panel, JB & instrument etc. are not energized. Follow always supervisor instruction. IF the panel, JB & instrument etc. are energized, obtain the work permit before starting any job. Ensure power is isolated by authorized person (Isolation Authorization) from panel, JB & instrument and having valid work permit. Observe all signboards and instructions mentioned in the permit. 	Site Engineer





Job Safety Analysis Cable Laying

ISO 45001:2018
(Cl 8.1.5)

A-815-JSA-006 Revision number : 00

Date:

				<ul style="list-style-type: none"> • After completion of job permit shall be returned PIA. • Use safety shoes, Safety helmet, safety goggle, rubber type hand gloves and insulated tools. • Ensure the authorized & experience persons deployed. • Ensure certified & 3rd party tested megger used. 	
		MV Cable Jointing and end Termination & repairing of cables	Injury to the persons & damage to the cable Fire	<ul style="list-style-type: none"> • Ensure Cable Jointing area shall be identified as per project specification and requirement. • Ensure that atmosphere condition is acceptable for cable jointing / termination. • All terminal connection shall be tightened at the bolts/terminals as per the recommended proper torque wrench tool. • While performing heat shrinking activity, always keep LPG/ Propane/Butane gas cylinder away from all sources of ignition, including heat, sparks and open flames. • Use industrial gas cylinder as per client approved procedure. • Never check for leaks 	Site Engineer





Job Safety Analysis Cable Laying

ISO 45001:2018
(Cl 8.1.5)

A-815-JSA-006 Revision number : 00

Date:

				<p>with a lit match or flame.</p> <ul style="list-style-type: none"> Always keep Fire watch & ABC type Fire Extinguishers Near by work place. 	
7	Testing	HI- POT Testing	Injury to the persons due to fire & explosion & damage to the cable	<ul style="list-style-type: none"> Surroundings work area shall be cordoned off / barricaded and applicable safety warning signboards shall be provided. Ensure other agencies are informed & removed from the cable testing areas. 	Site Engineer, Testing Engineer, Commissioning Incharge
8	General	Access & egress	Slipping & tripping	<ul style="list-style-type: none"> Access & egress must be free from obstruction. Ensure good housekeeping in the work area at all the times. Provide ramp as an access and egress with signage to the cable trench. Ensure hard barricade with blinking flasher around the cable trench. Remove all empty cable drums on daily basis from site. 	Site engineer, Site Safety



	Job Safety Analysis Cable Laying	ISO 45001:2018 (Cl 8.1.5)
	A-815-JSA-006 Revision number : 00	Date:

	Exposure to heat Exposure to dust	Heat stress, fatigue Dust inhalation Welfare Facilities	<ul style="list-style-type: none"> • Make sure availability of plenty of Drinking water at site. • Wear overall to avoid exposure from heat. • Wear all specified PPE's and comfort dust mask. • Rest Shelter to be provided as required. • All toilet facilities shall be provide with material to wash and dry hand after washing. • Toilet shall be kept in a clean condition, regular checks to be carried out by management to ensure that the facilities are up to standard. • Removal of waste materials shall be carried out on a regular basis. 	Site Safety, Site Engineer
	Emergency	Improper Rescue	<ul style="list-style-type: none"> • Refer the Rescue Plan enclosed & the Key Personnel responsible for the Electrical Management and Emergency contact nos. displayed at site etc. 	RCM , Site Safety, Site Engineer

All crew members must print/sign their name below to acknowledge their understanding of the JSA.

Sl. No.	Name	Designation	Signature	Remarks



 <small>Waste water solutions for a better life.</small>	Job Safety Analysis Cable Laying	ISO 45001:2018 (CI 8.1.5)
	A-815-JSA-006 Revision number : 00	Date:

--	--	--	--	--

JSA Conducted by:

Date:

Signature of Team Leader:

Date:



 <small>With pride. Guaranteed. For a better life.</small>	Job Safety Analysis Piling	ISO 45001:2018 (CI 8.1.5)
	A-815-JSA-007 Revision number : 00	Date:

NAME OF JOB SITE:					ISSUED DATE:	
NAME OF ACTIVITY:		PILING WORK (DMC PILING)			REVISION NO. AND DATE:	
DATE:					JSA NO:	
MINIMUM REQUIRED PERSONAL PROTECTIVE EQUIPMENT (SEE CRITICAL ACTIONS FOR TASK-SPECIFIC REQUIREMENTS)						
Safety Helmet	Full body apron	SCBA (if required)	Hand Gloves (Cut resistance)	Dust Mask		
Safety Shoe	High visibility reflective Vest	Ear Plug/Muff	Safety Goggles	Others		
Note to Team leader: Work must not start until all hazards are discussed; controls are in place; and all signatures are obtained.						
Sl. No.	ACTIVITY	SUB-ACTIVITY	RISK INVOLVED IN THE ACTIVITY	CONTROL MEASURES FOR SPECIFIED ACTIVITY	ACTION BY	
General Information: <ul style="list-style-type: none"> All employees (Staff and workmen) must wear hard hats on site. A supply of dust masks shall be kept on hand to fill workmen requests. All employees shall wear safety glasses. Workmen handling the pump will wear appropriate hand gloves. All employees on site must wear approved, hi-visibility safety vests, to make them visible to the equipment operators. Display pictorial safety images, posters at prominent places surrounding the area of work. Deploy trained and experienced foreman for safely completion of work under his guidance /supervision. 						
1	General Planning	-----	Major injury or damage due to poor access or traffic problem.	<ul style="list-style-type: none"> Traffic control by signalman. Access way and unloading zone identified TPI certificates for the rigs is required. 	RCM, Safety officer, Site engineer	
2	Setting of rig	Mobilization, unloading and Assembly of rig	<ul style="list-style-type: none"> Slips, trips, falls, abrasions, strains and sprains; manual injuries such as back damage. 	<ul style="list-style-type: none"> Work area to be kept clear at all times-no storing of materials and/or debris. 	Site Engineer	
			<ul style="list-style-type: none"> Fatality/permanent disability due to load unbalance 	<ul style="list-style-type: none"> Piling rig should sit on steel plates. Use hydra for lifting activities Usage of tagline to guide load 	Site Engineer	
			<ul style="list-style-type: none"> Rig overturn causing 	<ul style="list-style-type: none"> Sufficient ground preparation. 		



 WABAG WASTE AND WATER TREATMENT CONSULTANTS	Job Safety Analysis Piling	ISO 45001:2018 (Cl 8.1.5)
	A-815-JSA-007 Revision number : 00	Date:

			fatality/permanent disability	<ul style="list-style-type: none"> Ensure hydra is tested and thoroughly examined. 	Site Engineer/ Safety Engineer
			<ul style="list-style-type: none"> Deformed wire load and sling can cause fall of material causing injury or major damage. 	<ul style="list-style-type: none"> Ensure hydra operator is competent. All wire rope and sling are to be inspected prior to usage. Pile lifting zone to be cleared when lifting is in progress. 	Site Engineer
3	Boring	<ul style="list-style-type: none"> Insertion of guide casing. Boring with chisel Addition of DMC rod. 	<ul style="list-style-type: none"> Slipping of chisel from rope can lead to injury. Swinging of tools from tripod can hit objects/people standing nearby. Biological hazards. 	<ul style="list-style-type: none"> Use of proper taglines. Surrounding area to be barricaded. Proper cleaning of the nearby area by cutting and removing the bushes. 	Site Engineer
4	Insertion of reinforcement cage	<ul style="list-style-type: none"> Making of the cage. 	<ul style="list-style-type: none"> Electrical shock Burn Fumes Fire hazard Pinch points 	<ul style="list-style-type: none"> Refer to the welding and Bar bending JSA. 	Site Engineer
5	Concreting		<ul style="list-style-type: none"> The concrete pipeline can get misaligned due to vibrations leading to concrete spillage and serious injury to persons standing close by The rotating belt of the pump can lash out from its position and hit the near by person. Diesel leak from pump can lead to fire hazard. 	<ul style="list-style-type: none"> The locking system of the pipelines should be checked before the start of concreting. During concreting don't stand near the pipeline joints. Use wheel guard for the rotating parts of the pump. TPI of the concrete pump is required. Pump to be 	Site Engineer



	Job Safety Analysis Piling	ISO 45001:2018 (CI 8.1.5)
	A-815-JSA-007 Revision number : 00	Date:

			<ul style="list-style-type: none"> Concrete splash can lead to eye irritation and skin diseases. Hydraulic pipelines can burst cause injury 	<ul style="list-style-type: none"> operated by a trained person. Proper and regular maintenance of pump to avoid leakage. Provide a fire extinguisher nearby. Appropriate PPE like Latex gloves and goggles should be worn. 	
6	Completion	<ul style="list-style-type: none"> Removal of guide casing. Dismantling of rig. 	<ul style="list-style-type: none"> Pinch point while handling D-shackle. Swinging of casing after removal from ground can hit the persons nearby or the tripod leading to toppling of rig and injury to persons. The casing can fall if the sling tear and can cause fatality to any worker stand beneath or near to it. 	<ul style="list-style-type: none"> Arrangement for anchorage of full body harness while removal of sling from pulley at height. Barricading of the area. Using of leather gloves while removing pulley. 	Site Engineer

All crew members must print/sign their name below to acknowledge their understanding of the JSA.

Sl. No.	Name	Designation	Signature	Remarks



 <small>WABAG</small> <small>WATER AND WASTE CONSULTANTS PVT. LTD.</small>	Job Safety Analysis Piling	ISO 45001:2018 (CI 8.1.5)
	A-815-JSA-007 Revision number : 00	Date:

JSA Conducted by:

Date:

Signature of Team Leader:

Date:





Job Safety Analysis Work at Height

ISO 45001:2018
(Cl 8.1.5)

A-815-JSA-008 Revision number : 00

Date:

NAME OF JOB SITE:		ISSUED DATE:			
NAME OF ACTIVITY:		REVISION NO. AND DATE:			
WORK AT HEIGHT					
DATE:		JSA NO:			
MINIMUM REQUIRED PERSONAL PROTECTIVE EQUIPMENT (SEE CRITICAL ACTIONS FOR TASK-SPECIFIC REQUIREMENTS)					
Safety Helmet	Full body apron	SCBA (if required)	Hand Gloves (Cut resistance)	Dust Mask	
Safety Shoe	High visibility reflective vest	Ear Plug/Muff	Safety Goggles	Others	
Note to Team leader: Work must not start until all hazards are discussed; controls are in place; and all signatures are obtained.					
Sl. No.	ACTIVITY	SUB-ACTIVITY	RISK INVOLVED IN THE ACTIVITY	CONTROL MEASURES FOR SPECIFIED ACTIVITY	ACTION BY
General information:					
<ul style="list-style-type: none"> All employees (Staff and workmen) must wear hard hats on site. A supply of dust masks shall be kept on hand to fill workmen requests. All employees shall wear safety glasses. Workmen handling the pump will wear appropriate hand gloves. All employees on site must wear approved, hi-visibility safety vests, to make them visible to the equipment operators. Display pictorial safety images, posters at prominent places surrounding the area of work. Deploy trained and experienced foreman for safely completion of work under his guidance /supervision. 					
1	Obtain PTW		<ul style="list-style-type: none"> Injury/damage as a result of incorrect information. Unauthorized personnel. 	<ul style="list-style-type: none"> Obtain the correct PTW. Only authorized personnel allowed. All personnel to be properly trained and inducted. 	Supervisor/ Engineer
2	Use of Ladder		<ul style="list-style-type: none"> Person fall down & failure of ladder, 	<ul style="list-style-type: none"> Inspect ladder before erect it. Gap between two rungs should not more than 300mm. Use mandatory PPE's & must be used full body safety harness and anchored hook during accessing ladder. Place ladder in 75 angle & provide support & clamped it properly. Use Fall Arrestor in vertical ladder. Extended ladder 1 mtr above and working 	Engineer/ Safety Officer



 <small>Workplace solutions for a better life.</small>	Job Safety Analysis Work at Height	ISO 45001:2018 (CI 8.1.5)
	A-815-JSA-008 Revision number : 00	Date:

				<ul style="list-style-type: none"> platform. Use 3 point contact during ascending descending with ladder. 	
			<ul style="list-style-type: none"> Unauthorized Entry 	<ul style="list-style-type: none"> Allow only necessary & trained person into work area. Ensure pedestrain path Sign & poster should be displayed about the specific hazard. Continuous supervision required. 	Engineer/ Safety Officer
3	Working at Height		<ul style="list-style-type: none"> Person may fall from Height Confined space Hazards while working inside the trench (confined Space) Falling objects leading to injury to the persons working on the ground Slip, Trip and Fall Collapse of Working Platform 	<ul style="list-style-type: none"> Safe working Platform (Scaffolds) with safe means of access and egress shall be provided for work at height. Scaffolding shall be constructed as per IS 3696 Part-I (follow scaffolding ISA) by certified Scaffolders and must carry the intended load for which it is made Use scaffolding or other for a height of platform above 1.8M. All Scaffolds shall be certified by certified scaffolders and tagged accordingly. Scaffold having Green Tag duly authenticated by competent Scaffolding Inspector may be used for Work at Height. Scaffolds shall be checked by the user on daily basis and on weekly basis scaffold inspector shall inspect and recorded Persons supposed to work at height shall be medically fit and free from any illness / 	Engineer/ Safety Officer





Job Safety Analysis Work at Height

ISO 45001:2018
(Cl 8.1.5)

A-815-JSA-008 Revision number : 00

Date:

					<p>sickness</p> <ul style="list-style-type: none"> • People shall be trained on Work at Height training. • Working platform shall be provided without any gap. • Sole Board, Base Plate, Toe Board , Guard Rail etc. shall be provided along with other scaffolding requirements to avoid falling of materials and persons. • All access to work at height shall be clear of any obstacles • Materials shall not be thrown to & from the height. • TPI certified GIN wheel and Material lifting bag shall be used for taking material in and lowering from height • Ladders meant for access and egress shall be fitted with Fall arrestor and Fall arrestor rope and ensure people are using so • Maintain three point contacts while climbing up & down of ladder • No material shall be taken with hand while using ladder • Work at height is under Zero tolerance Policy and no violation shall be allowed . • Housekeeping on working platform shall be well maintained • No loose materials shall 	
--	--	--	--	--	--	--



 <small>www.wabag.com</small>	Job Safety Analysis Work at Height	ISO 45001:2018 (Cl 8.1.5)
	A-815-JSA-008 Revision number : 00	Date:

				<p>be placed on working platform. If required materials shall be securely held.</p> <ul style="list-style-type: none"> • Close Supervision of the job shall be ensured • Only one person at a time shall be allowed to use ladder • Ladder shall be fixed to the structure with ladder clamps at two/three points depending upon the length of ladder • All tool to be secured and must be carried in a tool kit bag. • Ensure people are wearing Full Body Harness with double lanyards and Shock absorber and lanyard hooks are anchored to have 100% fall protection apart from other PPE requirements. It shall be checked before every use by the user and ensure periodical inspection and record keeping with color coding . • Lifeline shall be provided and ensured its usage wherever required • Safety net shall be provided wherever required • Area below the work at height shall be barricaded to avoid unauthorized entry. 	
4	General		<p>Habits</p> <ul style="list-style-type: none"> • Adopting short cut method, negligence, 	<ul style="list-style-type: none"> • Daily TBT shall be conducted with workers. • Explaining the benefit of following safety rules , 	Supervisor, Safety Officer, Engineer





Job Safety Analysis Work at Height

ISO 45001:2018
(Cl 8.1.5)

A-815-JSA-008 Revision number : 00

Date:

			<p>wrong perception, absent mind, using cell phone.</p> <p>Personal Problem:</p> <ul style="list-style-type: none"> • Family problem, less of concentration, forgetfulness. <p>Work Related</p> <ul style="list-style-type: none"> • Night shift, over time 	<ul style="list-style-type: none"> • All these personal issues like illness, sickness medication etc shall be discussed in TBT. Training & motivation • Right person shall be engaged in right job • Same person should not be allowed to continue in night shift. • More than 12 hours work should not be carried out. • People shall be asked to take rest in designated rest shelter only and no one should take rest under or side the heavy equipment . • Horse play during work shall be stopped as that make persons excited / absent minded which lead to accident . • People shall not panic during any emergency and assemble in assembly point only. 	
--	--	--	---	--	--

All crew members must print/sign their name below to acknowledge their understanding of the JSA.

Sl. No.	Name	Designation	Signature	Remarks

JSA Conducted by:

Date:



 WABAG Sustainable solutions for a better life.	Job Safety Analysis Work at Height	ISO 45001:2018 (Cl 8.1.5)
	A-815-JSA-008 Revision number : 00	Date:

Signature of Team Leader:

Date:



 <small>consultants advised for a better life.</small>	Job Safety Analysis Pipe Laying	ISO 45001:2018 (CI 8.1.5)
	A-815-JSA-009 Revision number : 00	Date:

NAME OF JOB SITE:		ISSUED DATE:	
NAME OF ACTIVITY:	PIPELAYING ACTIVITY	REVISION NO. AND DATE:	
DATE:		JSA NO:	

MINIMUM REQUIRED PERSONAL PROTECTIVE EQUIPMENT (SEE CRITICAL ACTIONS FOR TASK-SPECIFIC REQUIREMENTS)

Safety Helmet	Full body apron	SCBA (if required)	Hand Gloves (Cut resistance)	Dust Mask
Safety Shoe	High visibility reflective Vest	Ear Plug/Muff	Safety Goggles	Others

Note to Team leader: Work must not start until all hazards are discussed; controls are in place; and all signatures are obtained.

Sl. No.	ACTIVITY	SUB-ACTIVITY	RISK INVOLVED IN THE ACTIVITY	CONTROL MEASURES FOR SPECIFIED ACTIVITY	ACTION BY
---------	----------	--------------	-------------------------------	---	-----------

General information:

- All employees (Staff and workmen) must wear hard hats on site.
- A supply of dust masks shall be kept on hand to fill workmen requests.
- All employees shall wear safety glasses.
- Workmen handling the pump will wear appropriate hand gloves.
- All employees on site must wear approved, hi-visibility safety vests, to make them visible to the equipment operators.
- Display pictorial safety images, posters at prominent places surrounding the area of work.
- Deploy trained and experienced foreman for safely completion of work under his guidance /supervision.

1	HANDLING PIPES	Delivery and unloading of pipes	Pipes may move/roll or be tampered with by others causing injury to persons	Provide secure stockpile area for pipes and fittings. Unload and stack pipes strictly in accordance with the manufacturers' recommendations (contact manufacturer for recommendations where necessary). Placing wedges for the pipe stacking to avoid rollover. Minimise height of pallets / stockpile.	Store incharge/Site incharge
		Delivery and unloading of pipes	Hit to person while lifting,Swinging load	Person handling Tagline ropes on both the ends shall maintain safe distance. Correct manual handling techniques. Maintain control of loads when lifting & moving by deploying authorised operator for hydra crane. Carry pipes close to ground while moving.	Site Engineer





Job Safety Analysis Pipe Laying

ISO 45001:2018
(Cl 8.1.5)

A-815-JSA-009 Revision number : 00

Date:

2	SITE SECURING	Barricading the site	Injury to a member of the public	Provide the appropriate fencing and/or barricades . Apply appropriate signage and pedestrian control. Devise and implement system for site inspection and security. Ensure security and equipment suitable to minimise vandalism.	
			Personal injury to members of the public, contractors and employees ; Vehicle accidents	Traffic Control Plan (TCP) as per RTA regulations. Keep area clean & clear of obstacles.	
			Slips, trips and falls, abrasions, strains and sprains; manual handling injuries such as spinal injuries	Conduct site inspection to ensure access/egress is adequate for the task activities.	
3	LOCATE UNDERGRO UND UTILITIES	Trial Pits excavation	Explosion, electrocution, damage service	Confirm location of services by "Pot holing" techniques. During manual excavation of pits check with relevant Authority (e.g. power, water, gas, council) records for location of services. If in doubt uses experienced/accredited service locators. When using hand prodders to locate pipes, prodders must never be driven in to the ground by hammers or other implements.	Project incharge





Job Safety Analysis Pipe Laying

ISO 45001:2018
(Cl 8.1.5)

A-815-JSA-009 Revision number : 00

Date:

4	EXCAVATION	During excavation	Noise, falling objects Damage to underground utilities. Oil spillage Hit by moving vehicle	Personal Protective Equipment (PPE) – hardhat, high visibility vest, hearing protection etc. Prirical maintenance to be ensured. Maintain (specified) appropriate spillage control techniques (trays,funnel). Employ signal man where appropriate. Permit to Work system to be followed	Site Engineer
		During excavation	Falling objects	No materials to be placed or stacked near the edge of any excavation. No load to be placed or moved near the edge of excavation where it is likely to cause collapse of side of work. No load handling/movement across excavation. No rollable objects stored uphill from excavation	
		During excavation	Soil Collapse	Shoring/sloping/benching has to be maintained as per the soil conditions to prevent soil collapse. Shoring techniques to be tested for trial pits before encaging into actual pits.	
		During excavation	Manual handling during shovelling	Manual handling awareness. Adequate rest periods allowed, job rotation, minimise repetitious twisting and shovelling.	
5	LAY BEDDING	Laying Earth mounds	Engulfment Dust – eye injury	Control operation of bedding by competent person. Watering of material. Control slopes. Delineate earth mounds appropriately. Warning signage. Cover when unattended or unable to be watered. Ensure nose mask and safety goggles for all workers involved in bedding activities.	





Job Safety Analysis Pipe Laying

ISO 45001:2018
(Cl 8.1.5)

A-815-JSA-009 Revision number : 00

Date:

6	PIPE LAYING	Slinging of pipes	Injury to persons generally	<p>Secure pipes to prevent movement irrespective of slope of surface, secure pipes to prevent movement e.g sand bags, star pickets, place against fixed objects which will prevent the movement of pipes. Orientate/select position to minimise potential for movement e.g place pipes normal to slope of ground. Place pipes in secure compound if site left unattended.</p> <p>Minimise waiting time for pipes on site prior to laying. Identify high risk or unsuitable stringing locations in advance, eg sloping or soft ground.</p> <p>Ensure availability of sand/gravel bags/pegs/timber or other suitable materials for retaining or securing pipes. Lifting and rigging by competent team.</p>	Site Engineer/Project Incharge
		Install pipe fittings on bed	Personal injury	<p>Use only maintained equipment fitted with yellow flashing lights and reversing alarms. Maintain a safe distance from working equipment. Wear appropriate PPE including high visibility clothing and hard hat etc. Perimeter fencing where appropriate. Place trained personnel on look-out.</p>	Site engineer
			Hit to person	<p>Correct manual handling techniques. Maintain safe distance from the pipe fittings. Maintain control of loads when lifting & moving. Carry pipes close to ground while moving providing mechanical aid is used.</p>	



 WABAG <small>WATER AND SEWERAGE BOARD</small>	Job Safety Analysis Pipe Laying	ISO 45001:2018 (CI 8.1.5)
	A-815-JSA-009 Revision number : 00	Date:

		Connection of pipelines by welding	Burns Electrocution Electric shocks	Wear appropriate PPE(face shield,safety boots,gloves apron),Fire extinguisher should be present. Earth straps and insulating gloves to be used as services are used for household earthing.Proper insulation of cable to be ensured without any joints.No naked wired connections.All cable connections to be routed through RCCB.	Site enginner/Electrical incharge
			Confined space	Welder to be engaged inside the pipe shall be ensured for a premedical checkup for checking any pre-existing medical conditions. Ventilation system should be handled properly by placing exhaust fans as required inside the work area to clear the fumes periodically.Job rotation to be maintained for the welders. Trolleys should be placed for proper access/egress inside the pipes.Unauthorized entry to be prohibited.Proper administrative controls to be deployed.	Site incharge/engineer
		Wrapping coating activity	Eye injury,UV radiation	Wear appropriate PPE(face shield,safety boots,gloves apron),Fire extinguisher should be present	
		Compaction activity	Public hazard	Compaction to specified standard.Site cleared of debris and refuse.	Site incharge
		Site resurfacing	Public hazard	Re-surface appropriately. Do not leave gaps in turf or leave uneven surface. Erect fence around hazardous areas until restored and safe.	



 <small>Sustainable solutions for a better life.</small>	Job Safety Analysis Pipe Laying	ISO 45001:2018 (CI 8.1.5)
	A-815-JSA-009 Revision number : 00	Date:

		Hydro Testing	Injury from high pressures in pipelines blowouts of plugs	<p>Ensure plugs and compressors are installed and secured against movement. Release air before removing plugs. Clear area of pipe ends being tested. All steps of hydro tests to be performed by competent engineers. Unauthorized entry to be prohibited. Proper barrication to be ensured in the testing area.</p>	
8	General	Weather Conditions (e.g. hot, cold wet, flooding/inundation, electrical storms, high winds)	Dehydration and dizziness	<p>Supply adequate drinking water in work area. Provide protection from UV rays. PPE. Stop working during rains.</p>	

All crew members must print/sign their name below to acknowledge their understanding of the JSA.

Sl. No.	Name	Designation	Signature	Remarks

JSA Conducted by:

Date:

Signature of Team Leader:

Date:





Job Safety Analysis Rock Blasting

ISO 45001:2018
(Cl 8.1.5)

A-815-JSA-002 Revision number : 00

Date:

NAME OF JOB SITE:				ISSUED DATE:			
NAME OF ACTIVITY:		ROCK BLASTING		REVISION NO. AND DATE:			
DATE:				JSA NO:			
MINIMUM REQUIRED PERSONAL PROTECTIVE EQUIPMENT (SEE CRITICAL ACTIONS FOR TASK-SPECIFIC REQUIREMENTS)							
Safety Helmet	Full body apron	SCBA (if required)	Hand Gloves (Cut resistance)	Dust Mask			
Safety Shoe	High visibility reflective Vest	Ear Plug/Muff	Safety Goggles	Others			
Note to Team leader: Work must not start until all hazards are discussed; controls are in place; and all signatures are obtained.							
Sl. No.	ACTIVITY	SUB-ACTIVITY	RISK INVOLVED IN THE ACTIVITY	CONTROL MEASURES FOR SPECIFIED ACTIVITY	ACTION BY		
General Information:							
<ul style="list-style-type: none"> All employees (Staff and workmen) must wear hard hats on site. A supply of dust masks shall be kept on hand to fill workmen requests. All employees shall wear safety glasses. Workmen handling the pump will wear appropriate hand gloves. All employees on site must wear approved, hi-visibility safety vests, to make them visible to the equipment operators. Display pictorial safety images, posters at prominent places surrounding the area of work. Deploy trained and experienced foreman for safely completion of work under his guidance /supervision. 							
1	Pre-Blast	Storage	-Damage to property/human due to blast due to improper storage.	-Explosives shall be stored in magazines which dry clean and cool and lighting given as per Indian electricity rules. -Magazines shall be located at a safe distance from the worksite properly fenced. -Storage should be done in a way that first should be used first. -Primer and blasting caps should not be stored in same box container or room along with other explosives. -Explosives not to be stored in a damp and wet conditions or near oil, gasoline , cleaning solution or other sources of heat.			



 <small>WABAG</small> <small>Water & Power Consultants</small>	Job Safety Analysis Rock Blasting	ISO 45001:2018 (CI 8.1.5)
	A-815-JSA-002 Revision number : 00	Date:

				<ul style="list-style-type: none"> -Smoking or any naked flame should be prohibited in the area. -An area upto a distance of 8m around the magazines should be free from vegetation, debris and combustibles. -Metallic objects capable of producing sparks should not be stored near the magazine. -Carbon dioxide extinguisher shall be maintained at the storage area. -signboards displaying "NO SMOKING" "HIGH DANGER EXPLOSIVES" etc needs to be displayed. -The following shall be hung up at the lobby of the magazines: <ul style="list-style-type: none"> 1)a copy of explosives rule. 2)a statement showing the stock in the magazine. 3)Certificate showing the last date of the lightning conductor. 	
		Obtain PTW	<ul style="list-style-type: none"> -Injury/damage as a result of incorrect information. -Unauthorized personnel. 	<ul style="list-style-type: none"> -Obtain the correct PTW. -Only authorized personnel allowed. -All personnel to be properly trained and inducted. -ERP should be ready 	Supervisor/ Engineer
		Preparing for work.	Injuries or property damage resulting from lack of	Employees are provided adequate orientation, equipment and training as per	





Job Safety Analysis Rock Blasting

ISO 45001:2018
(Cl 8.1.5)

A-815-JSA-002 Revision number : 00

Date:

			<p>knowledge, communication, equipment, or training.</p>	<p>their duties and responsibilities.</p> <ul style="list-style-type: none"> -Employees participate in and support an environment where all valid safety concerns can be raised and addressed, without judgement or reprisal. <p>BLASTER-IN-CHARGE HAS ABSOLUTE RESPONSIBILITY.</p> <ul style="list-style-type: none"> -Only authorized and/or certified employees will engage in blasting operations, under the approval of directorate of mines. . -Explosives are a vital and indispensable tool, and need to be treated with extreme caution and respect, and in full compliance with all applicable rules, regulations and policies 	
			<p>Injuries or property damage resulting from lack of training.</p>	<ul style="list-style-type: none"> -Employees trained and/or certified to use, handle, store and transport explosives must maintain their relevant endorsements, licenses, training and field requirements, or inform supervisor of problems or concerns. 	
			<p>Injuries or property damage resulting from lack of PPE and/or training.</p>	<p>Supervisors are responsible for providing crew members with adequate PPE and related training.</p>	
			<p>Injuries or property damage resulting from lack of knowledge, communication, equipment, or training.</p>	<p>Supervisors will conduct and document weekly safety meetings to discuss safety issues, projects, and other work related topics.</p>	



 <small>WABAG</small> <small>WATER AND POWER CONSULTANTS AND ENGINEERS</small>	Job Safety Analysis Rock Blasting	ISO 45001:2018 (CI 8.1.5)
	A-815-JSA-002 Revision number : 00	Date:

				Engineer and supervisors will also conduct a pre-blast briefing with personnel to provide project orientation, assign duties and responsibilities, review blasting procedures, and avoid miscommunication.	
		Blasting work: communication, planning, and logistics.	Injuries or property damage resulting from lack of communication.	- Good communication between guards and blaster-in-charge is essential and should reinforce individual awareness of real and potential hazards. - Radios, frequencies, and standard operating procedures (SOP's) should be reviewed and clearly understood by all participants before beginning work. - Instructions will come from blaster-in-charge, or a designated radio contact. - Positive radio communication is absolutely critical and radios should be thoroughly inspected and tested prior to leaving the shop.	
			Injuries or property damage resulting from lack of communication, equipment, or training.	- Each crew will be provided at least one first-aid kit and water-filter. - Crewmembers should be familiar with its location and contents at all times. - Basic first aid/CPR training will be available for all crewmembers.	
			General hazards, all hazards.	- Safety is everyone's primary	





Job Safety Analysis Rock Blasting

ISO 45001:2018
(CI 8.1.5)

A-815-JSA-002 Revision number : 00

Date:

				<p>responsibility, and all employees should take an active role in hazard identification, analysis, and mitigation.</p> <p>-If at any point, a job is deemed unsafe, guards and/or blasters should feel entitled to stop until the appropriate PPE, engineering controls, equipment or conditions are available or exist to make the job safe.</p>	
			<p>Injuries or property damage resulting from lack of knowledge, communication, equipment, or training.</p>	<p>-Each guard should receive training on basic radio procedures, emergency response plans, and individual duties and responsibilities.</p> <p>-Workers need to stay alert and focused on their surroundings and duties, the location of other guards, and any/all hazards while performing blasting operations.</p> <p>-Crewmembers should report any concerns or breaches of security to the blaster-in-charge immediately.</p>	
			<p>Injuries or property damage resulting from work site hazards such as weather.</p>	<p>-Blasters need to be continually aware of, and prepared for, dynamic and extreme weather.</p> <p>-Immediately vacate and guard site if lightning approaches.</p> <p>-Be aware of potential desensitizing of product from exposure to elements.</p>	



 <small>WABAG</small> <small>WATER & WASTE SERVICES FOR A BETTER LIFE</small>	Job Safety Analysis Rock Blasting	ISO 45001:2018 (CI 8.1.5)
	A-815-JSA-002 Revision number : 00	Date:

				-Preferable to use non-electric initiation system.	
		Preparing site/ signage.	Injuries caused by inadequate guarding.	-Post appropriate signs and guards around the perimeter of each shot. -Barricade the area. All approaches to the site shall be closed by a distance by at least 400m. The area should be evacuated 10mins before the start of the blasting process. -A loud siren of not less than 1min shall be sounded to warn everybody before the start of work. -Maintain communications with all guards, "positive-response", using radios if needed.	
2	During blasting	Blasting work: on site.	Injuries caused by improper handling.	-Handle explosives with extreme care, observing all instructions included in each box of explosives and caps. -Follow the "Always and never" instructions contained in each box of explosives and caps. -Never tamper or investigate the contents of the or try to pull the crimp safety fuse of the blasting cap -Never handle or prepare explosives, load holes, or tie bore-holes together with a radio chest harness on. -Keep radios away from explosives and related	





Job Safety Analysis Rock Blasting

ISO 45001:2018
(Cl 8.1.5)

A-815-JSA-002 Revision number : 00

Date:

				<p>equipment.</p> <p>-No smoking and use only non-sparking tools.</p>	
			Injuries or property damage resulting from improper transportation of explosives.	<p>-Have all required documents readily available when transporting explosives (by vehicle, person, or pack mule).</p> <p>-Explosives should be secured inside backpacks in such a way as to not pose a safety hazard to the person carrying the load or anyone else on the trail.</p> <p>-Never carry caps in the same container as detonation cord or explosive product.</p>	
			Injuries or property damage resulting from improper initiation.	<p>-Double check that all holes are tied into shot.</p> <p>-Have spare batteries and/or spare initiators at the job site.</p> <p>-Make sure the initiation site is a safe location.</p> <p>-Give loud verbal warning prior to shot.</p> <p>-Report to guards, "all clear," and call them in or keep at posts for next shot.</p>	
			Injuries caused by drilling operations.	<p>-Operators need to find the safest, most effective position for themselves and the machine.</p> <p>-If possible, consider moving materials so that drills can be operated from such a position to allow the driller to maintain good footing and</p>	



**Job Safety Analysis
 Rock Blasting**

ISO 45001:2018
 (Cl 8.1.5)

A-815-JSA-002 Revision number : 00

Date:

				<p>posture.</p> <ul style="list-style-type: none"> -Drill operators should maintain a relaxed grip on the handles, reducing the conduction of vibrations and impacts to hands, wrists, arms and elbows. -Allow the weight of the drill to drive the bit, while guiding the shank in the middle of the hole, with minimal pressure from the drill operator. -If necessary, a spotter, or an additional operator can help support the machine or guide the bit. -No drilling shall be started until the previous holes in blasted area are flushed with air or water. -While planning the drilling operation thoughts needs to be given to the strata or overburden with a view to avoid possibility of landslide after blasting. -Ensure that the diameter of each hole is grater then the outside diameter of the cartridges. -A borehole shall not be loaded with explosives after springing withut making it sure that it is cool and does not contain any smoldering materials. Temperatures above 65 degrees need to be avoided. -NEVER DRILL IN AN EXISTING 	
--	--	--	--	--	--



Job Safety Analysis Rock Blasting

ISO 45001:2018
(Cl 8.1.5)

A-815-JSA-002 Revision number : 00

Date:

				BOREHOLE WHICH MAY CONTAIN EXPLOSIVES.	
			Frozen bit, sudden stop, or fatigue/frustration.	<p>-When all else fails, take a step back and a big, deep breath, maybe stretch a little, and try again or try something different.</p> <p>-Drillers need to be attentive to the behavior of the drill and conscious of the type of rock they are drilling.</p> <p>-Micro-fractures and unforeseen seeps can jamb a bit, causing a sudden reaction with the drill.</p> <p>-Drillers should monitor the following: Changing tones- often signal a bit is about to break completely through a rock. Fast and slow drilling- often indicates different layers and hardness of rock. Color of the drill fines- a good indicator of the type of rock below.</p>	
			Injuries caused by transporting/packing drills.	<p>-Frame packs and backboards are available for transporting drills by foot.</p> <p>-Anyone carrying a drill should be extra careful of rough or loose footing, and get assistance while loading and unloading.</p> <p>-Packers or other trained staff must lash drills tight and secure to pack stock.</p> <p>-Poinjars should be purged whenever being transported or not in use.</p>	



 <small>WABAG</small> <small>WATER AND POWER CONSULTANTS</small>	Job Safety Analysis Rock Blasting	ISO 45001:2018 (Cl 8.1.5)
	A-815-JSA-002 Revision number : 00	Date:

		Blasting work: Initiation.	Misfire, Accidental detonation, Exposure to Elements.	<ul style="list-style-type: none"> -Handle explosives with extreme care, observing all instructions included in each box of explosives and caps. -Don't make up primers next to truck containing explosives. Place hands on ground for 5 seconds before handling electric detonators. -Be aware of potential desensitizing of product from exposure to elements. -No loose material shall be kept on the rocks prior to blasting. 	
			Misfire, Accidental detonation, Exposure to Elements.	<ul style="list-style-type: none"> -Do not tamp primer! -Follow the "Always and never" instructions contained in each box of explosives and caps. -Follow manufacturers instructions. -Double check that all holes are tied into shot. -Use only approved explosives (no nitroglycerin based products). 	
			Premature firing, misfires, and partial detonation.	<ul style="list-style-type: none"> -The "Blaster-in-Charge" controls the blast initiation device. -Check for proper resistance in EBC series. -Use EBW's or Non-EL blast system when electromagnetic radiation or extraneous electricity is present. (Radio transmitters, radar, high 	





Job Safety Analysis Rock Blasting

ISO 45001:2018
(Cl 8.1.5)

A-815-JSA-002 Revision number : 00

Date:

				<p>voltage electric lines, blowing dust or snow, etc.)</p> <p>-Immediately vacate and guard site if lightning approaches.</p> <p>-Follow misfire procedures in the event of a misfire or partial detonation</p>	
3	Post-Blast	-Area inspection	-Accidental detonation, Exposure to Elements.	<p>-The blaster shall not return till 5 mins after the blast after firing.</p> <p>-No person is allowed to approach the blasting site till 30mins after the blast is over.</p> <p>-A siren of more than 1 min should be sounded after the process is over.</p>	
		-Disposal	-Environmental hazard, improper disposal technique	<p>-No explosives shall be abandoned. These shall be disposed off strictly adhering to the approved method and in doing so the manufacturer or the appropriate authority shall be contacted.</p> <p>-Explosives, caps, boxes lines or materials used in packing of explosive should not be left lying around in the places where children or livestock have access to.</p> <p>-Paper or fibrous materials used in packing of explosives shall not be put to further use and should be destroyed by burning in the presence of responsible person.</p>	



 <small>WABAG</small> <small>WATER AND WASTE MANAGEMENT CONSULTANTS FOR A BETTER INDIA</small>	Job Safety Analysis Rock Blasting	ISO 45001:2018 (Cl 8.1.5)
	A-815-JSA-002 Revision number : 00	Date:

All crew members must print/sign their name below to acknowledge their understanding of the JSA.

Sl. No.	Name	Designation	Signature	Remarks

JSA Conducted by:

Date:

Signature of Team Leader:

Date:



 <small>W A B A G</small> <small>WATER AND POWER CORPORATION FOR A BETTER LIFE</small>	Job Safety Analysis Scaffolding	ISO 45001:2018 (Cl 8.1.5)
	A-815-JSA-011 Revision number : 00	Date:

NAME OF JOB SITE:		ISSUED DATE:			
NAME OF ACTIVITY:		REVISION NO. AND DATE:			
DATE:		JSA NO:			
MINIMUM REQUIRED PERSONAL PROTECTIVE EQUIPMENT (SEE CRITICAL ACTIONS FOR TASK-SPECIFIC REQUIREMENTS)					
Safety Helmet	Full body apron	SCBA (if required)	Hand Gloves (Cut resistance)	Dust Mask	
Safety Shoe	High visibility reflective Vest	Ear Plug/Muff	Safety Goggles	Others	
Note to Team leader: Work must not start until all hazards are discussed; controls are in place; and all signatures are obtained.					
Sl. No.	ACTIVITY	SUB-ACTIVITY	RISK INVOLVED IN THE ACTIVITY	CONTROL MEASURES FOR SPECIFIED ACTIVITY	ACTION BY
General information: <ul style="list-style-type: none"> All employees (Staff and workmen) must wear hard hats on site. A supply of dust masks shall be kept on hand to fill workmen requests. All employees shall wear safety glasses. Workmen handling the pump will wear appropriate hand gloves. All employees on site must wear approved, hi-visibility safety vests, to make them visible to the equipment operators. Display pictorial safety images, posters at prominent places surrounding the area of work. Deploy trained and experienced foreman for safely completion of work under his guidance /supervision. 					
1	Pre-work	Obtain PTW	Injury/damage as a result of incorrect information. Unauthorized personnel.	Obtain the correct PTW. Only authorized personnel allowed. All personnel to be properly trained and inducted.	Supervisor/ Engineer
2	Scaffold Erection And Dismantling	Selection of scaffold pipes	Fall hazard	The stability and safety of the scaffold shall be certified by a Responsible person and affix the GREEN TAG to the scaffold, before putting into use. Ensure the height of the scaffold does not exceed by more than 4 times its minimum base dimension, unless guys, ties, or braces are used.	Competent scaffold foreman/site supervisor
3	Scaffold Erection And Dismantling	Select a secure foundation on which to build and set your scaffold	Fall of debris	Proper supervision and all ct props to be attached with permanent base plate ,no temporary support to be	Competent scaffold foreman/site supervisor



 <small>swatchaiw,sookaso, for a better Ho.</small>	Job Safety Analysis Scaffolding	ISO 45001:2018 (Cl 8.1.5)
	A-815-JSA-011 Revision number : 00	Date:

				attached to ct prop.	
4	Scaffold Erection And Dismantling	Assembling the frame	Electrical hazards	No un-insulated electric wire should exist within 3m of the working platform , gangways, runs, etc of scaffold. While carrying bars ,rods, pipes or any conducting material of length greater than 3m special care shall be taken not to touch the electric wires.	Competent scaffold foreman/site supervisor
5	Scaffold Erection And Dismantling	Securing the scaffold	Fall of bracing	Proper procedure must be followed while erecting bracing	Competent scaffold foreman/site supervisor
6	Scaffold Erection And Dismantling		Scaffold coliapse	Cross bracing to be done	Competent scaffold foreman/site supervisor
7	Scaffold Erection And Dismantling	Placing of planks	Slip,trip	Proper supervision must be present. Install hand railing protection system along open sides & ends and front edge of the working platforms; hand rails – 1.2 mtr. tall; mid-rails - 0.6 mtr. tall and toe boards of at least 100 mm high.Ensure platforms are fully planked or decked with less than 20mm gaps. It should be able to support its own weight & 4 times max. load. WIDTH minimum 400 mm wide.	Competent scaffold foreman/site supervisor
8	Scaffold Erection And Dismantling	Erection of scaffolds	Fall of person	Proper safety harness to be tied for person working at the top section	Competent scaffold foreman/site supervisor
9	Scaffold Erection And Dismantling	Attaching of adequate access	Limited access	Adequate safe access procedure to be followed. If ladders are used to access the scaffold, use ones that are designed for that specific scaffold. Stair-like ladders can be used to access the scaffold but must have handrails and	Competent scaffold foreman/site supervisor



 <small>WABAG</small> <small>WATER AND SEWERAGE for a better life.</small>	Job Safety Analysis Scaffolding	ISO 45001:2018 (CI 8.1.5)
	A-815-JSA-011 Revision number : 00	Date:

				treading. A concern with the access point is to make it safe to maneuver and to prevent the scaffold from tipping over.	
10	Scaffold Erection And Dismantling	Inspection of scaffolds	Fall from height	Wear proper ppe, harness, proper training for inspections	Safety officer
11	Scaffold Erection And Dismantling	Dismantling of scaffolds	Access and egress	Adequate access to all the trucks needs to be provided.	Competent scaffold foreman/site supervisor
12	Scaffold Erection And Dismantling	Dismantling of scaffolds	Injury to workmen	Authorise the dismantling work through a Height Work Permit Dismantle from the top, first by removing the working platform, poles, braces, couplers, etc., stage wise. Never start dismantling from the bottom of scaffold. Display Red flag and barricade the area, No workers to enter the dismantling area. Display caution board " Dismantling work in progress- Do not enter this area" .Provide full body harness (FBH) and life line support for hooking the FBH of all workers engaged in dismantling work.	Competent scaffold foreman/site supervisor
13	Scaffold Erection And Dismantling	Dismantling of scaffolds	Fall of object	Adequate stacking space to be given. Check all platforms before dismantling. Remove all loose construction materials from working platforms, lower them with socks or using rope. DO NOT THROW ANY MATERIALS FROM HEIGHT	Competent scaffold foreman/site supervisor

All crew members must print/sign their name below to acknowledge their understanding of the JSA.

Sl. No.	Name	Designation	Signature	Remarks
---------	------	-------------	-----------	---------



 <small>Water & Air Services for a better life</small>	Job Safety Analysis Scaffolding	ISO 45001:2018 (Cl 8.1.5)
	A-815-JSA-011 Revision number : 00	Date:

JSA Conducted by:

Date:

Signature of Team Leader:

Date:





Job Safety Analysis Shuttering/De-shuttering

ISO 45001:2018
(Cl 8.1.5)

A-815-JSA-012 Revision number : 00

Date:

NAME OF JOB SITE:				ISSUED DATE:			
NAME OF ACTIVITY:		SHUTTERING/DESHUTTERING		REVISION NO. AND DATE:			
DATE:				JSA NO:			
MINIMUM REQUIRED PERSONAL PROTECTIVE EQUIPMENT (SEE CRITICAL ACTIONS FOR TASK-SPECIFIC REQUIREMENTS)							
Safety Helmet	Full body apron	SCBA (if required)	Hand Gloves (Cut resistance)	Dust Mask			
Safety Shoe	High visibility reflective Vest	Ear Plug/Muff	Safety Goggles	Others			
Note to Team leader: Work must not start until all hazards are discussed; controls are in place; and all signatures are obtained.							
Sl. No.	ACTIVITY	SUB-ACTIVITY	RISK INVOLVED IN THE ACTIVITY	CONTROL MEASURES FOR SPECIFIED ACTIVITY	ACTION BY		
General information:							
<ul style="list-style-type: none"> All employees (Staff and workmen) must wear hard hats on site. A supply of dust masks shall be kept on hand to fill workmen requests. All employees shall wear safety glasses. Workmen handling the pump will wear appropriate hand gloves. All employees on site must wear approved, hi-visibility safety vests, to make them visible to the equipment operators. Display pictorial safety images, posters at prominent places surrounding the area of work. Deploy trained and experienced foreman for safely completion of work under his guidance /supervision. 							
1	Shuttering	Shifting shuttering material	Object person fall from height, ergonomics	Appropriate ppe (helmet, safety shoes, harness), periodic inspections, pulley system can be used.	Shuttering foreman/site supervisor		
2	Shuttering	Preparation of working platform	Object person fall from height	Ladder to be provided and extended upto 1 m			
3	Shuttering	Working on slab	Fall of material/debris	Wear hard hats and safety shoe			
4	Shuttering	Placing of shuttering board	Object person fall from height	Ensure proper access to be provided			
5	Shuttering	Concreting	Thermal stress development	Proper settling time to be given			
6	Shuttering	Adjustment of CT prop	Fall of material/debris	Fixing bearing bar in prop, provision of net			
7	Shuttering	Deshuttering	Seperation of forms by forcing crowbars	Use of wooden wedges			
8	De-shuttering	General	Inadequate communication and management	Obtain permit to shutter and de-shutter			



	Job Safety Analysis Shuttering/De-shuttering	ISO 45001:2018 (Cl 8.1.5)
	A-815-JSA-012 Revision number : 00	Date:

All crew members must print/sign their name below to acknowledge their understanding of the JSA.

Sl. No.	Name	Designation	Signature	Remarks

JSA Conducted by:

Date:

Signature of Team Leader:

Date:





Job Safety Analysis Welding

ISO 45001:2018
(Cl 8.1.5)

A-815-JSA-013 Revision number : 00

Date:

NAME OF JOB SITE:				ISSUED DATE:			
NAME OF ACTIVITY:		WELDING		REVISION NO. AND DATE:			
DATE:				JSA NO:			
MINIMUM REQUIRED PERSONAL PROTECTIVE EQUIPMENT (SEE CRITICAL ACTIONS FOR TASK-SPECIFIC REQUIREMENTS)							
Safety Helmet	Full body apron	SCBA (if required)	Hand Gloves (Cut resistance)	Dust Mask			
Safety Shoe	High visibility reflective Vest	Ear Plug/Muff	Safety Goggles	Others			
<p>Note to Team leader: Work must not start until all hazards are discussed; controls are in place; and all signatures are obtained.</p>							
Sl. No.	ACTIVITY	SUB-ACTIVITY	RISK INVOLVED IN THE ACTIVITY	CONTROL MEASURES FOR SPECIFIED ACTIVITY	ACTION BY		
<p>General information:</p> <ul style="list-style-type: none"> All employees (Staff and workmen) must wear hard hats on site. A supply of dust masks shall be kept on hand to fill workmen requests. All employees shall wear safety glasses. Workmen handling the pump will wear appropriate hand gloves. All employees on site must wear approved, hi-visibility safety vests, to make them visible to the equipment operators. Display pictorial safety images, posters at prominent places surrounding the area of work. Deploy trained and experienced foreman for safely completion of work under his guidance /supervision. 							
1	Pre-work	Obtain PTW	<p>Injury/damage as a result of incorrect information.</p> <p>Unauthorized personnel.</p>	<p>Obtain the correct PTW.</p> <p>Only authorized personnel allowed.</p> <p>All personnel to be properly trained and inducted.</p> <p>Provide pre-work training and conduct a TBT before starting of job.</p>	Supervisor/ Engineer		
2	Welding	Welding M/C connection	Electrical hazard	<p>Resistance of earth pit will be maintained 1Ω (ohm).</p> <p>Return cable will be connected to the job and not be connected to scaffolding and structure for connectivity.</p> <p>Ensure no any workmen in front of the Welding work. No any workmen are allowed to sit on structure while doing welding.</p>	Mechanical supervisor/engineer		



 <small>WABAG</small> <small>Water & Power Solutions for a better life.</small>	Job Safety Analysis Welding	ISO 45001:2018 (CI 8.1.5)
	A-815-JSA-013 Revision number : 00	Date:

				<p>Safe working platform should be provided.</p> <p>Electric Supply will be taken from DB having rated MCB and 30Ma ELCB only for each welding machine.</p> <p>Termination will be done by using proper lug to the electric supply and earthing cables.</p> <p>Welding machine will be kept at dry place and inside shade for protection from rain & provide rubber mat for welding machine .</p> <p>Ensure welding is not performed in wet climate.</p> <p>Deploy certified welder.</p> <p>Use of inspected and validated welding machine.</p> <p>Ensure use of proper cylinder trolley along secured with proper chain in tig welding</p>	
3	Welding		Tripping hazard	<p>Ensure Housekeeping prior to start the job on regular basis and removal of combustible material at least 10.2m (35feet) away from the work location avoid trailing cables.</p> <p>Provide elevated routing</p>	Mechanical supervisor/engineer/safety
4	Welding	Preparation of work platform (if welding at height)	Fall from height during access and egress or during working on elevated platform	<p>Scaffolding inspection checklist and work permit system to be followed.</p> <p>Scaffold tag system to be followed</p>	Mechanical supervisor/engineer/safety
4	Welding	Welding	Fire hazard	<p>No falling slag, fire blanket in use below the welding point, fire watcher</p> <p>Ensure availability of the DCP 10 kg fire extinguisher and CO2 4.5 kg fire extinguisher, fire blanket and fire buckets in the work location.</p>	Mechanical supervisor/engineer



	Job Safety Analysis Welding	ISO 45001:2018 (Cl 8.1.5)
	A-815-JSA-013 Revision number : 00	Date:

5	Welding	Welding	Ultra violet rays	Proper welder's face shields in use ,eye protection for helpers also ensured.	Mechanical supervisor/engi neer/safety
6	Welding	Welding	Tripping hazard	Electrode bits collection box in use with daily lowering down, proper housekeeping.	Mechanical supervisor/engi neer/safety
7	Welding	Welding	Fume/dust	Use nose mask	Mechanical supervisor/engi neer/safety

All crew members must print/sign their name below to acknowledge their understanding of the JSA.

Sl. No.	Name	Designation	Signature	Remarks

JSA Conducted by:

Date:

Signature of Team Leader:

Date:



	Job Safety Analysis Bar bending and Cutting	ISO 45001:2018 (Cl 8.1.5)
	A-815-JSA-014 Revision number : 00	Date:

NAME OF JOB SITE:		ISSUED DATE:	
NAME OF ACTIVITY:	BAR BENDING AND CUTTING	REVISION NO. AND DATE:	
DATE:		JSA NO:	

MINIMUM REQUIRED PERSONAL PROTECTIVE EQUIPMENT (SEE CRITICAL ACTIONS FOR TASK-SPECIFIC REQUIREMENTS)

Safety Helmet	Full body apron	SCBA (if required)	Hand Gloves (Cut resistance)	Dust Mask
Safety Shoe	High visibility reflective Vest	Ear Plug/Muff	Safety Goggles	Others

Note to Team leader: Work must not start until all hazards are discussed; controls are in place; and all signatures are obtained.

Sl. No.	ACTIVITY	SUB-ACTIVITY	RISK INVOLVED IN THE ACTIVITY	CONTROL MEASURES FOR SPECIFIED ACTIVITY	ACTION BY
---------	----------	--------------	-------------------------------	---	-----------

General information:

- All employees (Staff and workmen) must wear hard hats on site.
- A supply of dust masks shall be kept on hand to fill workmen requests.
- All employees shall wear safety glasses.
- Workmen handling debris from the demolition will wear appropriate hand gloves.
- All employees on site must wear approved, hi-visibility safety vests, to make them visible to the equipment operators.
- Display pictorial safety images, posters at prominent places surrounding the area of work.
- Deploy trained and experienced foreman for safely completion of work under his guidance /supervision.
- Permission in written must be taken from legal authority (respecting legal law & regulations as per central / state / client /PMC)

1	BAR BENDING AND CUTTING	Installation of bar bending/cutting machine	Electric shock/Electrocution	Connection tapped through rccb, proper joint, proper rating power cable in use, double earth provided	Site supervisor
2	BAR BENDING AND CUTTING	Installation of bar bending/cutting machine	Electric shock/Electrocution	Connection tapped through rccb, proper joint, proper rating power cable in use, double earth provided	



 <small>WABAG</small> <small>WABAG</small>	Job Safety Analysis Bar bending and Cutting	ISO 45001:2018 (CI 8.1.5)
	A-815-JSA-014 Revision number : 00	Date:

3	BAR BENDING AND CUTTING	Bar cutting using powered tools	Trapping and entanglement hazard	Scrap disposal yard earmarked, daily collection of bar cut pieces observed	Safety Officer, Engineer
4	BAR BENDING AND CUTTING	Bar cutting	Electrical fluctuations	Periodic inspections by trained operator, sufficient machines available	
5	BAR BENDING AND CUTTING	Bar cutting	Eye injury due to foreign particles	Proper eye protection are in use	
6	BAR BENDING AND CUTTING	Bar bending	Fracture of bones,fall of objects, piercing	Use safety boots,gloves.work to be done with buddy system,keep hands away from the working area while bending the bars.	
7	BAR BENDING AND CUTTING	Shifting of reinforcement steel after bending or cutting	Ergonomics,cut injury, piercing	Workmen trained for safe handling of rebar and adequate ppe i.e. gloves to be worn by every worker	
8	BAR BENDING AND CUTTING	Shifting of reinforcement steel after bending or cutting	Caught in between objects	Safe material handling technique in application	
9	BAR BENDING AND CUTTING	Bar cutting using powered tools	Trapping and entanglement hazard	Scrap disposal yard earmarked, daily collection of bar cut pieces observed	

All crew members must print/sign their name below to acknowledge their understanding of the JSA.

Sl.	Name	Designation	Signature	Remarks
-----	------	-------------	-----------	---------



Job Safety Analysis Bar bending and Cutting

ISO 45001:2018
(Cl 8.1.5)

A-815-JSA-014 Revision number : 00

Date:

No.				

JSA Conducted by:

Date:

Signature of Team Leader:

Date:

ANNEXURE – 7

SITE ACTIVITY PLAN

Sr No	Doc Ref No	Activity	Frequency	2019												2020		
				July	Aug	Sep	Oct	Nov	Dec	Jan	Feb	May	June	July	Aug	Sep		
1	CMP-04	Internal Audit	Quarterly															
2	N/A	External Audit	Yearly															
3	N/A	Client Audit																
4	N/A	Equipment Inspection fitness	Fortnightly															
5	HSE OCP -025 F-915-005	Safety committee meeting	Monthly															
6	HSE OCP -025	Safety Walkthrough	Fortnightly															
7	HSE OCP -025 F-915-005	Near miss meeting	Monthly															
8	HSE OCP -025 F-720-006	Tool Box Talk	Daily															
9	HSE OCP -025	Mass tool box talk	Weekly															
10	HSE OCP -025 F-720-005	Job Specific Training / Social & Behavioral based training /Awareness sessions	Weekly															
11	N/A	Client HSE meeting																
12	WABAG/HSE/MRPL/001	Review of HSE Manual / HSE Plan	Quarterly															
13	As per governing codes and standards	Evaluation of HSE Statutory compliance	Monthly															
14	OCP-015	Emergency response mock drill	Half Yearly															
15	A-815-HIRA	Update HIRA Register	Quarterly															
16	A-815-JSA	Update JSA	Quarterly															
17	F-740-002	Visitor Alert & Feedback	As visited															
18	N/A	Client walk through																
19	HSE OCP -025	Labour camp Inspection	Monthly															
20	HSE OCP -025	Pest Control	Quarterly															
21	HSE OCP -025	Medical Camp	Half Yearly															
22	HSE OCP -025 F-720-005	Training on HSE Procedures	Monthly															
23	HSE OCP -025 F-720-008	Induction Training	As Required															
24	F-815-011	Lifting equipment Inspection	As Required															
25	F-815-010	Vehicle inspection	As Required															

P	Planned
C	Completed
NC	Not Completed



ANNEXURE – 8

ANNUAL TRAINING CALENDAR

MONTH	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31					
JAN																																				
FEB																																				
MAR																																				
APR																																				
MAY																																				
JUN																																				
JUL																																				
AUG																																				
SEP																																				
OCT																																				
NOV																																				
DEC																																				

LEGEND: Completed Not completed Rescheduled

HSE Management system		HSE Control Procedure		HSE Control Procedure		Occupational health and hygiene		Social Management	
TOPIC	ABBREVIATION	TOPIC	ABBREVIATION	TOPIC	ABBREVIATION	TOPIC	ABBREVIATION	TOPIC	ABBREVIATION
Integrated	IMS	Work at	WAH	Handling spills	HS	Communicabl	CD	Workplace	WP/
HIRA	HIRA	Electrical	ES	Working with	PT	Hest stress	HS	Women:	WHA
JSA	JSA	Chemical	CH	Hot work	HWS	Labor camp	LCHK	Protection	CL
Aspect/Impact	AI	Cylinder safety	CS	Vehicle safety	VS	Sexually	STD	Statutory:	SRWC
Incident reporting	IR	Mistrial	MH	Silps & Trips	ST	Kitchen	KHS	Labour laws	LL
Worker feedback	WF	Scaffolding	SS	Piling safety	PL	Sanitation	SH	Gender	GD
Permit to work	PTW	Concreting	CNS	Piling safety	PPL	Pest: Disease	PDP	Community -	CSS
Personal protective	PPE	Pine hazards	PH	Sand/grit	SGB	Mosquito bite:	MAL		
Emergency response	ERP	Painting safety	PS	Lock out Tag	LOT	Water borne	WBD		
Statutory rules and	LEG	Confined	COS	Vibration	VH	Air borne	ABD		
Code of conduct-Site	COC	Excavation	EX	Waste	WH	Food borne	FBD		
Near miss reporting	NMR	Housekeeping	HK	Environmental	EP	Alcohol and	ADA		
Violation procedure	VP	Material	MS	Machinery:	MVP	Ergonomics	ERG		



ANNEXURE – 9

The trainings which form an integral part of the HSE Site Management is divided into:

1. Internal Training
2. External Training

Internal Trainings

S.No	Training	Description
1	WABAG HSE Management System	
	<ol style="list-style-type: none"> 1. Vision and mission 2. HSE Policy 3. HSE management system procedures 	<ul style="list-style-type: none"> • All the employees of Wabag are communicated through Induction, displays, mailers, open house etc. • The stakeholders, including contractors are given a HSE passport, which provides a detailed description of WABAG HSE processes. • At project sites once in six months trainings are conducted to all the personnel involved in the project (Client, contractor, sub- contractor, Wabag employees). • The HSE Management system procedures is submitted to Client during contract stage.
2	Construction phase	
	<ol style="list-style-type: none"> 1. Material lifting procedure 2. Material handling 3. Electrical Safety 4. Personal Protective equipment 5. Working at height 6. Ladder safety 7. Gas cylinders : Use and handing 8. Painting safety 9. Fire hazards 10. Occupational health 11. Heat Stress 12. Basic first aid 13. Environmental pollution 14. Scaffolding safety 15. Concreting safety 16. Sand/grit blasting hazards 17. Excavation Safety 18. Working with portable electrical tools 19. Permit to work system 	<ul style="list-style-type: none"> • Familiarization training on HSE plan, procedures, formats, reporting methodology, HIRA, Environmental Aspect/Impact are imparted to all the project management team, just before the commencing of the project. • Every six months refresher trainings are conducted. • The trainings are conducted for all levels of employees at the site, which includes the management, engineers, supervisors and the workers. • Trainings on critical activities are conducted by external experts.



	<ol style="list-style-type: none"> 20. Slips & Trips 21. Confined space 22. Spills handling 23. Material stacking 24. Material storage 25. Healthy workplace habits: Diseases 26. Site vehicle management 27. Safe practices in hydrostatic and pneumatic testing 28. Welding and gas cutting 29. Incident management 30. Fire-fighting equipment 31. 5-S Housekeeping 32. Piling safety 33. Noise and vibration hazards 34. Energy isolation : LOTO 35. Emergency response procedure 36. HIRA Training 37. Aspect/Impact Training 	
Operation and maintenance		
3	<ol style="list-style-type: none"> 1. Work permit system 2. Chemical handling 3. Hydrogen sulphide safety 4. Near miss reporting 5. Incident reporting & investigation 6. Lab safety 7. Methane handling 8. Chlorine handling 9. Pump maintenance 10. Electrical maintenance 11. Emergency response procedure 12. Basic first aid 13. Spills handling 14. 5S- Housekeeping 15. Fire fighting 16. Fire hazards 17. Gas testing 18. Confined space 19. Energy isolation : LOTO 20. Noise and vibration hazards 	<ul style="list-style-type: none"> • Familiarization training on HSE plans, procedures, formats, reporting methodology, HIRA, Environmental Aspect/Impact are imparted to all the project management team, just before the commencing of the project. • Every six months refresher trainings are conducted. • The trainings are conducted for all levels of employees at the site, which includes the management, engineers, supervisors and the workers. • Trainings on critical activities are conducted by external experts.



	<ol style="list-style-type: none"> 21. Environmental pollution 22. Waste handling 23. Chemical exposure 24. Occupational health hazards 25. Drowning hazards 26. Personal protective equipment 27. Sludge handling hazards 28. Chemical storage 29. Chlorine tonner handling 30. Working with portable tools 31. SCBA training 	
4	<p style="text-align: center;">Induction training</p> <p>The induction training is giving to any new employee or a contract worker. This is to ensure that they are aware of the following:</p> <ol style="list-style-type: none"> 1. WABAG policies and procedures 2. WABAG HSE requirements 3. Organization hierarchy at site 4. Roles and responsibility 5. Statutory and regulatory requirements 6. Mandatory HSE rules & requirements 7. Personal protective equipment 8. Hazards and risks at site 9. Emergency response, contact display, evacuation routes and assembly points 10. Information on prohibited/extremely hazardous areas, if any 	
	<p style="text-align: center;">Social training</p> <p>This training includes the topics which are important for maintaining a safe workplace through creation of awareness about topics like</p> <ol style="list-style-type: none"> 1. Sexual harassment and protection of woman 2. Protection of children 3. Regulations to protect women and children 4. Religious tolerance and caste discrimination 5. Code of conduct - Site 6. Workers grievance system <p>Health and Hygiene</p> <ol style="list-style-type: none"> 1. Communicable diseases: air, water and food 2. Sexually transmitted diseases - HIV Prevention 3. Diseases caused by mosquitos: Prevention and cure 4. Best practices - hygienic living environment 5. Housekeeping at labour camp 6. Kitchen hygiene & safety 7. Sanitation: cleanliness and hygiene 	



External trainings

Regular trainings are conducted at our projects by experts from well-known institutes such as NIST Institute Pvt. Ltd, Bureau Veritas, Du-Pont and many others. The aim of the trainings is to facilitate and improve the awareness and competency of the personnel. The trainings are carried out across the organization, including head offices and project/ operation & maintenance sites.

HSE operational & awareness trainings for senior and middle management is done through online programs.

Some of the topics covered under training are as follows:

1. Emergency response mock drills
2. Work at height
3. Confined space
4. Electrical safety
5. Chemical handling
6. Behavioral based safety
7. Fire-fighting training
8. Emergency response measures
9. First aid training

In Wabag, trainings on HSE is of highest of importance and management is totally committed to ensure safety of all stakeholders. Continual improvement is a process we employ to ensure the best practices in the industry is followed and understood within the organization.



ANNEXURE – 10

APPENDIX TO

 WABAG sustainable solutions for a better life.	HSE Operational Control Procedures	Rev no 02
	OCP-001 BIOGAS ENGINE MAINTENANCE	Date: 10-01-2019

1.0 PURPOSE

To ensure the Health & Safety of employees and to protect environment from the impact arising out of Operation and Maintenance of the Bio Gas Engine.

2.0 SCOPE

This procedure is applicable for ensuring safety of personnel during the Operation and Maintenance of Bio-Gas engine at various sites during its installation, operation and maintenance activities like isolation, ventilation, draining, flushing, checking of gas, personnel entry for inspection, repair and modifications of Bio gas engine etc. This procedure is majorly applicable for O&M and to a limited way in EPC.

3.0 RESPONSIBILITY

Plant Manager/ Site In charge, Process Engineer, Electrical Engineer or Electrical Technician and Safety Officer/Engineer (if posted exclusively at the site) of O&M and RCM/ Discipline Engineer /Contractors' Engineer of EPC have the primary responsibility to ensure safe execution of stated work on the Bio-gas engine including implementation of the permit to work system.

Site Safety Officer/Engineer, Head, HSE(H.O) are responsible for the implementation and maintenance of the HSE system through promoting awareness on HSE Management Systems and training to be imparted to site employees and workmen.

4.0 POTENTIAL HAZARDS

- 4.1 **Asphyxiation** - Lack of Oxygen and Chemical Asphyxiation – Displacement of oxygen due to Methane (Sewer gas) or Hydrogen Sulphide.
- 4.2 **Toxic Hazards:** Presence of toxic gases like hydrogen sulphide, carbon monoxide, chlorine gases (traces).
- 4.3 **Fire and explosion hazards:** Gases like methane, CO & CO₂ has potential fire risks.
- 4.4 **Slip, trip and fall hazards:** Spillage of oil and coolant causes slip/Trip hazard. Fall from height
- 4.5 **Heat and Electrical Hazards**
- 4.6 **Environmental:** Air pollution, Waste oil generation, noise and exhaust emissions during normal operation , start up and shut down.

5.0 PROCEDURES

5.1 Legal Requirement:

Sl. No.	Control Activity	Responsibility	Records	Checking & Monitoring	Remarks
I	Noise Monitoring	RCM/ Safety officer	Noise record	Check noise level,	Ensure instrument calibration & validity
II	Stack Monitoring	RCM/ Safety officer	SPM, SO _x , NO _x , and CO	Stack emission monitoring	Emission levels as per Air Act
III	Hazardous Waste disposal	RCM/ Safety officer	Waste qty. category & disposal	Account all Haz. wastes generated.	Haz. Wastes (MHTB) Rules, 2008 to be followed
IV	Used battery disposal	RCM/ Safety officer	Battery inventory and disposal	Review record maintained.	Disposal as per Battery (M&H) Rules, 2010
V	Audiometry testing.	RCM/ Safety officer	Pre-employment and subsequently.	Audiometry reports	Authorised test lab.
VI	Electrical license holders	RCM/ Safety officer	Copy of electrical License	Check availability of license.	Shall be as per IE Act/Rule



 <small>sustains life, enriches it, for a better life.</small>	HSE Operational Control Procedures	Rev no 02
	OCP-001 BIOGAS ENGINE MAINTENANCE	Date: 10-01-2019

5.2 Preventive/routine Maintenance Activity

No	Control Activity	Responsibility	Records	Checking & Monitoring	Consequence
I	All electrical tools and hand lamps shall be protected by RCD/ELCB and Low voltage (24 Volts).	Elec. Engr./ Elec.Tech	Record observation	Flame proof lamps	
II	Earthing of equipment to be checked and connected by not less than 2 separate distinct electrodes. The neutral conductor of 3 phase 4 wire systems and the middle conductor of 2 phase 3 wire shall be earthed.	Elec Engr./ Elec.Tech	Record earth resistance obtained.	Check earth resistance to ensure safe earthing	Electrical shock
III	Use only non-sparking hand tools inside the Bio- gas engine room / engine. No tools shall be hand carried, take them in carry case or bag. If must, loose tool shall be tied to the waist of the employee.	Elec Engr./ Safety Officer	-	-	Fire or explosion. could occur. Fall of tools from height.
IV	No welding and cutting work done inside the Bio gas engine area without obtaining the HOT WORK PERMIT from the Engineer In-Charge.	Mech.Engr./ Safety Officer	Record observation	Observation Hot Work Permit	Fire hazard or explosion
V	'No smoking', 'No naked flames', 'No sparks' ' High Noise Area – Protect with Ear muffs' " Danger , Methane & H2S Gas Area" signs shall be displayed in the Bio-Gas Engine area	Safety officer/Plant Manager	-	-	untoward incidents
VI	All hazardous work shall be carried out under the direct and continuous supervision of responsible persons, Discipline Engineer / Supervisor.	Plant Mgr./ Discipline Engr./Safety Officer	Record observation	Continuous monitoring under Direct Supervision	Dangerous incident could occur.

5.2 Preparation of Bio gas engine before start Shut down maintenance work

No	Control Activity	Responsibility	Records	Checking & Monitoring	Consequences
I	Close the gas supply and dis-connect power supply to engine.	Proc. Engr/ Elec. Engr	LO/TO	PTW	Explosion can occur
II	Open all doors to ventilate the room naturally or forced ventilation using the exhaust blower or fan	Process Engr.	PTW	use of flame proof type equipment.	Asphyxiation
III	Check Oxygen, Methane (Explosive Mixture), H2S, LEL and CO level. Using calibrated gas analyser with validity & traceability	Process Engr/ Elec. Engr	Record gas levels	O2 - 19 to 23.5 % H2S <10 ppm, LEL < 10 %, CO < 50 ppm.	Asphyxiation
IV	Ensure all components are de-energised.	Proc. Engr/ Elec. Engr	Record	Use clamp on – tester	Electrocution
V	Engine & coolant to be cooled to ambient condition before removing the pipes, seals and covers or opening components containing liquids.	Process Engr/ Elec. Engr	Record	Observation	Thermal burn



 WABAG sustainable solutions for a better life.	HSE Operational Control Procedures	Rev no 02
	OCP-001 BIOGAS ENGINE MAINTENANCE	Date: 10-01-2019

VI	No admittance for unauthorised persons in the engine room..	RCM/ Plant Mgr.	-	-	-
----	---	--------------------	---	---	---

5.3 During Shut down Maintenance Work

No	Control Activity	Responsibility	Records	Checking & Monitoring	Consequences
I	All electrical tools and hand lamps shall be protected through RCD/ELCB and use Low voltage (24 Volts).	Elec. Engr./ Elec Techn	-	Flame proof type equipments	Explosion
II	This hazardous work require continuous & direct supervision of Discipline Engineer / Supervisor	Elect. Engr. Plant Mgr.	-	Direct Supervision	-
III	Ensure the availability of standby vehicle for emergency purpose.	Plant Manager	-	Ensure Vehicle availability	-

5.4 Preparation of Bio gas engine for restart after Shut down maintenance work

No	Control Activity	Responsibility	Records	Checking & Monitoring	Consequences
I	Ensure the Coolant lines are connected to the engine.	Proc. Engr/ Elec. Engr	LO/TO	PTW	Over heating
II	Open the gas supply and connect the power supply to the engine and switch on the ignition source of engine.	Proc. Engr/ Elec. Engr	LO/TO	PTW	—


5.5 Training and Awareness

No	Control Activity	Responsibility	Records	Checking & Monitoring	Remarks
I	Promote awareness on HSE Systems requirement through induction training and conduct toolbox meetings periodically on the following, > Potential Hazards and controls > Requirement of this procedure > H2S gas Awareness Training. > DO's and DONT's and Use of PPEs	Plant Mgr./ Safety Officer	Record of Training. provided	Refresher/ Induction Training	—
II	Display safety posters (pictorial) depicting the hazards of the Bio gas engine in local language/Hindi/English	Plant Mgr.	Display of safety posters	Visual	—

6.0 REFERENCES

- Project Safety Plan



 WABAG sustainable solutions for a better life.	HSE Operational Control Procedures	Rev no 02
	OCP-002 REFURBISHING SLUDGE DIGESTER AND GAS HOLDER	Date: 10-01-2019

1.0 PURPOSE

To ensure Health and safety of personnel while refurbishing sludge digester & gas holder.

2.0 SCOPE

This procedure is applicable all activities pertaining to the activities like isolation, draining, flushing, purging / ventilating, gas checking, personnel entry for inspection, repair, modifications and re-furbishing of Sludge Digester(s) and Gas Holder(s) and connected accessories viz, pipelines, man holes, pits etc., This procedure is applicable majorly for O&M and during the commissioning in EPC.

3.0 RESPONSIBILITY

Plant Manager/RCM/Site In charge, Discipline Engineer and Contractors' Engineer have prime responsibility for the safe execution of the work connected with Sludge Digesters and Gasholders.

Site Safety Officer and Head, HSE (HO) is responsible for implementing the HSE System through, education and training of the site employees, implementation of Work Permit System, Gas Checking while working with the gas digester and gas holders.

4.0 POTENTIAL HAZARDS

- 4.1 **Asphyxiation** - Lack of Oxygen and Chemical Asphyxiation – Displacement of oxygen due to Methane (Sewer gas) or Hydrogen Sulphide.
- 4.2 **Toxic Hazards:** Presence of toxic gases like hydrogen sulphide, carbon monoxide, chlorine gases (traces).
- 4.3 **Fire and Explosion hazards:** Gases like methane, CO has potential fire risks.
- 4.4 **Slip, trip and fall hazards:** Inside the digester or gasholder may contain sludge or water vapours and thus has slip/trip hazards. And also has the potential fall risks.
- 4.5 **Biohazards** due to the presence of bacteria's and micro organisms viz., E-coli, cholera, etc.,
- 4.6 **Environnemental:** Air pollution, Water usage.

5.0 PROCEDURE

5.1 Legal Requirement:

No.	Control Activity	Responsibility	Records	Checking & Monitoring	Remarks
I	Fall Protection	Plant Manager	PTW	Compliance with PTW	-
II	Eye protection	Plant Manager	PPE record	Provision of Eye goggles.	-

5.2 Personal Hygiene

No.	Control Measures	Responsibility	Records	Checking & Monitoring	Consequences
I	Workmen engaged in handling sewers are to be provided vaccination against tetanus and diphtheria to protect from water-borne diseases	Plant Manager	Vaccination records	observation	Viral attack, skin and water diseases
II	Wash with soap and disinfect hand and face before drinking and eating.	All Employees	-	-	Skin diseases

5.3 Preparation of Digester and Gas Holder before entry of employees

No.	Control Activity	Responsibility	Records	Checking & Monitoring	Consequences
I	Physically isolate the digester / gasholder from all input / output connection by closing the valve and inserting the blinds.	Workmen/ Process Engr.	LO/TO	Visual	Gas Leakage causing explosion / asphyxiation
II	Drain and flush the sludge in digester using water jet and wash gasholders	Workmen/ Process	PTW	Observation	-




	and digester with water.	Engr.			
III	Open the man holes and ventilate the tanks by forced ventilation using exhaust blower /fan (flame proof)	Workmen / Safety Officer	PTW	Observation	Asphyxiation/ Fatality
IV	Check Oxygen, Methane (Explosive Mixture), H ₂ S , LEL and CO. Ensure the gas monitor has valid calibration & traceability	Process Engr./ Safety officer	Gas levels Calibration Report	Gas levels	Fatality
V	Ensure oxygen content is in the range of 19% to 23.5 % by Vol. by forced or natural ventilation. None to be allowed entry into digester/ gas holder when O₂ level is below 19%.	Plant Manager/ Safety Officer	Confined Space PTW	Gas Monitor O ₂ - 19.5% - 23.5 % Vol.	Asphyxiation
VI	Explosive mixture of methane, Lower Explosive Limit (LEL), shall be well below of 5 % i.e. Methane Gas concentration not to exceed 5%. For Hot work LEL shall be 0%.	Plant Manager/ Safety Officer	Confined Space PTW	Monitor LEL < 5% Vol. LEL < 0% (for hot work)	Explosion can occur
VII	Ensure that the H ₂ S level is less than 10 PPM.	Plant Mgr./ Safety Officer	Confined Space PTW	Gas Monitor <10 PPM	Asphyxiation
VIII	Obtain confined space entry permit from the Engineer In-Charge of Client /Consultant and maintain all safe conditions mentioned as above during entry and working time.	Process Engr./ Plant Manager	Confined Space PTW	—	Fatality
IX	Ensure manhole watch (Standby Person) is posted outside at the entry point and instruct him not to move away from that place till all the employees from the tank have come out.	Process Engr./ Safety officer	Confined Space PTW	Attendance Sheet.	Safety Violation

5.4 During Work:

No.	Control Activity	Responsibility	Records	Checking & Monitoring	Consequences
I	Use non-sparking type hand tools inside the digester and gasholder Tools shall be carried in the carry on case or bag only. No loose tools shall be hand carried. If it is must then they shall be tied to the waist by the operator.	PE	PTW	Monitor compliance	Explosion
II	All electrical tools and hand lamps are of low voltage (24 Volts) shall be protected with RCD/ELCB.	SI/EE	Confined Space PTW	Flame proof type portable equipments	Explosion
III	No welding, chipping and cutting shall be carried out inside the gas holder and digester without the HOT WORK PERMIT from the Engineer In-Charge.	SI/PE	Confined Space PTW	Observation and adherence.	Explosion
IV	This hazardous work shall be directly supervised & continuously monitored by the Discipline Engineer / Plant In-charge.	Plant Mgr./ Process Engr.	Confined Space PTW	Direct Supervision	-
	Ensure the availability of standby	Plant	-	Check	-



 <small>Water & Air Solutions for a better life.</small>	HSE Operational Control Procedures	Rev no 02
	OCP-002 REFURBISHING SLUDGE DIGESTER AND GAS HOLDER	Date: 10-01-2019

V	vehicle in case of any emergency.	Manager		availability	
---	-----------------------------------	---------	--	--------------	--

5.5 Training and Awareness:

No.	Control Activity	Responsibility	Records	Checking & Monitoring	Remarks
I	Promote awareness on HSE Systems through induction training and conduct tool box talks periodically to the site employees and workmen on the following, <ul style="list-style-type: none"> ➤ Potential Hazards & Controls. ➤ Requirement of this OCP. ➤ DO's and DONT's. ➤ Use of PPEs. 	Plant Manager/ Safety Officer	Record of training conducted	List of training conducted during a specific period.	-
II	Display safety posters (pictorial) depicting the hazards near the digesters and gas holders in local language/Hindi/English.	Plant Manager/ Safety Officer	Display of safety posters	Visual	-

6.0 REFERENCES

- Safety Plan.

7.0 ATTACHMENTS

Refer Material Safety Data Sheets for

- Methane.
- Hydrogen Sulphide.
- Carbon Monoxide.



 <small>sustainable solutions for a better life.</small>	HSE Operational Control Procedures	Rev no 02
	OCP-003 CONFINED SPACE WORK	Date : 10-01-2019

1.0 PURPOSE

To ensure the absolute health & safety of personnel, properties and the environment while carrying out activities in a confined spaces like, tanks, pipelines, digesters, gas holders, vessels, pits, silos, closed wells, etc., .

2.0 SCOPE

This procedure is applicable for all activities carried out in Sites and Plants , while isolation, draining, flushing, purging / ventilating, gas checking, personnel entry for work, inspection, repair, modifications and re-furbishing in the confined spaces. This procedure is applicable to both EPC and O&M

3.0 RESPONSIBILITY

Site In charge, concerned discipline engineer and contractors' engineer have prime responsibility for safe execution of the work carried out in a confined space.

Site Safety Officer and Manager Head, Safety (OBG) and Head HSE are responsible for putting the safety system in firm place viz., education and training of the site employees on this procedure and implementation of Permit to Work System, including Gas Checking and monitoring while working in confined space..

4.0 POTENTIAL HAZARDS

- 4.1 Asphyxiation - Lack of Oxygen and Chemical Asphyxiation – Displacement of oxygen due to Methane (Sewer gas) or Hydrogen Sulphide.
- 4.2 Toxic gas hazards : Presence of toxic gases like hydrogen sulphide, carbon monoxide, chlorine gases (traces)
- 4.3 Fire and explosion hazards: Gases like methane, CO has potential fire risks.
- 4.4 Slip, trip and fall hazards: Inside the digester or gasholder which may contain wet sludge or water vapours and thus can cause slip, trip fall hazards, has the potential fall risks due to height
- 4.5 Biohazards due to the presence of bacteria and microorganisms in the STP sludge viz., E-coli, cholera, etc.,

5.0 PROCEDURE

5.1 Legal Requirements

No.	Control Measures	Responsibility	Records	Checking & Monitoring	Consequences
I	Display caution board at the entrance or near all man holes and work places involving work in confined space "DANGER – CONFINED SPACE. DONOT ENTER WITHOUT AUTHORISATION AND WORK PERMIT"	RCM	Display Board Authorisation and Permit to Work with Validity	Work Permit issue date/time/ name of persons to whom issued etc.	Regulatory violation
II	Post a man (watch) at the entrance or near the man hole and work is carried out in confined space Maintain a register logging the name of the persons working inside the confined space, time of entry and exit.	Engineer	Work Permit	Audit	Regulatory violation

5.2 Preparation of confined space prior to entry of employees (e.g. Gas Digester and Gas Holder)



No.	Control Activity	Responsibility	Records	Checking & Monitoring	Consequences
I	Physically isolate the confined space from all the input / output connections by closing the valve and inserting the blinds	Discipline Engineer	LO/TO	Visual Inspection	—
II	Drain, flush and clean the confined space, if it contains any toxic and hazardous substances.	Process Engineer	Valid Permit for working in confined space.	Physical Inspection	Toxic contents
III	Open the man holes and ventilate the tanks either by forced ventilation using exhaust blower / fan (of flame proof type)	Safety Officer	Valid Permit for working in confined space.	Checking and Monitoring Oxygen level in confined space.	Lack of oxygen
IV	Check the Oxygen and Methane level (Explosive Mixture) and also levels of other gases present viz., CO ₂ , CO and H ₂ S. Ensure the gas monitor used is calibrated having validity & traceability	Safety Officer	Calibration Report	Validity and traceability of Gas monitor	—
V	Ensure that the oxygen content is at least 19% by volume through forced air or natural ventilation. If it is below 19%, then no one shall be permitted to enter the digester/gas holder	Safety Officer	Confined Space Permit Record of Oxygen levels	Gas Monitor O ₂ > 19.5% Volume	Asphyxiation
VI	Ensure the explosive mixture of methane is well below the Lower Explosive Limit of 5 % . I.e. Methane Gas concentration shall not exceed 5%.	Safety Officer	Valid Permit for working in confined space.	Gas Monitor LEL < 5% Volume	Fire & explosion
VII	Ensure that the proper confined space entry permit is obtained from the Client /Consultant and all the conditions mentioned above to ensure safety is maintained during entry and working time.	Safety Officer	Valid Permit for working in confined space.	Verify PTW for completeness & correctness in all respects	Unsafe conditions and unsafe act
VII	Ensure that the manhole watch posted (Standby Person) outside the entry point, do not to move away from the place till all employees have come out of the confined space	Safety Officer	Valid Permit for working in confined space.	Verify log of entry and exit from confined space	Unsafe condition and act

5.3 During Work

No.	Control Activity	Responsibility	Records	Checking & Monitoring	Consequences
I	Use non-sparking type tools where working environment has flammable gases or substances. All electrical appliances should not exceed 24V. All tools shall be carried in the carry on case or bag only. No loose hand tools shall be carried with and if necessary they shall be tied to the waist of the employees	Discipline Engineer	—	Check tools used are of Non sparking type tools. Tool are carried in the carry case/ waist bag	Fire & explosion



 W A B A G <small>sustainable solutions for a better life</small>	HSE Operational Control Procedures	Rev no 02
	OCP-003 CONFINED SPACE WORK	Date : 10-01-2019

II	All the electrical tools and hand lamps shall be of flameproof type	Discipline Engineer	—	Flame proof type portable equipments	Fire & explosion
III	No welding, chipping and cutting shall be carried out inside the confined space without HOT WORK PERMIT.	Safety Officer	Hot work permit for welding	If welding is carried out check for Hot work permit.	Fire & explosion
IV	Ensure continuous direct supervision of discipline engineer / supervisor.	Discipline Engineer/ Supervisor	—	Direct Supervision	Incident could occur
V	Ensure availability of standby emergency vehicle at all times	Safety Officer	—	Standby Vehicle	

5.4 Training and Awareness

No.	Control Activity	Responsibility	Records	Checking & Monitoring	Consequences
I	Educate all the employees through induction training programme and thereby regular tool box meeting by the supervisors/Engineers daily about <ul style="list-style-type: none"> ➤ Potential Hazards ➤ Requirement of this procedure ➤ DO's and DONT's ➤ Use of PPEs 	Discipline Engineer & Safety Officer	Trg. Register	Refresher Induction trg. Every year	—
II	Display suitable posters (pictorial) depicting the hazards near the digesters and gas holders during this period in local language	Safety Officer	Display of safety posters	Visual	—

6.0 REFERENCES

- Safety Plan

7.0 ATTACHMENTS

- Work Permits



 <small>sustainable solutions for a better life.</small>	HSE Operational Control Procedures	Rev no 02
	OCP-003 CONFINED SPACE WORK	Date : 10-01-2019

CONFINED SPACE ENTRY PERMIT

Work Performed By: _____ Reference Drawing: _____

Location of work:

Brief description of the work:

Expected period of work: From _____ To: _____

Person responsible Supervision in confined space (Name):

Signature of Supervisor (Receiver): _____ Date: _____ Time: _____

R-01 Check Lists:

- Name of the standby person : _____ and instructed properly
- Is adequate ventilation is provided inside the confined space.(natural / forced) :
- Has vessel entry control board been provided to identify and monitor movement of vessel entry personnel?
- Are the lighting provided with 24 Volts supply only? :
- Is the vessel cleaned up properly and free from the toxic contents? :
- Is the vessel isolated from all input/output pipelines, and blinded? :
- Check whether the oxygen level is maintained (19 % to 21%)
- Check the Methane Concentration and report values obtained LEL / HEL :
- Are the internals free from other toxic gases (like Chlorine, H2S, CO) etc., :
- Are the Respiratory protective equipment provided to workmen:
- Are the required PPEs have been provided and used by all workmen? :

Personnel Entry LOG

Sl. No.	Name	Age	In Time	Out Time	Signature

CHECKED BY (Engineer & Safety Officer):
 Name: _____ signature _____ Date _____ Time _____

APPROVED BY [Client/Consultant]:

Name: _____ signature _____ Date _____ Time _____

Permit closed after safe execution of work on date:..... at hrs.....

Signed by Supervisor (Receiver) : _____ Date: _____
 Time: _____



1.0 PURPOSE

To ensure the absolute safety of personnel and properties while performing **electrical work in EPC Site or Operation and Maintenance of electrical equipments in the O&M plant.**

2.0 SCOPE

This procedure addresses the significant electrical hazards and risks identified in the activities of EPC and O&M.

3.0 RESPONSIBILITY

RCMs/Plant Managers/ Electrical Engineer / Technician (Elec.) and Contractors' Elec. Engineer/Technician have the primary responsibility for safe execution of the electrical operation maintenance activity in EPC/O&M Plants

4.0 POTENTIAL HAZARDS

4.1 ELECTRICAL SHOCK

Electrocution or electrical shock may cause serious injuries to a person within seconds with currents as low as 30 mA at 50 Volts and 50 or 60 Hz and cause fatality at higher exposure time and when the current ratings are above 30 mA at 50 Volts at 50Hz or 60 Hz.

4.2 HEATING AND SOURCE OF IGNITION

Electrical Burns: Overheated electrical conductors may cause burn injury and ignite flammable materials.

Electrical Explosion: Switching or sparking of electrical equipment /appliances in flammable atmospheres may cause fire and explosion. Even a small spark from a battery operated appliance may have sufficient energy as a source of ignition.

Electrical arcing may cause burn injuries. or while operating the starters, contactors, etc. in exposed condition may result in arcing and flashover.

5.0 PROCEDURE

5.1 Legal Requirement:

No.	Control Activity	Responsibility	Records	Checking & Monitoring	Remarks
I	Electrical license holders	RCM/Plant Manager/ Elec. Engineer	License copy	Only Authorised personnel do the Elec. work	As per IE Rules
II	Provide earthing system	Technician Electrical.	Report	Ensure resistance value <3 ohms	As per IE Rules
III	Over load protection device	Technician Electrical.	Report	Availability of protective devices.	As per IE Rules
IV	Residual Current Device (RCD)/ELCB	Contractor/RCM / Plant Manager	Report on Periodic test	Availability of protective devices.	As per IE Rules
V	Non conductive electrical safety mats	RCM/ Plant Manager		To be as per IS Spec.	As per IE Rules
VI	Hazardous Waste – Quantity & Disposal to Client (Customer)	Plant Manager	Waste qty. and category & disposal	Waste disposal to authorised processor	As per Haz. Rules

 WABAG Sustainable solutions for a better life.	HSE Operational Control Procedures	Rev no 02
	OCP-004 ELECTRICAL MAINTENANCE WORK	Date: 10-01-2019

5.1 R-01 Procedure

No.	Control Measures	Responsibility	Records	Checking & Monitoring	Consequences
I	Ensure equipment, cord condition and connections are free from open fault (damages).	Elec. Engr./ Elec.Techn.	Record observation	Visual	Electrical Shock
II	Check proper earthing /grounding of equipment. Ensure that - neutral Conductor of 3 phase 4 wire systems and/or the middle conductor of 2 phases 3 wire systems are earthed by not less than by 2 separate distinct earth electrodes	Elec. Engr./ Elec.Techn.	Megger values report	Earth Megger <3 ohms	Electrical Shock
III	Ensure the standard colour coding are provided for proper distinction between live, neutral and earth conductors.	Elec. Engr./ Elec.Techn.	Record observation	Visual	Electrical Shock
IV	Ensure any circuit or apparatus whether intended for operation at different voltages or at the same voltage, are identified by an indication of permanent nature, such that the respective circuits are readily distinguishable from one and another.	Elec. Engr./ Elec.Techn.	Record observation	Visual	Electrical Shock
V	Use of protective device like Residual Current Device (RCD)/Earth Leak Circuit Breaker or rated fuse, of to prevent from elec. hazards to workmen. Use rated ELCB of 30mA.	Elec. Engr./ Elec.Techn.	Record observation	Check rated fuse is as per recommendation (weak link) in RCD.	Electrical Shock
VI	Ensure no person shall work or insisted to work on any live electric supply line or apparatus unless he is well trained and authorized by a permit to work and takes the required safety precautions at all times..	Elec. Engr/ Elec. Techn.	PTW- LOTO	PTW and use of calibrated Clamp on tester	Electrical Shock
VII	No person other than Licensed Electrical contractors and supervisors/ technicians having certificate of competency shall carryout the electrical installation work and electrical maintenance work.	RCM/ Plant Manager Elec. Engr.	Experience Record and copy of license	Qualified and experienced should have B/ C grade license.	Electrical Shock
VIII	Portable Equipments: a) No flexible cables (silk wires) shall be used in any portable electrical equipment or apparatus unless they are heavily insulated. b) Portable electrical equipment like flexible grinder, drilling m/c etc. are protected with guards for rotating parts c) Ensure the cables provided for portable/ transportable apparatus are of three core type for single phase or four core type for three phase supply respectively.	Elec. Engr/ Elec.Techn.	Record observation	Check for heavy insulation and protection	a) Elec. Shock b) Bodily injury c) Elec. shock
IX	Affix permanently in visible area, a danger Warning in English or local vernacular with sign of skull bones design on all extra high, high & medium voltage installations.	RCM/ Plant Manager Elec. Engr.		Ensure display board is as per IS – 2551	—
	Provide Fire buckets filled with clean dry	RCM/Plant			



X	sand, and Fire extinguisher (Class C), ready for use, near the electrical installations and equipment to extinguish any elect. fires	Manager Elec. Engr.		Visual	
---	--	------------------------	--	--------	--

5.2 During Work


No.	Control Measures	Responsibility	Records	Checking & Monitoring	Consequences
I	Electrical Isolation: Electrical isolation is more than just turning off equipment .it also includes disconnection (often both live and neutral) and prevention of reconnection (usually by fixing locks) and proving the equipment is dead.	RCM/Plant Manager Elec. Engineer	PTW	Ensure the isolation has been properly done by using tester.	Electrical shock/Electrocution
II	Multi-lock system: Lock shall be used in isolation point to avoid energising by other work .Which give better protection then Tag out process.	RCM/Plant Manager Elec Engineer	LOTO	Visual	Electrical shock
III	ELECTRICAL TAG-OUT: Tag shall be used in isolation point to avoid to accidental energising of the electrical systems by others It can be used minor electrical job like lamping.	RCM/Plant Manager Elec Engineer	LOTO	Visual	Electrical shock
IV	PPE: Employee should wear Elec. Safety leather gloves, dielectric footwear etc,	RCM/ Plant Manager	PTW	Visual	Electrical shock

5.3 Training and Awareness

No.	Control Activity	Responsibility	Records	Checking & Monitoring	Remarks
I	Promote awareness amongst all employees through HSE induction training programme and organise tool box meeting periodically on the following, <ul style="list-style-type: none"> ➤ Potential Electrical Hazards ➤ Requirement of this OCP ➤ Elec Shock First Aid (CPR) ➤ DO's and DONT's ➤ Use of PPEs 	RCM/ Plant Manager	Trg. Register	Refresher/ Induction trg.	—
II	Display posters depicting the Elec hazards near the Electrical Installations.	RCM/ Plant Manager	Display of safety posters	Visual	—

6.0 REFERENCES: Electrical Equipment Operation & Maintenance Manual.



 WABAG Sustainable Solutions for a better life.	HSE Operational Control Procedures	Rev no 02
	OCP-005 HANDLING OF CHEMICALS AND SPILL CONTROL	Date: 10-01-2019

1.0 PURPOSE

To ensure the absolute safety of personnel, properties while working in the Plant laboratory and Chemical handling, storage and mixing areas.

2.0 SCOPE

This procedure is applicable for all activities associated with handling of chemicals in the treatment process and also in the Chemical Laboratory for analysis of various parameters. This procedure is applicable for O&M.

3.0 RESPONSIBILITY

Chemists, Site Safety Officer (where exclusively posted in some of the O&M Plants) have the primary responsibility for ensuring safe handling, transport and storage of chemicals and disposal of the chemical wastes generated after proper treatment.

Head (HSE) is responsible for implementation of the HSE system viz., Education and training of the site employees.

4.0 POTENTIAL HAZARDS

- 4.1 **Toxic Hazards:** Presence of toxic acids, solvents and gases.
- 4.2 **Fire and Explosion hazards:** Organic solvents, Gases like methane has potential fire risks.
- 4.3 **Slip, trip and fall hazards:** Spillage like poly electrolyte can cause slip/Trip hazard.
- 4.4 **Heat hazards.** Heat generated from Equipments like hotplate, oven/muffle furnace.
- 4.5 **Electrical hazards:** Electric shock and Electrocutation.
- 4.6 **Biological Hazard**
- 4.7 **Man Handling & Mechanical Hazard-** bodily injury
- 4.8 **Health Hazard-** Chemical Fumes, chemical burn, ergonomic
- 4.9 **Particulate emission**
- 4.10 **Environmental:** Water pollution, chemical spills, fugitive emissions, waste disposal

5.0 PROCEDURE

5.1 Legal Requirement

No.	Control Activity	Responsibility	Records	Checking & Monitoring	Remarks
I	Ensure the chemical lab and storage areas are well illuminated	Chemist	-	Check lux levels	Lux levels as per Factory Act
II	Electrical Safety	Chemist	-	Check for loose connection	-
III	Provision of Fire extinguisher and its control	Chemist	-	As per Factory Act	-
IV	Handle spillage of chemicals and dispose chemical wastes safely.	Chemist	No. Spills/ Qty.	Safe disposal. MSDS	As per Haz. Waste Rules
V	Chemical wash water disposal	Chemist	—	As per Water Rules	Neutralize before disposal

5.2 Routine Activity:

No.	Control Activity	Responsibility	Records	Checking & Monitoring	Consequences
I	Maintain stock of chemicals used.	Chemist	Stock Register	Verify at random	Resource loss



 WABAG <small>sustainable solutions for a better life.</small>	HSE Operational Control Procedures	Rev no 02
	OCP-005 HANDLING OF CHEMICALS AND SPILL CONTROL	Date: 10-01-2019

				entries made	
--	--	--	--	--------------	--

II	Display signs like 'No smoking', 'No naked flames', 'No igniting sparks' etc. near to storage area.	Chemist	Record observation.	-	—
III	Ensure availability of MSDS for all chemicals handled and display the important contents at the place of use, preferable in local language.	Chemist	Availability MSDS for chemicals used	Check for MSDS and their display	Chemical Hazards

5.3 Storage of chemicals

No.	Control Activity	Responsibility	Records	Checking & Monitoring	Consequences
I	After accounting for chemicals upon receipt move quickly to the storage area. Ensure storage is maintained below the eye level	Chemist	Stock Reg.	Periodic Observation	Fall and chemical hazards.
II	Avoid storage of in-compatible materials. Consult MSDS	Chemist	—	Periodic Observation	Reaction of chemicals
III	Ensure that organic solvents are stored in a separate location, free from electrical and fire hazards	Chemist	—	Periodic Observation	Fire/explosn. hazard
IV	Provide secondary containment for containers with liquid chemicals	Chemist	—	Check for leakage of chemicals	Land pollution
V	Store acid containing containers preferably on sand bed or the place shall be laid with acid proof tiles.	Chemist	—	Periodic Observation	Land pollution
VI	Store glass wares safely in separate area, preferably in the lower level of the storage shelves to avoid accidental damage during handling.	Chemist	—	Periodic Observation	Resource loss, bodily injury

5.4 Handling of Chemicals

No.	Control Activity	Responsibility	Records	Checking & Monitoring	Consequences
I	Do not handle chemicals directly. Use always the PPEs provided (Full sleeve aprons, hand gloves, skid boots, acid proof goggles, respirators/ mask)	Chemist	Record incidents of violation	Periodic Observation	Chemical burns,
II	Remove any accidental spills with suitable inert absorbent material and put it in PVC cover, tie it fully and dispose it as safely as per MSDS	Chemist	—	Periodic Observation	Slip, trip, fall hazards
III	Use appropriate lifting appliances (EOT Crane, hand trolley, conveyor etc.) in the plant to handle, transport and mixing of chemicals for process requirement	Chemist/ Process In-charge Plant Manager	Third Party certificates for lifting machines	Random check to ensure compliance	Back ache/ Bodily injury/ Chances of failure of lifting equipment.
IV	In case of any accidental contact of the any part of the body/eyes with chemicals, wash affected part or the	Chemist/ Process In-charge	—	—	Chemical burn eye irritation

	eyes with copious running potable water using the safety shower/ eye wash fountain				
V	While adding measured quantity of liquid chemicals in the Laboratory avoid manual sucking using the pipettes. Use only hand bladder type pipettes	Chemist	—	Observation	ulceration
VI	Storage, handling and consumption of foods or beverages is strictly prohibited in chemical stores, laboratories, lab refrigerators, nor any glassware or utensils used in laboratory operations shall used be handling foods or beverages.	Chemist	—	Observation	Food contamination
VII	Display safety and health related signage's in Chemical Stores, Laboratories	Chemist/ SI	—	—	—

5.5 Handling of Laboratory equipments and glassware

No.	Control Activity	Responsibility	Records	Checking & Monitoring	Consequences
I	All laboratory equipment shall be inspected for their safe condition, before use	Chemist	—	—	Electrical Hazard, Mechanical Hazard
II	While handling glassware take appropriate care to avoid breakage. Use brush to collect broken glassware for disposal	Chemist	—	—	Injury- cut
III	Use appropriate PPEs (Hand gloves, Goggles, full sleeve aprons/ lab coat,) while handling chemicals and hot liquids/solids	Chemist/ SI	—	—	—
IV	Dispose the chemical containing waste water safely and the chemical wastes as per MSDS.	Chemist/ SI	—	—	Violation of legal requirement

5.6 Training and Awareness

No.	Control Activity	Responsibility	Records	Checking & Monitoring	Remarks
I	Promote awareness on HSE requirements amongst all employees by conducting HSE induction training programme and conduct tool box meetings periodically on the following, > Potential Hazards involved > Requirement of this OCP > DO's and DONT's while handling chemicals and Lab Safety > Use of right PPEs for the job	Plant Manager/ Process Engineer	Trg. Register	Refresher /Induction trg.	—
	Display Safe poster (pictorial) on	SI	Display of	Walk through	

 <small>sustainable solutions for a better life</small>	HSE Operational Control Procedures	Rev no 02
	OCP-005 HANDLING OF CHEMICALS AND SPILL CONTROL	Date: 10-01-2019

II	various types of hazards to be encountered while handling chemicals and spills control measures in local language/English/Hindi		safety posters	Checking for display of posters	—
----	---	--	----------------	---------------------------------	---

5.7 SPILL CONTROL AND ACCIDENT PROCEDURES

EYE CONTACT:

Immediately flush eyes with cool potable running water continuously for 15 minutes, lifting the affected eye lid occasionally. If pain persists call for medical attention immediately.

SKIN CONTACT:

Fully remove the contaminated clothing. Wash affected part with copious running water for some time. Apply mild soap and wash with water again. Rinse thoroughly. Seek medical attention if skin rash persists.

IF INHALED:

Remove to farther place for breathe fresh air.

Small Spill:

Do not attempt cleanup if you feel unsure of your ability to do so or if you perceive the risk to be greater than normal handling operations. If you are confident in your ability to clean up the solid spills using hand brush and the liquids with absorbent and dispose them in poly bags or as given in MSDS, tightly sealed for safe disposal. Make sure that spilled chemicals are compatible.

Large Spill:

Notify others in area of spill. Evacuate area, notify second knowledgeable source, remain in area in safe location to restrict access and assist with response.

5.8 WASTE DISPOSAL

Disposal of wastes containing liquid/solid chemical spills: Dispose of solid waste as per MSDS and direct the liquid spills after neutralization to the inlet of treatment plant for further dilution and processing.

6.0 REFERENCES

Nil

7.0 ATTACHMENTS

Nil



	HSE Operational Control Procedures	Rev no 02
	OCP-006 WELDING AND GAS CUTTING OPERATIONS	Date: 10-01-2019

1.0 PURPOSE

To ensure HSE requirements are adequately complied with during welding and gas cutting operations

2.0 SCOPE

This procedure shall apply to both O&M Plants and EPC Projects where welding and gas cutting operations are involved

3.0 RESPONSIBILITY

- a) RCM/Plant Manager/Site In-charge, Mechanical Engineer, Safety officer at Project Sites, O&M Plants.
- b) Periodical Health check and monitoring of the employees shall be the primary responsibility VATech Wabag
- c) Periodic health check and monitoring of Sub-contract employees shall be the primary responsibility of the Sub-contractor.

Site Safety Officer and Head, HSE (HO) are responsible for implementation and maintaining the HSE System requirements at their sites viz., including training and increasing the awareness of the employees, on HSE.


4.0 DEFINITIONS

ADEQUATE VENTILATION	A ventilation flow, which allows fresh air to circulate to replace contaminated air, which is simultaneously removed.
COMBUSTIBLE SUBSTANCE	Any substance which, after ignition, will continue to burn in air.
FIRE WATCH	Person(s) assigned to work with welders to watch for fires resulting from welding, cutting, and brazing operations.
HOT WORK PERMIT	An approval form required prior to performing welding or cutting operations in areas not designated for welding.
IGNITABLE MATERIAL	Any material that is capable of burning.
LOCAL EXHAUST VENTILATION	A ventilation system that captures and removes the contaminants at the point they are being produced before they escape into the worksite.

5.0 POTENTIAL HAZARDS

- i. Explosion-due to improper handling/storage of gas cylinders.
- ii. Accidental Fire hazard -during use of flash/arc for cutting or welding.
- iii. Electric shock- due leakage of electricity.
- iv. Asphyxiation-Oxygen displaced by fumes/hot gases.
- v. Heat exposure-continuous use of torch flash/arc without heat resistant wall/clothes.
- vi. Excessive Light hazard- Use of flash or arc without screen.
- vii. Fugitive emissions-Generation of toxic gas during arc cutting/welding.
- viii. Dust emission-Emission of dust during cutting operation.
- ix. Flash back-Back due to chocking of torch nozzle.
- x. Health hazard- continuous inhalation of fugitive emissions.



 WABAG <small>Quality. Safety. Health. For a better life.</small>	HSE Operational Control Procedures	Rev no 02
	OCP-006 WELDING AND GAS CUTTING OPERATIONS	Date: 10-01-2019

6.0 PROCEDURE

6.1 ^{R-01} Legal Requirement:

No.	Control Activity	Responsibility	Records	Checking & Monitoring	Remarks
I	Various precautions given in Gas Cylinder Rules, to ensure safety during storage and use of gas cylinders	Mechanical Engineer	Permit to work	Physical verification	Gas cylinder Rule violation
II	Use only industrial type (commercial grade) LPG cylinders. NO DOMESTIC LPG cylinders shall be used.	RCM	Permit to work	Physical verification	PDSO rules violation

6.2 Preparation for Welding/Gas cutting

No.	Control Activity	Responsibility	Records	Checking & Monitoring	Consequences
I	Check welding cables are free from damages to insulation, no loose joints/connections. Use proper clamping and gripping. If joining of cables is required	Discipline Engineer	Permit to work	Physical Inspection	Electrical shock and spark generation
II	Check and ensure the body of the Welding machine (generator) is properly earthed / grounded separately using earth cleats.	Discipline Engineer	Permit to work	Physical Inspection	Electrical shock
III	No welding and cutting shall be carried out in an environment where flammable substances are present. This locations requires HOT WORK PERMIT	Discipline Engineer	Hot work Permit	Inspection	Fire & Explosion
IV	'No smoking', 'No naked flames', 'No sparks' signage boards shall be displayed wherever flammable substances are present	Discipline Engineer	-	Verify display of signage	Fire & Explosion
V	Keep fire watch and ward, first aid, portable type fire extinguishers near the place of work.	Discipline Engineer	Permit to work	Check provision made	Fire & Explosion
VI	Check and ensure the welding area is free from combustible materials like packaging cartons, papers, wood, cotton wastes, rags and flammable materials like petrol, diesel, paints & varnishes, PVC, cables, etc.,	Discipline Engineer	Permit to work	Inspection	Fire & Explosion

6.3 During Welding /Gas Cutting Work:

No.	Control Activity	Responsibility	Records	Checking & Monitoring	Consequences
I	Provide the employees (welders, helpers, gas cutters) with helmet, UV shield, safety shoe, leather hand gloves, eye goggles, and dungaree/apron.	Discipline Engineer	PPE register	Physically verify at random.	Eye injury, thermal burns
II	Gas cylinders shall be kept upright, on trolleys only properly chained to prevent their falling. Never roll and carry the cylinders by other means.	Discipline Engineer	---	Physically Check the condition	Bursting of cylinders
III	Check the Gas pressure gauge is working		Pressure	Physically	Over



 W A B A G <small>sustainable solutions for a better life.</small>	HSE Operational Control Procedures	Rev no 02
	OCP-006 WELDING AND GAS CUTTING OPERATIONS	Date: 10-01-2019

	correctly and are the flash back arrester is provided at the gas torch end,		Gauge report	Check the condition	pressurisation
IV	Check whether right polarity has been chosen for the welding and proper earthing is done using earth cleats only. No welding of rods or flats for earthing shall be permitted	Discipline Engineer	Permit to work	Physical Verification	Improper earthing can lead to electrical shock.
VI	Ensure that the gas cylinders are kept closed and the key is removed from the cylinders, when no operations is being carried out.	Discipline Engineer	---	Inspection	Bursting of cylinders
VII	Collect welding electrode butts in a container (metallic)	Discipline Engineer	---	Inspection	Waste Management
VIII	Ensure no admittance for unauthorised persons.	Security Officer		Observation	---

6.4 Training and Awareness

No.	Control Activity	Responsibility	Records	Checking & Monitoring	Remarks
I	Promote awareness on HSE requirements amongst employees through HSE induction training and regular tool box meeting on, > Potential Hazards of the process > Requirement as per this OCP. > DO's and DONT's during welding /gas welding. > Use of appropriate PPEs	Supervisor/ Discipline Engineer/ Safety officer	Training Register	Refresher Induction training every year	---
II	Display posters (pictorial) depicting the welding hazards near the welding and other fabrication area preferably in local language and national language, English	Safety officer	Display of safety posters	Visual	---

6.5. Other Requirements

Ensure that all required permits are obtained before start of the welding work, to provide for safe operation.

6.5.1 Confined Space Operations:

- a) Proper precautions must be taken by personnel who are required to perform welding or cutting operations in a confined space area.
- b) Prior to welding tanks, cylinders, or other containers, supervisory personnel must complete a hot work permit and verify that the containers do not contain, or have not contained, any flammable, toxic, or explosive materials. If containers have contained flammable, toxic, or explosive materials, then they must be emptied, well flushed, or otherwise purged and the internal air is sampled prior to welding.

6.5.2 Fire Protection:

- a) Fire protection equipments must be always maintained in ready for use condition at all times when welding or cutting operations are performed.



	HSE Operational Control Procedures	Rev no 02
	OCP-006 WELDING AND GAS CUTTING OPERATIONS	Date: 10-01-2019

- b) If welding is to be performed in areas where a fire hazard may exist, fire watch practices must be established and implemented prior to start of welding (Hot work Permit.)
- c) When performing welding or cutting operations on coated surfaces that are highly flammable (determined by a flammability test), the coating must be stripped from the area to prevent ignition.
- d) All surfaces covered with toxic preservatives, including coatings which generate toxic substances upon heating, must be stripped for a distance of at least 4 inches from the area of heat application.
- e) Contractors performing welding and cutting operations must be made aware of the risks involved in the operations, and shall obtain approval from District prior to performing such operations.

7.0 REFERENCES

- Project specific HSE Plan

8.0 ATTACHMENTS

- Hot work permit





HSE Operational Control Procedures

Rev no 02

OCP-007 MATERIALS LIFTING/HANDLING MACHINES TOOLS & TACKLES

Date: 10-01-2019

1.0 PURPOSE

To provide guidelines for safe use of lifting machinery and tackles, like fork lifts, cranes and hoists, derricks, winches, trucks, excavators, conveyors, passenger lifts and material hoists.

2.0 SCOPE

This procedure is applicable to all Project Sites, EPC and O&M Plants and administrative Offices.

3.0 RESPONSIBILITY

Site In charge, Discipline Engineer, safety officer and Contractors are Responsible for implementing this procedure.

Contractor is responsible for ensuring periodical health check of the operator and the appointed signaler. Safety Officer of VATEch WABAG shall check and ensure this requirement is met always.

Site Safety Officers and Head (HSE) are responsible for HSE System is put into practice through training and awareness to the employees and workmen.

4.0 POTENTIAL HAZARDS:

- 1) Environment Hazard : Vehicular emissions
- 2) Health hazards : Noise induced hearing impairment, exhaust emissions from engines
- 3) Bodily Injury/fatal due to fall of heavy loads during improper, over turning; collision, handling poor slinging operations, worn out or defective slings etc.

5.0 PROCEDURES

5.1 Legal Requirements:

No.	Control Measures	Responsibility	Records	Checking & Monitoring	Remarks
I	Operators with valid License / Experienced / Medical Fitness certificates with above 18 years of age to be employed	RCM / safety officer	Copy of license	Periodical Checking	CMPV Rules Violation
II	Registration, Pollution Under Check (PUC), Insurance and Fitness certificates of all Lifting Machines will be checked before use.	RCM / safety officer	Copy of certificates	Periodical Checking	CMPV Rules Violation
III	Ensure all lifting tools & tackles are verified and certified by competent authorities for safe use	RCM / safety officer	Copy of certificates	Periodical Checking	Factories Act/BOCW Rules
IV	Legible marking of SWL identification marks on the lifting tools and tackles along with the Test certificate issued by competent person.	RCM	Competent Authority report	Verify marking with the test certificate	Violation of Law

5.2 Operations

No.	Control Measures	Responsibility	Records	Checking & Monitoring	Consequences
1	Check lifting machines & tackles for, - Identification Mark Number on m/c. (mentioned in Test Certificate) - Automatic Safe Working Load Indicator. - Date of Load Test / Maintenance - Manufacturing process of tackles	Discipline /safety Engineer	Test report by third party	Verify details with the test report submitted	incident occurrence



II	Driver of every power driven lifting appliance shall be provided with a suitable cabin and the cabin shall have an unrestricted view for good operation	Discipline /safety Engineer		Physical check	
III	Take following precautions while lifting the material/load, <ul style="list-style-type: none"> Load to be lifted shall not exceed the Safe Working Load (SWL) marked on the hook and the equipment, and carried out as per the load chart Lock the safety latch provided on the hook Center the load and as close to the mast as possible, to minimize the potential for vehicle tipping or load falling. Handle only stable loads Place the load at the lowest position for oscillation free traveling Keep vehicle speed low to stop when required Barricade the swing area. 	Discipline /safety Engineer	Record of load lifted and equipment used with SWL	Check whether load lifted is well within the SWL marked on the lifting equipment and the hooks used	Bodily Injury/fatal
V	Standard hand signals as given in Fig. 1 to 3, to be followed by the crane operators and respond to the signals provided by the trained signaler.	Discipline /safety Engineer	Training given on use of hand signals	supervision/ provide training on use of hand signal	Wrong signalling & incidents
VI	A tag line or guide rope shall be used on all loads that swing freely and swing area is to be barricaded.	safety Engineer	Ground clearance used	No swinging of loads allowed	Bodily Injury/fatal
VII	When work is stopped or when crane is not in operation, boom shall be kept in horizontal position or tied in place to prevent its tossing by wind or other external force and engine switched off.	Discipline /safety Engineer	Inspection	—	—
VIII	Regularly inspect the vehicle for its safe operating conditions of brakes, lights, horns etc.	Discipline /safety Engineer	Checklist	—	—

5.3 Training and Awareness

No.	Control Activity	Responsibility	Records	Checking & Monitoring	Remarks
I	Employees shall be provided with HSE induction training and regular tool box meeting shall be conducted on <ul style="list-style-type: none"> Potential Hazards Requirement of this OCP DO's and DONT's Use of PPEs 	Discipline Engineer & Safety Officer	Trg. Register	Refresher Induction trg. Every year	—
II	Display Safety posters (pictorial) depicting hazards in local language.	Safety Officer	safety posters	Visual	—



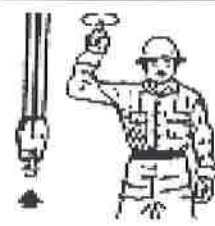
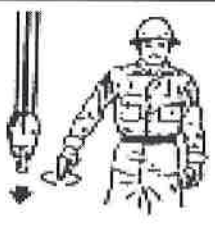
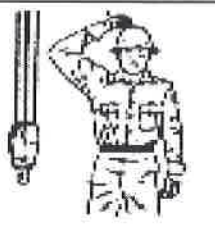

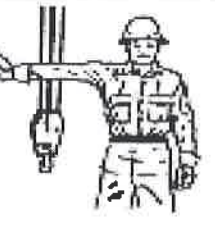
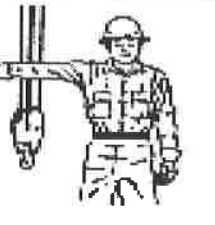
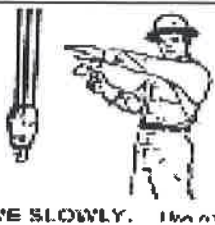

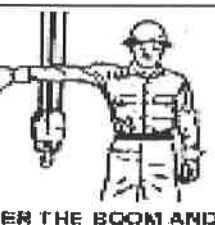
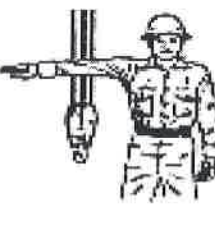
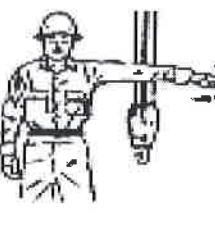
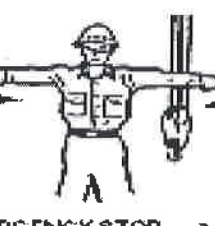
6.0 REFERENCES

- Safety Plan

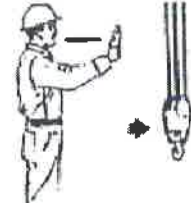
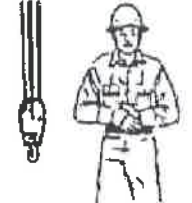
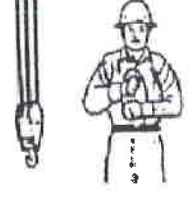

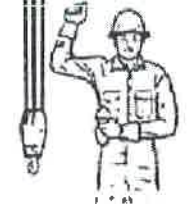

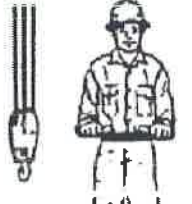

7.0 ATTACHMENTS

- Hand Signals chart

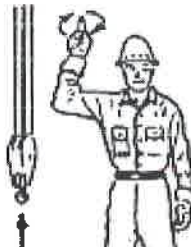
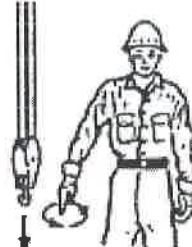
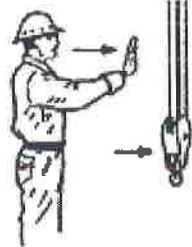
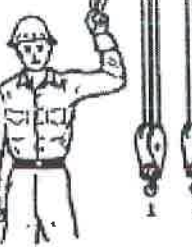


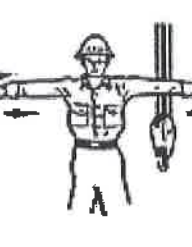

HAND SIGNALS- MOBILE CRANE

 <p>HOIST. With hand extended, palm facing forward, index finger pointing up.</p>	 <p>LOWER. With hand extended, palm facing forward, index finger pointing down.</p>	 <p>USE MAIN HOIST. With hand extended, palm facing backward, index finger pointing up.</p>
 <p>USE WHIPLINE. With hand extended, palm facing forward, index finger pointing up and thumb extended.</p>	 <p>RAISE BOOM. With hand extended, palm facing forward, index finger pointing up and arm extended horizontally.</p>	 <p>LOWER BOOM. With hand extended, palm facing forward, index finger pointing up and arm extended horizontally.</p>
 <p>MOVE SLOWLY. With hand extended, palm facing forward, index finger pointing up and arm extended horizontally.</p>	 <p>RAISE THE BOOM AND LOWER THE LOAD. With hand extended, palm facing forward, index finger pointing up and arm extended horizontally.</p>	 <p>LOWER THE BOOM AND RAISE THE LOAD. With hand extended, palm facing forward, index finger pointing up and arm extended horizontally.</p>
 <p>SWING. With hand extended, palm facing forward, index finger pointing up and arm extended horizontally.</p>	 <p>STOP. With hand extended, palm facing forward, index finger pointing up and arm extended horizontally.</p>	 <p>EMERGENCY STOP. With hand extended, palm facing forward, index finger pointing up and arm extended horizontally.</p>

MOBILE CRANES (CONTINUED)

 <p>TRAVEL. (Both Tracks) With hand open and slightly raised, make pushing motion in direction of travel.</p>	 <p>DOG EVERYTHING. (Stop) Hand in front of body.</p>	 <p>TRAVEL. (Telescoping Booms) Use both hands in front of body, making a circular motion, about each other, indicating direction of travel, forward or backward. (For hand cranes only.)</p>	 <p>EXTEND BOOM. (Telescoping Booms) One Hand Signal. One hand in front of chest, palm pointing forward with thumb pointing down.</p>
 <p>TRAVEL. (One Track) Use the track on side indicated by raised hand. Hand open to the side, palm indicated by circular motion of other hand rotated vertically in front of body. (For hand cranes only.)</p>	 <p>EXTEND BOOM. (Telescoping Booms) Both hands in front of body with thumbs pointing outward.</p>	 <p>RETRACT BOOM. (Telescoping Booms) Both hands in front of body with thumbs pointing inward toward each other.</p>	 <p>RETRACT BOOM. (Telescoping Booms) One Hand Signal. One hand in front of chest, thumb pointing forward and heel of hand facing down.</p>

HAND SIGNALS- OVERHEAD CRANES

 <p>HOIST. With hand open, palm facing up, pointing up, in a small horizontal circle.</p>	 <p>LOWER. With hand open, palm facing down, pointing down, in a small horizontal circle.</p>	 <p>BRIDGE TRAVEL. Hand open, palm facing forward, hand open and slightly raised, make pushing motion in direction of travel.</p>	 <p>MULTIPLE TROLLEYS. Hand open, palm facing forward, 1 and 2 fingers in front of chest. Regular signals follow.</p>
 <p>TROLLEY TRAVEL. Palm up, fingers closed, thumb pointing in direction of travel, rotated horizontally.</p>	 <p>STOP. With hand open, palm down, hand open, palm down, in a small horizontal circle.</p>	 <p>EMERGENCY STOP. Both hands extended, palm down, in a small horizontal circle.</p>	 <p>MOVE SLOWLY. Use this hand signal to indicate motion signals. Proceed after hand motion signals in front of hand, using the hoist signal. All hand signals should be made slowly.</p>

 <small>consulting solutions for a better life.</small>	HSE Operational Control Procedures	Rev no 02
	OCP-008 SAFE ERECTION & DISMANTLING OF SCAFFOLDS	Date: 10-01-2019

1.0 PURPOSE

To ensure safety of working personnel, properties and the environment, while erecting and dis-mantling scaffoldings for working at height.

2.0 SCOPE

This procedure is applicable all the types of scaffoldings, erection and dismantling mainly in EPC Sites, and to certain extent in O&M Plants and offices (H.O. and Pune) when working at height using scaffold is required for example painting of walls etc.

3.0 RESPONSIBILITY

Contractors' Engineer, discipline engineer and RCM are responsible for ensuring the safety of workmen during erection and dismantling of scaffoldings as described in this procedure.

Site Safety Officer and Head HSE (HO) are responsible for implementing the HSE system through education and training of the site employees, implementation of Work Permit System for all the works of scaffoldings.

4.0 POTENTIAL HAZARDS

- 4.1 Falls from height – caused by slipping & tripping, unsafe access and due to lack of fall protection
- 4.2 Fall of tools / debris/materials from height causing injury
- 4.3 Electrocution – from overhead power lines
- 4.4 Scaffold collapse - caused by instability or overloading
- 4.5 Bad planking giving way causing fall of person or fall of materials through openings.

5.0 PROCEDURE

5.1 Legal Requirement

No.	Control Measures	Responsibility	Records	Checking & Monitoring	Remarks
I	Carry out erection, dismantling, addition, or alteration of scaffoldings, only under the supervision of responsible person.	Civil Engr. Safety Officer	Scaffold check list	Direct Supervision	Violation of BOCW Rules
II	The stability and safety of the scaffold shall be certified by a Responsible person and affix the GREEN TAG to the scaffold, before putting into use.	Civil Engr. Safety Officer	Scaffold Check list and PTW	Visual Inspection	Violation of BOCW Rules
III	Workers shall not use unstable and unsafe scaffold, identified with Red Tag indicating "Don't use this Scaffold" put on scaffold by the responsible person.	Civil Engr. Safety Officer	Red TAG	Visual Inspection	Violation of BOCW Rules

5.2 Erection of Scaffoldings

No.	Control Activity	Responsibility	Records	Checking & Monitoring	Consequences
I	If overhead power lines present near the scaffold erection area, ensure it is de-energised. If not, maintain the clear distance of 3 mtrs. away from the power lines	Elec. Engineer / Safety Officer	Scaffold checklist	Visual Inspection	Electrocution



II	Ensure the scaffold poles, legs, posts, frames, and uprights are placed on base/sole plates and mud sills or other firm foundation	Civil Engineer/ Safety Officer	Scaffold checklist	Visual Inspection	Unstable, result in collapse of scaffoldings
III	Ensure the height of the scaffold does not exceed by more than 4 times its minimum base dimension, unless guys, ties, or braces are used.	Civil Engineer/ Safety Officer	Scaffold checklist	Inspection	Unstable, result in collapse of scaffoldings
IV	Provide access when scaffold platforms are more than 800mm above or below a point of access. Permitted types of access: Ladders, such as portable, hook-on, attachable, stairway type or built-in stair towers, ramps and walkways	Civil Engineer/ Safety Officer	Scaffold checklist	Inspection	Fall of person(s)
V	Install hand railing protection system along open sides & ends and front edge of the working platforms: hand rails – 1.2 mtr. tall; mid-rails - 0.6 mtr. tall and toe boards of at least 100 mm high	Civil Engineer/ Safety Officer	Scaffold checklist	Inspection	Fall of person(s) or materials
VI	Ensure platforms are fully planked or decked with less than 20mm gaps. It should be able to support its own weight & 4 times max. load. WIDTH minimum 400 mm wide	Civil Engineer/ Safety Officer	Scaffold checklist	Inspection	Fall of person(s) or materials

5.3 Dismantling of scaffolds

No.	Control Activity	Responsibility	Records	Checking & Monitoring	Consequences
I	Only competent and trained workers shall be deployed for dismantling.	Civil Engineer	Training record	Behaviour observation	Unsafe act / or conditions
II	Dismantle from the top, first by removing the working platform, poles, braces, couplers, etc., stage wise. Never start dismantling from the bottom of scaffold.	Civil Engineer	—	House keeping	Unsafe conditions
III	Display Red flag and barricade the area, No workers to enter the dismantling area. Display caution board " Dismantling work in progress- Do not enter this area"	Safety Engineer	RED Tag	—	Injury to workmen
IV	Provide full body harness (FBH) and life line support for hooking the FBH of all workers engaged in dismantling work	Discipline Engineer	—	Enforcing usage of FBH	Injury to workmen
V	Authorise the dismantling work through a Height Work Permit	Safety Engineer	Height work permit	—	High severity/ risk
VI	Remove all loose construction materials from working platforms, lower them with socks or using rope. DO NOT THROW ANY MATERIALS FROM HEIGHT	Civil Engineer	—	House keeping	Fall of materials

 WABAG <small>sustainable solutions for a better life.</small>	HSE Operational Control Procedures	Rev no 02
	OCP-008 SAFE ERECTION & DISMANTLING OF SCAFFOLDS	Date: 10-01-2019

5.4 Environmental Controls

No.	Control Activity	Responsibility	Records	Checking & Monitoring	Consequences
I	Segregate damaged wooden planks, scaffolding pipes and couplers etc., during erection and dismantling	Discipline Engineer	Waste register	Inspection of storage yard	Mix of wastages
II	Explore the possible use of the waste pipes, wooden planks for alternative purposes.	Discipline Engineer	—	—	—
III	Dispose the scarp materials	RCM	—	—	—

5.5 Training and Awareness

No.	Control Activity	Responsibility	Records	Checking & Monitoring	Remarks
I	Promote awareness on HSE requirements amongst all employees through HSE induction training and by conducting periodic tool box meetings on, <ul style="list-style-type: none"> ➤ Potential hazards and Risks ➤ Requirement of this OCP ➤ DO's and DONT's ➤ Use of PPEs 	Discipline Engineer & Safety Officer	Trg. Register	Refresher Induction trg. Every year	—
II	Display posters (pictorial) depicting the hazards involved in scaffolding and dismantling in local language/English /Hindi.	Safety Officer	Display of safety posters	Visual	—

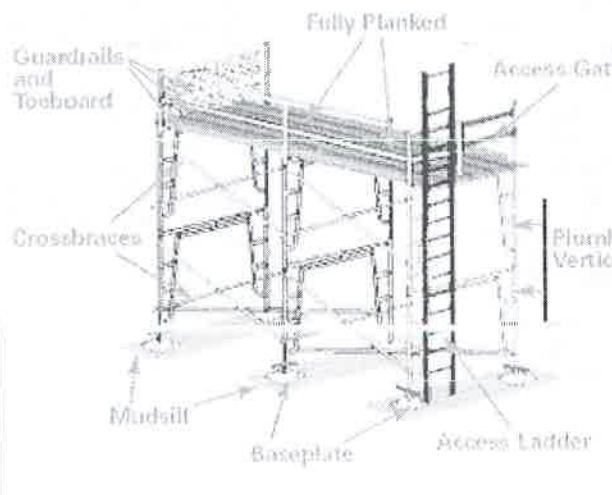
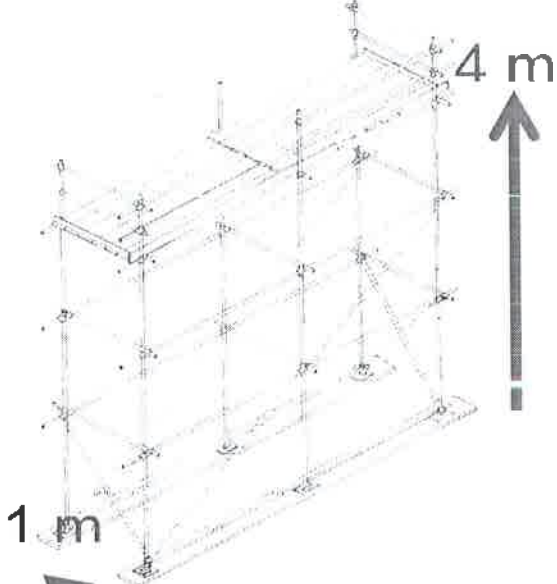
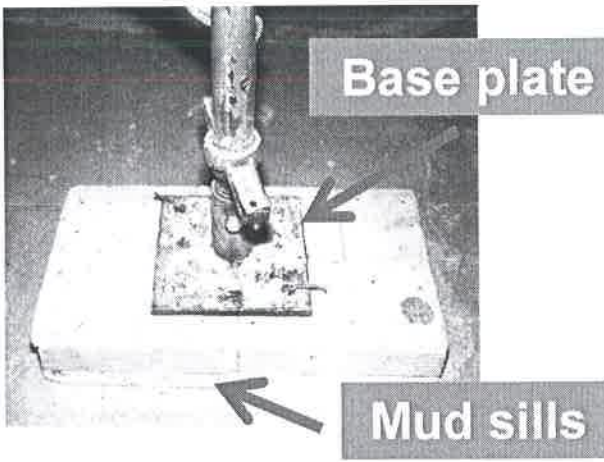
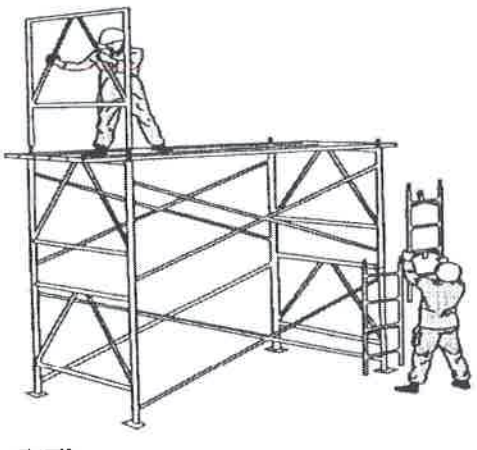
6.0 REFERENCES

- Safety Plan

7.0 ATTACHMENTS:

- Check list



<p>Scaffolds – General arrangement</p>	<p>Height shall not exceed 4 times the base width of scaffold</p>
	
<p>Excavation near a building: Shoring required to prevent collapse of the building</p>	<p>Dismantling - Stagewise</p>
	

 WABAG sustainable solutions, for a better life.	HSE Operational Control Procedures	Rev no 02
	OCP-008 SAFE ERECTION & DISMANTLING OF SCAFFOLDS	Date: 10-01-2019

SAFETY CHECKLIST FOR SCAFFOLDING

Location/Civil Structure			Date:	
Type of Scaffolds:			Tag status:	
S.No	Checking Items	STATUS		REMARKS
		YES	NO	
1	Scaffolding pipe, Clamps, Extension pins including nuts, bolts washer etc. should be free from rust, oil, and crack.			
2	Ensure only the inspected scaffolding pipe, metallic; planks, etc. are only used.			
3	Rope used for tightening scaffolding pipe joints planks etc., shall be inspected for wear & tear.			
4	Provide/use base plate or firm base below each scaffold pipe for good support.			
5	Grip cup lock or clamp joints of the structure.			
6	Change in direction of ladder at every landing platform.			
7	Landing platform & guard rails are provided as per requirement.			
8	Stiles / rungs for ladder to be provided with not more than 0.5m spacing.			
9	If cantilever / swinging scaffoldings are used, it shall be provided with railing from all sides.			
10	Strength of the existing structure to be ensured before providing scaffolding from it.			
11	Scaffolding planks provided shall be physically checked for free from defects like cracks etc.			
12	Stability of the scaffolding structure shall be checked before handing over for use or before performing any specific job on it.			
13	Physically inspect the condition of portable ladder provided / fixed to the scaffold structure, ensure there are no damages or missing rungs.			
14	Proper tagging provided at the foot of scaffolds			
Additional Comments (If any):				
Remarks: Scaffolds provided are safe to use for further working				
Checked by: Civil Engineer		Checked by: Safety Officer		Reviewed and Approved by RCM
Signature:		Signature		Signature
Date:		Date:		Date:



 <small>sustainable solutions for a better life.</small>	HSE Operational Control Procedures	Rev no 02
	OCP-009 SAFE USE OF LADDERS AND STAIRS	Date: 10-01-2019

1.0 PURPOSE

To ensure to ensure safety requirement are to be complied with while working on different types of ladders and stairs as access to the elevated /under the ground locations.

2.0 SCOPE

This procedure is applicable in EPC, O&M and work in offices (H.O and Pune offices), where temporary height works is involved using the ladders.

3.0 RESPONSIBILITY

RCM/Plant Manager/ Site In charge, Discipline Engineer and Contractors' Engineer are responsible for the safe use of ladders and stairs as per this procedure.

Site Safety Officer and Head (HSE), H.O. are responsible for ensuring implementation of the HSE Management System and the OCPs through training and education of the site employees, including implementation of the inspection system for all types ladders and stairs used as temporary access.

4.0 POTENTIAL HAZARDS

- 4.1 Fall from height - caused by slipping, unsafe access, and the lack of fall protection
- 4.2 Struck by moving objects/ vehicles while working on ladder.
- 4.3 Electrocutation- while working near over the head power lines or working with metallic ladder

5.0 PROCEDURE

5.1 Legal Requirement

No.	Control Measures	Responsibility	Records	Checking & Monitoring	Remarks
I	Every ladder or step-ladder used in building or other construction work shall be of good construction, made of sound material and of adequate strength to withstand 4 times the load to which the ladders are subjected to. Ladders must not be painted.	RCM	Ladder Inspection Report	Physically check the ladders for rigidity of construction	Collapse of ladder and injure person, if ladder is of poor quality/ construction

5.2 Before use of ladders/stairs

No.	Control Activity	Responsibility	Records	Checking & Monitoring	Consequences
I	Ladders of 3 metres above in height shall be latched (tied) to a structure at the top, & firmly secured while resting on the floor.	Safety Engineer	—	Visual	—
II	The base of a ladder must be set back one unit to every four-unit rise. (Slope is 1:4 or Angle 75°)	Safety Engineer	—	—	—
III	Ladders used for access at floor level or a platform, must extend at least one metre above the landing point.	Civil Engineer/ Safety Officer	—	Inspection	—
IV	The area around landings and base of the ladder must be free of any trash, oily surface, hoses, cords, any loose material that could cause tripping while	Civil Engineer/ Safety Officer	—	Inspection	—



	accessing				
V	Set the bottom of a ladder always on a solid base. Concrete blocks, metal containers, unsupported planks, etc. must never be used as a base.	Civil Engineer/ Safety Officer	—	Inspection	—
VI	Metal ladders, ladders with metal reinforcing wire or wet ladders must never be used near naked electrical wires or equipment with exposed electrical conductors.	Civil Engineer/ Safety Officer	—	Inspection	—
VII	Ensure while using an extension ladder, which when fully extended, it has a minimum overlap of sections of four rungs, Splicing or lashing ladders together to create a longer ladder is not permitted.	Civil Engineer/ Safety Officer	—	—	—
VIII	While ascending or descending the ladder you must always face the ladder, making always a 3 point contact.	operator			
IX	Never carry any tools in hands, while ascending or descending the ladders. Use tool holders firmly secured/ tied to waist.	operator	—	—	—

5.4 Training and Awareness

No.	Control Activity	Responsibility	Records	Checking & Monitoring	Remarks
I	Provide training and awareness to all employees on HSE Systems requirements, through HSE induction training and tool box meetings on, <ul style="list-style-type: none"> ➤ Potential Hazards ➤ Requirement of this OCP ➤ DO's and DONT's ➤ Use of PPEs 	Discipline Engineer & Safety Officer	Trg. Register	Induction trg to all new entrants and Tool Box talks given	—
II	Display posters (pictorial) on the hazards of using ladders and unsafe practices in ladder usage.	Safety Officer	safety posters	Physical verification	—

6.0 REFERENCES

- Safety Plan

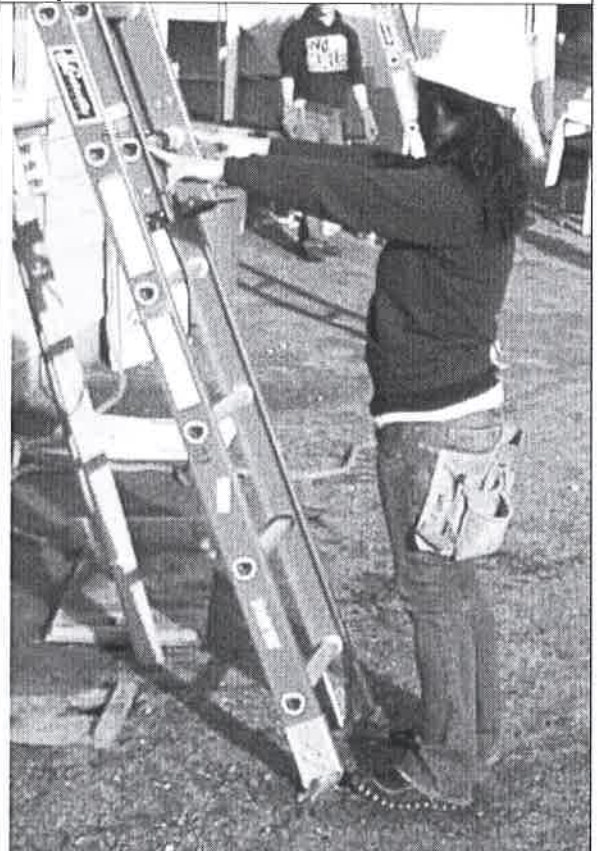
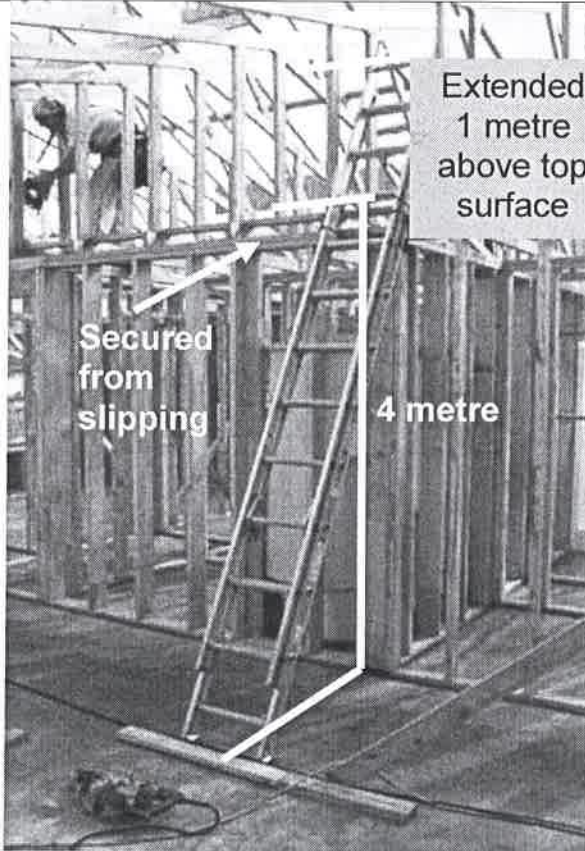
7.0 ATTACHMENTS:

- Pictures of safe and unsafe use of ladders



Ladder - Slope

One way to ensure proper angle is to stand with your feet at the base of the ladder and extend your arms straight out. If your hands just touch, the ladder will be very close to the 4 to 1 ratio.



Place ladder base on a firm, level surface with secure footing

When climbing a ladder, you must have both hands free and face the ladder. This


allows for three points of contact with the ladder at all times



UNSAFE PRACTICES- LADDER USAGE

UNSAFE PRACTICES- LADDER USAGE



 <small>sustainable solutions for a better life.</small>	HSE Operational Control Procedures	Rev no 02
	OCP-010 SAFE PRACTICES IN HYDROSTATIC AND PNEUMATIC TESTING	Date: 10-01-2019

1.0 PURPOSE

This purpose of this procedure is to ensure safety precautions to be taken during the Hydrostatic and Pneumatic testing of equipments /pipelines etc

2.0 SCOPE

This procedure is applicable to all EPC Project Sites

3.0 RESPONSIBILITY

RCM/ Site In charge, Discipline Engineer, and Contractors' Engineer and Safety officers are primarily responsible for the safe execution of the testing.

Site Safety Officer and Head HSE (HO) are responsible for implementing the HSE System through education and training of the employees/workmen involved in the hydrostatic and pneumatic testing.

4.0 POTENTIAL HAZARDS

1. Resource depletion, usage of water for Hydro test
2. Noise generation from compressor
3. Oil spillage from compressor
4. Mechanical hazards during testing
5. Electrical Hazards

5.0 PROCEDURE

5.1 Legal Requirement

No	Control Measures	Responsibility	Records	Checking & Monitoring	Consequence
I	Down stream pressure shall be regulated and ensure it does not exceed the testing pressure.	Mechanical Engineer	Pressure gauge	Pressure Regulator/ gauge	Regulatory Violation
II	Ensure safety relieve valve is fitted with pressure vessel and tested for its safe operation and is maintained in good condition	Mechanical Engineer	Test certificate	Annual testing of SRV	Bursting of Pressure Vessel

5.2 Hydro testing

No	Control Activity	Responsibility	Records	Checking & Monitoring	Consequence
I	All personnel working in the immediate vicinity shall be notified of the testing, well before start Hydraulic / Pneumatic testing.	Mechanical Engineer	IOM issued	random check on awareness of testing	—
II	Test equipment shall be inspected for wear or damage and to ensure the gauges used are calibrated and the pressure ratings are not exceeded by the test pressure.	Mechanical Engineer	Inspection report	Physical verification	Injury from bursting
III	Post warning signs about the safety hazards/risks at all important areas of testing and put up barricades shall be setup at all entry points and crossings to restrict the access and to forewarn the danger, to avoid entry of unauthorized personnel in the test area..	Safety Officer	Permit to work	Physical verification	
IV	Pressurize the system and the	Mechanical	Inspection	Physical	



	pipeline/equipment slowly by increasing pressure in incremental step at each stage and allow it to stabilize at each stage, for monitoring leakage. If any.	Engineer	and test report	checking	
V	Inspect all welds, flanges, threads and other possible leak sources. Mark the locations of leak noted, for repairing.	Mechanical Engineer	Inspection and test report	Physical checking	Leakage may happen
VI	Depressurize the system carefully, safely and slowly. Repair all leaks noted. During the test. Repeat the test until the system is tight and leak proof.	Mechanical Engineer	Inspection and test report	Physical Check	—
VII	Pressure Gauges (2nos.) with valid calibration and traceability to National Stds. shall be used to monitor the pressure. The scale range of the gauges shall not exceed 1.5 times to 2 times the test pressure	Mechanical Engineer	Calibration report of the gauges used for testing	Verification of calibration report	—
VIII	The water used hydrostatic test may be stored and reused for another system/ structure	Mechanical Engineer	Qty of water used	-	Resource depletion

5.3 Training and Awareness

No	Control Activity	Responsibility	Records	Checking & Monitoring	Remarks
I	Provide training on awareness on HSE System requirements through HSE induction training and conducting the tool box talks periodically on, <ul style="list-style-type: none"> ➤ Potential Hazards of testing employed ➤ Requirement of this OCP ➤ DO's and DONT's ➤ Use of PPEs 	Safety Officer	Trg. Register	Refresher Induction trg. Every year	—
II	Display posters (pictorial) depicting the hazards near the Hydro/Pneumatic test area in local language/Hindi and English	Safety Officer	Display of safety posters	Visual	—

6.0 REFERENCES

- HSE Plan

7.0 ATTACHMENTS

- Nil



 W A B A G <small>sustainable solutions for a better life.</small>	HSE Operational Control Procedures	Rev no 02
	OCP-011 SAFE HANDLING OF COMPRESSOR & PNEUMATIC TOOLS	Date: 10-01-2019

1.0 PURPOSE

To ensure the health & safety of operating personnel while handling the Compressor and Pneumatic tool, to reduce the risks involved.

2.0 SCOPE

This procedure is applicable to all O&M and EPC sites

3.0 RESPONSIBILITY

RCM/Plant Manager /Site In charge, Discipline Engineer and Contractors' Engineer are responsible for the safe operation the hand tools, while executing the work connected with it.

Site Safety Officer and Head, HSE (HO) are responsible for implementing the HSE Management Systems through training and awareness on the Systems requirement to the site employees.

4.0 R-01 POTENTIAL HAZARDS

1. Dust Generation (Health Hazard & Environmental)
2. Noise Hazard (Environmental)
3. Leakage of oil causing land contamination (from compressor)
4. Mechanical Hazard: Bodily Injury (chip breaking etc)
5. Slip, trip and fall hazards
6. Electrical Hazards (if not earthed properly)
7. Fall of tools causing injury while working with tools at height)

5.0 PROCEDURES


5.1 Legal Requirement

No.	Control Measures	Responsibility	Records	Checking & Monitoring	Remarks
I	Air receiver of compressor shall comply with SMPV Rules (test pressures: 1.1 times for pneumatic and 1.5 times for hydraulic, of the design pressure)	Safety Officer	Test report for air receiver	Review test report of air receiver	For capacity of 1000 ltrs. and above
II	Scaffolding and ladders used for height work shall be as per BOCW Rules	Safety Officer	PTW	—	Bodily Injury/ Fatality
III	Noise emission	Safety Officer	Noise level	Noise Monitoring	Hearing impairment,
IV	Oil leakage and disposal of oily waste	Mechanical Engineer	—	Waste disposal identified bins / drums	Violates Haz. Wastes (MHTB) Rules 2008

5.2 Compressor and Pneumatic tool Handling

No.	Control Activity	Responsibility	Records	Checking & Monitoring	Consequence
I	Air compressor shall be operated and maintained as per instruction manual	Discipline Engineer	Operation Manual	As per instruction manual	Unsafe condition
II	Check hose pipe for damages, elec-	Operator	—	Visual	Bodily injury



 WABAG <small>sustainable solutions for a better life.</small>	HSE Operational Control Procedures	Rev no 02
	OCP-011 SAFE HANDLING OF COMPRESSOR & PNEUMATIC TOOLS	Date: 10-01-2019

	trical loose connections, prior to using				
III	Check if, the compressor is serviced, tested including its safety relief valve.	Safety Officer/ Mech. Engr./	Test Report	Review report and validity	Air receiver explosion
IV	Set the equipment to recommended pressure setting for the tool or for the job being done. Do not exceed the set pressure	Safety Officer/ Mech. Engr./	---	Compliance check by Safety Officer	---
V	Use recommended PPEs for the job (ear plug, safety-helmet, shoes, gloves goggles, gloves, protective apron, dust mask) while working	Operator	---	Compliance check by Safety Officer	Injury, noise nuisance, congestion in lungs
VI	Do maintain good housekeeping while working with the compressor and pneumatic tools at all times	Operator	House-keeping Checklist	Compliance check by Safety Officer	Slip, fall hazard
VII	Make sure that tool has completely stopped before changing or disconnecting.	Operator	-	-	Injury from rotating parts
VIII	Do not project the running compressor hose or nozzle towards any part of the body or face, for cleaning purpose.	Operator	-	-	Bodily Injury to operator
IX	Unplug the cord from elec. mains before disengaging the tool from compressor.	Operator	-	-	Electrical shock
X	Wipe of oil spillages using cotton waste and dispose them in colour coded bins.	Operator	-	-	Slip, trip, fall, environment. pollution

5.3 R-01 Training and Awareness

No.	Control Activity	Responsibility	Records	Checking & Monitoring	Remarks
I	Promote awareness through HSE induction training and organise regular tool box meetings to the operator and employees on, > Potential Hazards/Risks > Requirement of this procedure > DO's and DONT's > Use of right PPEs for the job	Mechanical Engineer & Safety Officer	Trg. Register	Check for the trainings conducted during the year and records maintained	---
II	Display Safety posters (pictorial) depicting the hazards encountered in local language/Hindi/English	Safety Officer	Display of safety posters	Visual	---

6.0 REFERENCES

- HSE Plan

7.0 ATTACHMENTS

- None



1.0 PURPOSE

To ensure adequate HSE requirements to be complied with during insitu stress relieving operations on equipments at Project sites and O&M Plants and Project sites

2.0 SCOPE

This procedure is applicable to all Project Sites, O&M Plants

3.0 RESPONSIBILITY

- a) RCM/Plant Manager/Site In-charge, Mechanical Engineer, Safety officer at Project Sites, O&M Plants.
- b) Periodic health check and monitoring of workmen shall be the primary responsibility of the Sub-contractor. VA Tech WABAG shall check and ensure this requirement is met.
- c) Site Safety Officers and Head, Head, HSE (HO) are responsible for implementation and maintaining the HSE Management Systems by imparting training and promoting awareness to the employees,

4.0 POTENTIAL HAZARDS

Safety Hazards

- 4.1 Fire hazard
- 4.2 Burn Injury
- 4.3 Electrical hazard (if electrical heating is used).
- 4.4 Slip, trip and fall from height (Tank)
- 4.5 Mechanical and man handling hazards

Environmental

- 4.6 Dust emission (cleaning) and emission of smoke (if diesel firing is used)
- 4.7 Noise emission (through nozzles when diesel fire is used).
- 4.8 Leakage /Spillage of diesel
- 4.9 Disposal of waste wire wool/ glass wool, an insulation material,

Health:

- 4.10 Etching on skin (while handling glass wool- thermal insulation materials).
- 4.11 Lungs infection (due to inhalation of smoke)

5.0 PROCEDURE

5.1 Legal and General Requirement

No.	Control Measures	Respon- sibility	Records	Checking & Monitoring	Remarks
I	Lifting equipments, tools and tackles to be used shall be certified by competent authority	RCM/ Safety Officer	Competent authority reports	Verify the reports for correctness	Unsafe condition
II	Site Safety Officer shall ensure that scaffoldings provided and the ladders placement for the height work shall meet the legal requirement	Safety Officer	PTW	Verify requirements as per the PTW	Collapse, fall from height causing injury or fatality
III	Emission of smoke during heating with furnace oil/diesel and burner noise emission	Safety Officer	PTW	Check smoke and noise emission by visual means	Lung disease Use ear plug to avoid noise
IV	Ensure safe disposal of oily waste	Discipline	Disposal	Waste	Legal



	cottons, waste wire wool generated during wrapping and unwrapping of the equipment	Engineer	record	identification and disposal	violation Land contamination
V	Before commencing the work obtain work permit and where necessary an exclusive method statement could be made and got approved by Client/Consultant.	RCM	Letter of approval by client PTW	Review PTW issued for completeness	Can result in hazards listed under Cl.4.1

5.2 Preparation for Stress Reliving

No.	Control Activity	Responsibility	Records	Checking & Monitoring	Con-Sequences
I	Ensure that skilled persons are only involved in this work and they are made aware of the hazards associated with the work, before commencing the work	Mech. Engineer	Training record	Review record	—
ii	Place the vessel on the rails and FIRMLY support it firmly by internal bracings. Use appropriate lifting equipments and tackles for lifting while adopting the safety precautions while handling and lifting	Supervis or Discipline Engineer (Mech)	Site Plan PTW	Check lifting equipments and tools for certification by competent person.	Damage to Equipment bodily injury or fatality due to fall of materials/ equipments
III	Insulation of the tank shall be done by using glass wool pad and wired in such a way to prevents loss of heat. Collect waste glass wool and dispose in safe manner	Discipline Engineer (Mech)	PTW	Disposal of glass wool	Land Pollution
IV	PPEs relevant to the job execution like mask, goggles, gloves, and safety harness for height work .etc. shall be provided to workmen	Safety officer	PTW	Visual Check	Endanger personal safety
V	Drums of diesel required for heating shall be stored at a location away from the hot work, to maintain in a cool condition Necessary secondary containment shall be provided to collect the spills during handling	Stores in charge	Record quantity issued, returned after use	Inspect storage location and Check whether provision made for secondary containment.	Accidental fire and explosion

5.3 During Stress Reliving

No.	Control Activity	Responsibility	Records	Checking & Monitoring	Con-Sequences
I	Hard barricade at least 5 meter away from the operational area of Stress relieving operation and post warning signs at the location to warn the general public/ traffic around the operational area.	Safety officer	PTW	Display signs "Hot Work" , Hard barricading hoist red flag etc.	Burn injury due to accidental contact with hot job.
II	The total area shall be protected from direct wind flow/water ingress and	Discipline Engineer	PTW	Use of flame proof type	Reduces heating



 WABAG <small>environmental solutions for a better life</small>	HSE Operational Control Procedures	Rev no 02
	OCP-0012 ON SITE STRESS RELIEF TREATMENT	Date: 10-01-2019

	personnel contact.			tarpaulin.	efficiency
III	Since the operation is carried out at elevated temperature with high heat input, necessary precautions like providing fire extinguishers, sand buckets, fire hydrant & hoses etc. ambulance, shall be kept ready in standby mode to tackle any emergency fire.	Mechanical Engineer/ Safety officer	PTW	—	Fire hazard can be severe in case of any accidents happening.
IV	Deploy competent electrician for this task. Provide power supply through 3-phase system, routing through MCB/ELCB with proper earth connections. Providing DG at site with proper earth connection shall ensure continuous power supply.	Discipline Engineer (Electrical) Safety Officer	PTW	—	Violation of IE Act/ Rules

5.4 Training and Awareness

No.	Control Activity	Responsibility	Records	Checking & Monitoring	Remarks
I	Promote awareness HSE requirement to all employees through HSE induction training programme and conduct tool box meeting periodically on the following, > Potential Hazards & Risks > Requirement of this OCP > DO's and DONT's > Use of PPEs	Discipline Engineer & Safety Officer	Trg. Register	Refresher / Induction trg.	—
II	Display Safety posters (pictorial) depicting the hazards and the control required in local language/English and Hindi	Safety Officer	Display of safety posters	Visual	—

6.0 REFERENCES

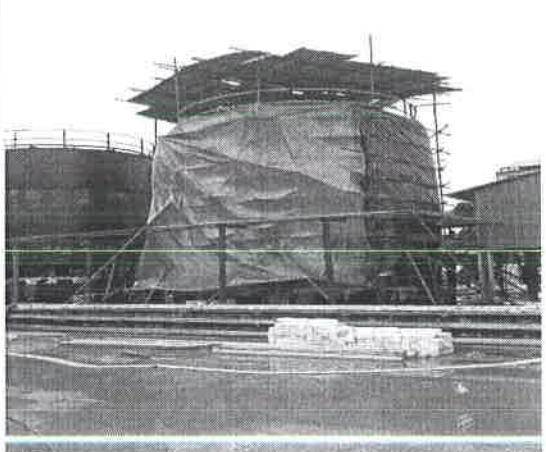

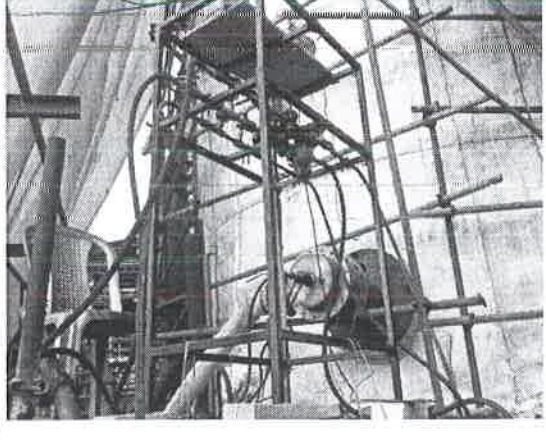
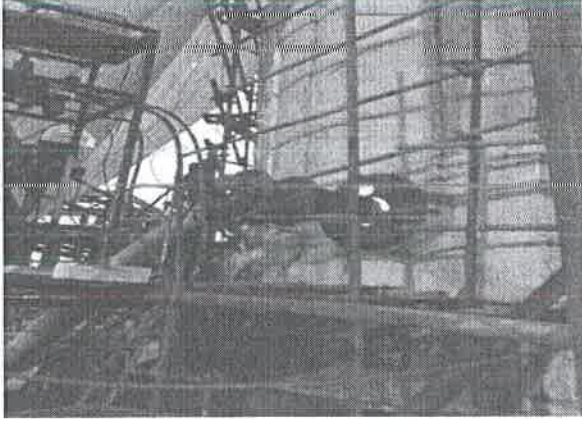
- ♦ Safety Plan

7.0 ATTACHEMENT


- Photographs explaining the arrangements and safety requirements to be ensured during on-site stress relieving operation



Photographs explaining arrangement for stress relieving operation and safety requirements

<p>Before stress Reliving wool pad covered from rain protection</p>	<p>Fire Fighting arrangement</p>
	
<p>Diesel firing through nozzle</p>	<p>Elevated Temperature at 600C</p>
	



 <small>sustainable solutions for a better life.</small>	HSE Operational Control Procedures	Rev no 02
	OCP-013 LOCK OUT AND TAG OUT FOR WORK ON ENERGISED SYSTEMS	Date: 10-01-2019

1.0 PURPOSE

To ensure health & safety of operating personnel and protect the environment while carrying out maintenance or repair activities of any energized systems like rotating machines/, equipments/, motors, pumps, compressors, MCBs, transformers, flow through pipes, etc.,

2.0 SCOPE

This procedure is applicable all activities carried out in EPC sites and O&M Plants while disconnecting equipments/system from electrical, mechanical, chemical and mechanical energy sources and facilitate repair and maintenance activities in a safe manner.

3.0 RESPONSIBILITY

RCM/Plant Manager/ Site In-charge, Discipline Engineer and Contractors' Engineer are responsible for the safe isolation through lock out and tag out procedure.

Site Safety Officer and Head, HSE(HO) are responsible for implementing and monitoring the performance HSE and promoting awareness amongst employees through education and training on HSE, and implementation of LOTO and Work Permit System..

4.0 POTENTIAL HAZARDS

- 4.1 Electrical shock and electrocution
- 4.2 Caught in and entanglement
- 4.3 Burns (chemical and thermal)
- 4.4 Slip, trip and fall- while working on damp surface and oil areas
- 4.5 Injury from Bursting of pipe lines or vessels(emergency situation)
- 4.6 Chemical burns (while handling chemical containing vessels/pipe lines) etc.

5.0 PROCEDURE

5.1 Legal Requirements

No.	Control Measures	Responsibility	Records	Checking & Monitoring	Remarks
I	While working on equipments for maintenance , display caution board on or near the MCB / rotary machine/ valve /equipment/ pressure vessels, " Danger ! Do Not Switch On " and " Men Working On line Do Not Operate Or Switch On ".	Supervisor /Discipline Engineers	Display Board	Random check for display of caution board	Regulatory Requirement
II	Exercise control over the entire activities through LOTO & work permit.	Discipline Engineer/ Safety Officer	Work Permit/ LOTO	Display of work permit/ LOTO	

5.2 Storage tanks/ Vessels/ Pits/ Vats/ Silos/ pipes & pipe lines /valves etc.,

No.	Control Activity	Responsibility	Records	Checking & Monitoring	Consequences
I	Physically isolate the tanks/vessels/ pits/vats/ silos from all the input / output connecting pipes including the drainage pipes by closing the valves and inserting blinds.	Discipline Engineer	LO/TO	Visual Inspection	Unsafe condition
II	Flush, drain and clean tanks/pits/ vessels/vats/ silos, if they contain any toxic and hazardous substances.	Discipline Engineer	Work Permit	Visual Inspection	Toxic Hazard




 WABAG sustainably advancing for a better life.	HSE Operational Control Procedures	Rev no 02
	OCP-013 LOCK OUT AND TAG OUT FOR WORK ON ENERGISED SYSTEMS	Date: 10-01-2019

III	Open man holes, ventilate tanks/ vessels/ pits/vats/silos either by forced air ventilation using exhaust blower/fan (flame proof type)	Safety Officer	Work Permit	Oxygen Checking	Asphyxiation
IV	Check the levels of Oxygen and Methane (Explosive Mixture) and other gases viz., CO ₂ , CO and H ₂ S in the area around and inside the vessels. Ensure the gas monitor used for checking is calibrated has validity & traceability	Safety Officer	Calibration Report	Check on Validity and traceability	Explosion can occur
V	Oxygen content shall be at least 19% by vol., or else ensure it through forced air or natural ventilation. No one shall be permitted to work in any area, if Oxygen level is below 19%, especially no entry to the digester/gas holder	Safety Officer	Confined Space Permit	Gas Monitor O ₂ > 19.5% Volume	Asphyxiation
VI	Check levels of explosive mixture of methane is well below the Lower Explosive Limit of 5%. i.e. Methane Gas concentration shall not exceed 5%	Safety Officer	Confined Space Permit	Gas Monitor LEL < 5% Volume	Fire & explosion
VII	Ensure proper confined space entry permit is obtained from the Engineer In-Charge of Client /Consultant and all the safety requirements mentioned there in arc maintained during entry and working inside.	Safety Officer	Confined Space Permit	-	Unsafe conditions and behaviours
VII	Ensure a manhole watch (Standby Person) is posted outside the entry point and shall not move away from the place until all employees come out of the confined space.	Safety Officer	Confined Space Permit	-	-

5.3 Electrical and Mechanical Systems & Equipments

No.	Control Activity	Responsibility	Records	Checking & Monitoring	Consequences
I	Equipments powered by prime movers (electrical motors, compressed air, hydraulic fluid) shall be dead stopped prior to working	Discipline Engineer		Check for physical stoppage.	Entanglement
II	Observe for stoppage of rotary / reciprocating parts of equipments even after stopping, due to inertial force before working on it	Discipline Engineer		Check for physical stoppage.	Caught in
III	De-pressurise the pneumatic/ hydraulic systems by venting and bleeding to ensure that there is no pressure inside. Also charge the system to atmospheric, in the case of vacuum system	Discipline Engineer	Pressure gauge	Vacuum/ Pressure levels maintained	Bursting
IV	De-magnetise the system where magnetic field is used as energy source for carrying out repair or maintenance task.	Discipline Engineer	—	Zero magnetic flux	Physical injury
V	Lower the elevated boom/car/lifts etc., to the ground level before carrying out any repair/ maintenance activities.	Discipline Engineer	—	—	—



 WABAG sustainable solutions for a better life.	HSE Operational Control Procedures	Rev no 02
	OCP-013 LOCK OUT AND TAG OUT FOR WORK ON ENERGISED SYSTEMS	Date: 10-01-2019

VI	Isolate the electrical power supply connected with the electrical motors/equipments from the nearest MCB	Electrical Engineer	LOTO	Test with multi meter	Electrical shock
VII	Remove the HRC fuse / fuse carrier and lock the level of MCBs, so that it cannot be energised by others.	Electrical Engineer	LOTO	Apply lock & key to be kept by the technician working on it.	Electrical shock

5.4 Training and Awareness

No.	Control Activity	Responsibility	Records	Checking & Monitoring	Remarks
I	Promote awareness through induction training on HSE requirements and organise Tool box talks periodically on, <ul style="list-style-type: none"> > Potential Hazards/Risks involved > Requirement of this OCP procedure > DO's and DONT's > Use of PPEs 	Discipline Engineer & Safety Officer	Maintain record of Training given	Training planned vs conducted during the period	—
II	Display safety posters (pictorial) depicting the hazards associated with the process in local language/Hindi/English	Safety Officer	Display of safety posters	Displays made location wise	—

6.0 REFERENCES

- Safety Plan
- OCP:021 Permit to Work Procedures

7.0 ATTACHMENTS

- Necessary work permits shall be obtained duly authorised , prior to start working on an energised system
- To obtain Work permits for carrying out work on energised systems using LOTO along with hot work or height work etc. refer "OCP :021 : Permit to Work Procedure".



1.0 PURPOSE

To ensure the absolute safety of personnel, properties and the environment, while carrying out the rock blasting work.

2.0 SCOPE

This procedure is applicable to all EPC Project Sites, for carrying out the excavation work involving blasting of hard rock

3.0 RESPONSIBILITY

RCM/ Site In charge, Discipline Engineer and Contractors are primarily responsible for ensuring safe execution of the work connected with blasting.

Site Safety Officer and Head HSE (HO) are responsible for implementing and maintaining the HSE Management Systems and promote awareness on the HSE requirements through training of site employees and implementing the OCPs & Work Permit System.

4.0 POTENTIAL HAZARDS

- Health hazard: Vibration, dust emission and Noise generation (While drilling and blasting)
- Bodily Injury/ Fatality : Flying rock particles, explosion
- Environmental: Noise, Dust emissions

5.0 PROCEDURE

5.1 Legal Requirement

No.	Control Measures	Responsibility	Records	Checking & Monitoring	Remarks
I	To obtain license (Form LE-3) Petroleum And Explosives Safety Organisation (PESO)	Contractor/ RCM	Copy of License in Form-LE-3	Review license validity and capacity/type /Qty. indicated	Violation of Explosives Rules 2008
II	Ensure written communication is sent to District Collector, Revenue Divisional Officer, and Dist. Supdt. of Police, Dist. Fire Officer before commencement of work and obtain NOC for blasting	RCM	NOC to be kept on record	Review NOC conditions and monitor requirements	Violation of Explosives Rules 2008
III	With reference to NOC , send written communication to Petroleum and Explosives Safety Organisation (PESO) and obtain NOC for use of explosives and blasting	RCM /Project. Manager	NOC from PESO to be kept on record.	Review NOC conditions	Violation of Explosives Rules 2008
IV	Vehicle used for transportation of explosives and detonators shall be approved by Chief Controller of Explosives (CCOE), Nagpur.	Contractor	Certificate issued by PESO	Review certificate	Violation of Explosives Rules 2008
V	Ensure maintain records of the following. 1).Qty. of explosives brought, 2). Qty of explosives used and 3) Qty. of explosives returned after blasting.	License holder / Discipline Engineer	checklist	Blasting operations and record maintenance	Violation of Explosives Rules 2008

5.2 Preparation for Controlled blasting

No.	Control Activity	Responsibility	Records	Checking & Monitoring	Consequences
I	Intimate well in advance the place and time of blasting, to the Local Fire Services and Police Station.	RCM/ Safety officer	Letter of intimation	—	NOC Violation
II	Carry out drilling work in Hard rock using wet sand bags to reduce the dust and noise	Operator	Inspection of hard rock	Visual checking	nuisance Respiratory track irritation
III	Drilling operation to be stopped and debris shall cleared before charging the next set of holes with explosives	Operator/S uper-visor	PTW	—	To prevent accidental explosion
IV	Two fire water tenders with fire fighting crew to be kept always ready in standby mode during the blasting operations along with ambulance and medical team to be kept in the vicinity of blasting area to meet any emergencies.	RCM	PTW	Check and record	Denial of immediate first treatment to injured
V	Completely cordon off, by soft barricading, around 200 Mtrs. Of the blasting area, post sufficient warning signs to caution the workmen and other visitors, employees and post signal men and installing warning sirens.	Site Security/ Safety Engineer	PTW	Check for barricading signage, and posting Signal man.	Unsafe condition
VI	No trespassing shall be allowed in the cordoned area and No person shall be allowed to carry any electronic devices or mobile phones in the blast location, while charging the holes.	Safety Officer	PTW	Movement of people in the area	Explosion/ Fatality
VII	Check whether licensed vehicle the explosives are received in the licensed vehicle. High Explosives and Detonators shall be transported separately. Note down the type, date of mfr. Capacity etc of the explosives brought.	Safety Officer	PTW	Check for license in the box carrying the explosives	Violation of NOC conditions
VIII	The blasting operations shall be carried out only between sunrise and sunset & the environment conditions on the day of blasting shall be taken into account while planning for blasting (Rain / Sunny / Wind / Thunders / Lightning)	Contractor/ Discipline Engineer	Inspection	Visual	Violation of NOC conditions

5.3 During Controlled blasting

No.	Control Activity	Responsibility	Records	Checking & Monitoring	Consequences
I	The bored holes shall be cleared of all debris before explosives are charged. resistivity of the detonator shall be checked	License Holder Discipline Engineer	—	Visual	—



 <small>customized solutions, for a better life.</small>	HSE Operational Control Procedures	Rev no 02
	OCP-014 CONTROLLED BLASTING	Date: 10-01-2019

II	Check and ensure whether the electrical circuit for continuity and the total resistivity is checked by the Authorised person	License Holder Discipline Engineer	PTW	Verify recorded values	Short circuit
III	Cover the blasting surface with wet sand bags, followed by spreading the waste conveyor belts as a protective, followed by wire mesh will control the movement of flying debris and dust emission.	License Holder Discipline Engineer	PTW	Inspection report for blasting	Noise / dust pollution
IV	Controlled blasting shall be done only after approval from competent person (Mines Manager)	License Holder Discipline Engineer	PTW	Visual	—
V	Inspect the area blasted to ascertain number of misfires occurred and maintain a record of the same. The misfired explosives can be reconnected for re-blasting	License Holder Discipline Engineer	PTW	Visual	—

5.4 Training and Awareness

No.	Control Activity	Responsibility	Records	Checking & Monitoring	Remarks
I	Promote awareness on HSE Systems requirement through induction training on HSE. Organise Tool Box meeting regularly to all employees and workmen on the following, <ul style="list-style-type: none"> ➤ Potential Hazards of the job ➤ Requirement of OCP procedure ➤ DO's and DONT's ➤ Use of PPEs 	Discipline Engineer & Safety Officer	Trg. Register	Refresher Induction training	—
II	Display suitable posters (pictorial) depicting the hazards near the blasting and painting area	Safety Officer	Display of posters	Visual	—


6.0 REFERENCES

- Explosive Rules 2008
- Explosive Act 1884

7.0 ATTACHMENTS

- Nil



	HSE Operational Control Procedures	Rev no 02
	OCP-015 EMERGENCY PREPAREDNESS AND RESPONSE PLAN	Date: 10-01-2019

ON SITE EMERGENCY PREPAREDNESS AND RESPONSE PLAN

NAME OF THE PROJECT/ :
NAME OF THE PLANT :
PROJECT NUMBER :
SITE ADDRESS :
Document Reference No :
Rev. No :
Date of Issue :	DD/MM/YYYY

NOTE:


This Emergency Preparedness and Response Plan is Site specific, prepared to address the emergency scenarios as applicable to the EPC Project /O&M Plant, addressing the emergency scenarios as applicable to this specific project/O&M Plant, besides including the emergency scenarios specified in BOCW Rules for the EPC Project and Factories Act for O&M Plants.

This document is prepared, implemented and maintained by the respective RCM of EPC Project/ Plant Manager of O&M Plant and Head Admin for HO and Pune offices.

Structure of EPRP Procedure made by the Site In-charge is in line with this OCP. This document is approved by Head, HSE for EPC Projects and O&M Plant.

PREPARED BY	REVIEWED BY	APPROVED BY
Signature Name: Date:	Signature Name: Date:	Signature Name: Date:



 WABAG <small>Sustainable solutions for a better life.</small>	HSE Operational Control Procedures	Rev no 02
	OCP-015 EMERGENCY PREPAREDNESS AND RESPONSE PLAN	Date: 10-01-2019


INDEX

Sl. No.	Description	Page No.
1.	OBJECTIVE	
2.	ROLES AND RESPONSIBILITIES DURING EMERGENCY	
3.	CO-ORDINATION BETWEEN THE ORGANIZATION	
4.	LIKELY DANGERS TO THE PLANT	
5.	DETAILS OF SAFETY SYSTEMS	
6.	COMMUNICATION FACILITIES	
7.	FIRE FIGHTING RESOURCES	
8.	MEDICAL FACILITIES	

1.0 OBJECTIVES:

To ensure emergency preparedness at all times and mitigate the emergencies in the event of its occurrence, ensuring there is no impact caused on the Health and Safety of employees and others and also prevent or reduce the impact caused on the Environment




	HSE Operational Control Procedures	Rev no 02
	OCP-015 EMERGENCY PREPAREDNESS AND RESPONSE PLAN	Date: 10-01-2019

2.0 RESPONSIBILITY

No.	Person involved	Responsibility
1	SITE INCIDENT CONTROLLER	<ol style="list-style-type: none"> 1. Assess the extent of / scale of emergency and decide if a major emergency exists or is likely to occur. 2. Assume the Roles and Responsibilities of Site Main Controller, till his arrival at the place of emergency. 3. Quickly report the emergency to Site Main Controller and Head, Security. 4. Activate onsite emergency action plan based on the nature of emergency. 5. Direct the shutdown and evacuate people from the Project Site/ plant. 6. Identify the area to be next affected by the emergency and assess the extent and arrange for quick evacuation. 7. Call outside emergency services like fire brigade, police, and members of mutual aid if the emergency is a major one. 8. Give advice, information when requested by the Head of the Fire Services, Police and other mutually aiding members. 9. Make available copies of ON SITE EPR Plan. 10. Brief Site Main Controller, upon his arrival at the scene.
2	SITE MAIN CONTROLLER	<ol style="list-style-type: none"> 1. Over all In-charge of the situation at the site and shall head the Emergency Team. 2. Shall upon receipt of communication reach the scene of emergency and in consultation with incident controller, take stock of the emergency situation, issue further instructions for speedy mitigation, relieving the incident controller of his responsibility 3. Direct all operations and call external agencies where further assistance is required to tackle and mitigate. 4. Ensure that all key persons are called on site to delegate extra duty, depending upon the situation. 5. Ensure that first aid and medical treatment is given for injured. 6. Evacuate the site/plant staff, in case of human life is in peril 7. In all cases of major emergencies, report the event to the local police station, civil & district authorities and other Govt. authorities as required under law through Customer/Head SBU. 8. Arrange to call experts / the supplier. 9. Liaise with fire brigade and police. 10. Give clearance signal when emergency is over and normalcy is restored.
3	SECURITY PERSONNEL	<ol style="list-style-type: none"> 1. To cordon the area of emergency, regulate and control the movement of vehicles and people towards the scene of emergency, except allowing only the emergency services. 2. Direct the employees and visitors to the Emergency Assembly Points. 3. Carryout head count and inform missing numbers/ members to the Site Incident Controller, to organize a search operation for the missing people. 4. Hold personnel at the assembly point till "ALL CLEAR" signal is given. 5. Take charge of firefighting and rescue operations with the support of persons



 <small>WABAG</small> <small>reliable solutions, for a better life.</small>	HSE Operational Control Procedures	Rev no 02
	OCP-015 EMERGENCY PREPAREDNESS AND RESPONSE PLAN	Date: 10-01-2019

		<p>trained in first aid and fire emergency, till the arrival of fire brigade</p> <p>6. Direct the ambulance and other emergency service vehicles to the scene of emergency.</p> <p>7. Restrict entry of unauthorized and untrained persons to the scene of incident.</p> <p>8. Initiate and participate in the rescue operation.</p>
4	EMPLOYEE/ WORKERS	<p>Inform the RCM/ Plant Manager / Site Engr. / Shift I/C in case of ,</p> <ul style="list-style-type: none"> • Profuse gas leakage or fire or explosion occurs and also mention its exact location, including the land marks if any. • Extent to which of firefighting and rescue operation has been taken. • The material(s) involved in the emergency scenario. • No. of persons affected, if any. <p>Provide rescue to the affected and extinguish the fire using the extinguishers.</p>

3.0 Emergency Declaration

Site Main Controller (Site PI) declares emergency and site incident controller communicates emergency to the employees, area wise or whole site depending the emergency situation through

- Blowing emergency siren **OR**
- Blowing whistle

3.1 EVACUATION

If the incident is likely to affect people in the surrounding area of the site/plant, Site Main Controller shall inform the Client's representative on evacuation plan. Evacuate the site people to the assembly point/area or away from site ensuring proper head count is done to identify any missing members of,

- a) Contractors workers residing in the affected area.
- b) The evacuation shall be done along the escape route or in the upwind direction leading to the assembly point.

4.0 RESPONSE TO EMERGENCY

On hearing emergency siren or emergency bell or whistle, all the employees including visitors, vendors, drivers and all contractors' employees at site shall suspend the job immediately and get to the nearest emergency assembly point by following the emergency escape routes displayed in the site.


Note: DO NOT JUMP from the height. Get down to the floor level safely using stairs, ladders.

Emergency action to be taken within 5 minutes of the occurrence of emergency at the site.

- Raise emergency alarm
- Activate emergency squad personnel
- Main Controller and Incident Controller to take charge of the situation
- Notify Police - Emergency Phone No
- Notify Fire Brigade - Emergency Phone No.

5.0 ESSENTIAL EMPLOYEES



	HSE Operational Control Procedures	Rev no 02
	OCP-015 EMERGENCY PREPAREDNESS AND RESPONSE PLAN	Date: 10-01-2019

Few workers trained in firefighting, use of gas masks, first aid etc. shall be retained on duty on each shift, to form the task group. It shall be the responsibility of this task group to assist and execute under the instructions of Site Incident Controller and Site Main Controller.

5.1 Site Emergency Team Members;

Name	Emergency Designation	Contact Phone Number
	Site Main Controller	
	Site Incident Controller	
	First Aider and Rescue Team	
	Fire Fighting Team	
	Heat Count – Assembly Point 1	
	Heat Count – Assembly Point 2	
	Observer -1	
	Observer-2	
	Observer-3	
	Nearby Fire Service Station	
	Nearby Ambulance	
	Nearby Hospital 1	
	Nearby Hospital 2	

6.0 REHEARSAL / MOCK DRILL:

Mock drill shall help in identifying the deficiencies in the procedures and the likely difficulties that might be encountered during actual emergency, hence rehearsal of the plan through mock drill shall be undertaken at an interval of atleast one year or as required by the Law or when a new process or change of people are involved. Report the observations of the mock drill in Format at Annexure-1 and analyse the observations made during the mock drill and take appropriate corrective action, including review of the EPRP procedure where found necessary.

7.0 REVISION

"The Plan", will be reviewed once in every two years and/ or immediately after the occurrence of an emergency and the procedure will be updated based on the observations made . In case of any change in the process of operations or methods, the plan shall be reviewed and updated.

8.0 EMERGENCY SCENARIOS & PROCEDURES:


FIRE & EXPLOSIONS:

Involving oil, gas, chemicals, fuels, electrical fire and major fires

TOXIC GAS LEAKAGE:

Excess chlorine gas leakage and H2S gas release.



	HSE Operational Control Procedures	Rev no 02
	OCP-015 EMERGENCY PREPAREDNESS AND RESPONSE PLAN	Date: 10-01-2019

STRUCTURAL COLLAPSE:	Structural instability,
CHEMICAL SPILLAGE OR LEAKAGE:	Bursting of HCl, H ₂ SO ₄ storage tanks and pipe lines.
FLOOD, BOMB OR SUBSTANCE THREAT:	Chemical, biological or radiological threat, suspicious package.
FALL FROM HEIGHT	Unsafe working conditions leading to fall from Height

8.1 FIRE EMERGENCY

Employees shall be made aware of the fire emergency plan and shall take prompt action as per the following procedure:

1. If you see fire or hear fire explosion, pull the closest fire alarm where available.
2. Make a call to Plant In-charge/Shift In-charge from a safe location giving the following information:

Your Name:

Contact Phone Number:

Location from where you are calling from:

a) USE OF EXISTING EQUIPMENT

If trained and confident using your best judgment, if the fire is small enough try to put out the fire using the fire extinguisher located nearby. If the fire is not getting extinguished fully or spreads even after attempting to extinguish them, then leave the area immediately. While leaving close all the doors on your way & warn others on your way to move out quickly..

b) FIRE EVACUATION

If the fire is clearly out of control, notify all others in danger, **SHOUT "FIRE" "FIRE"** and evacuate all personnel from the building to the designated assembly point located outside the building. Assist people to move out fast, especially those who are physically challenged to be moved out first.

8.2 TOXIC GAS RELEASE AND LEAKAGE:

In case of accidental release of a toxic gas, such as a leaking chlorine cylinder, alert people in the immediate vicinity /area of the spill and quickly evacuate the people from that area and close the door.


1. Make a call to Plant In-charge/Shift In-charge from a safe location give the following information.

Your name:

Contact Phone Number:

Location from where you are calling from

2. Where provided, turn on the ventilation blower, if leakage is minor in nature and can ensure compliance with applicable exposure limits (3 ppm).
3. If leakage is minor, wearing Self Contained Breathing Apparatus enter the chlorine storage location, and find out the location of leak using ammonia solution and arrest the leakage using Chlorine Cylinder Leak Arresting Kits.
4. If leakage is major, Chlorine cylinder should be shifted to neutralization pit and leave the area immediately, closing all doors on your way & warn others on your way out.
5. **Never put water on the leaking chlorine cylinder, as it is dangerous.**

	HSE Operational Control Procedures	Rev no 02
	OCP-015 EMERGENCY PREPAREDNESS AND RESPONSE PLAN	Date: 10-01-2019

8.3 CHEMICAL EMERGENCY:

a) MINOR OR MANAGEABLE CHEMICAL SPILL (“INCIDENTAL SPILL”)

- 1) Alert all people in the immediate vicinity of chemical spill. Isolate the area of contamination.
- 2) Clean the chemical spills, only after familiarizing with its physical and health hazards and the method of disposal, as detailed out on the product label or MSDS.
- 3) Dispose of the waste generated in a safe manner as mentioned in the MSDS and as per Haz Wastes (MHTB) Rules, 2008 if applicable.


b) MAJOR OR UNMANAGEABLE CHEMICAL SPILL

(Considering high toxicity, flammability, quantity involved is a large amount, a repelling odor or one without warning properties, acute symptoms of exposure, or a chemical that cannot be identified.)

- 1) **Do not attempt to clean up major, unmanageable chemical spills.**
- 2) Alert people to evacuate to a safer place or assigned emergency assembly area.
- 3) Isolate the area and prevent entry of people.
- 4) Post a “Do Not Enter” sign or place barrier tape across the location.
- 5) Call the emergency team/supplier for further help.
- 6) Dispose of the waste generated in a safe manner as mentioned in the MSDS and as per Hazardous Wastes (MHTB) Rules, 2008 if applicable.

8.4 STRUCTURAL COLLAPSE

- 1) Main incident controller and rescue team shall alert the workers to assemble in the assembly area.
- 2) Main controller shall call fire Fire brigade/Rescue team/ Security/Ambulance along with the Medical team.
- 3) Security shall cordon off the area to prevent crowd movement and re-route all traffic well around the collapse site.
- 4) All spaces in the collapse structure shall be monitored for flammable, toxic, and oxygen deficient atmospheres before entry is made and also other utilities to the building are totally shut off.
- 5) Main controller shall direct the rescue team and fire brigade for locating and evacuating the people trapped under the collapsed structure.
- 6) Security shall carry out head count quickly to identify the missing persons and their location of work.
- 7) Medical team shall establish the first aid centre to treat the injured at site.
- 8) Rescue team shall locate and handle carefully the victims from the collapsed structure and move them to the identified location for First aid and Medical treatment.
- 9) Seriously injured persons shall be shifted immediately to the nearest hospital.
- 10) If rescue teams have not been able to locate victims through other methods, then they should remove the debris carefully to locate the trapped victims and move them on a stretcher to the first aid point or to the nearest hospital based on the nature of injury suffered.
- 11) If there are live victims, rescue teams must be very careful while removing debris so as not to cause a secondary collapse or further injury to the victim(s).

 WABAG sustainable solutions for a better life.	HSE Operational Control Procedures	Rev no 02
	OCP-015 EMERGENCY PREPAREDNESS AND RESPONSE PLAN	Date: 10-01-2019

12) Structural team shall be called to investigate the cause of the collapse and plan for further investigation and identify corrective measures to avoid similar structural collapse in future..

8.5 BOMB OR SUBSTANCE THREAT: Chemical, biological or radiological threat, suspicious package.

- a. To assist in preparing for and minimizing the effect of bomb emergencies, the following additional guidelines should be followed by each site Main controller in their facility.
- b. **Planning and Inspecting** may be expected to be the subject of civil disorders or demonstrations to determine whether some of the entrances to the building should be closed.
- c. **Suspicious Actions:** All employees, particularly maintenance personnel who move about the building, must be alerted to observe and report immediately any threats and suspicious looking persons, packages, or equipment in the building. This additional surveillance, if practiced continuously, will reinforce efforts of the Emergency Response Team.
- d. **Building Service Spaces:** All doors to building service areas, such as mechanical rooms, transformer vaults, sink rooms, wire closets, etc., should be locked at all times when possible with access allowed only to authorized personnel.
- e. **Stairwells and Restrooms:** Particular attention should be given to closets not capable of being locked, restrooms, stairwells, and other areas where explosives might be secreted or persons might conceal themselves.
- f. **Key Control:** All organization supervisors should maintain a record of keys issued to employees. This record must be available to the Emergency Response Coordinator and the building maintenance personnel pending the establishment of an overall key control program for the facility.
- g. **After-Hour Entry:** Identifying and recording the presence of all persons entering or leaving the building after normal duty hours is essential. While this is a basic responsibility of a Security Force, the process will be improved by giving building occupants periodic notice of appropriate entrances and exits to be used before and after duty hours during different times of the year. These notices will also contain instructions for the general public attending events, meeting, etc. All occupants must comply with such notices.

8.6 FLOOD:

To assist in preparing for and minimizing the effect of Flood emergencies, the following additional guidelines should be followed by each incident & Main controller in their facility.

- Move garbage containers, chemicals and Gas cylinder beyond the reach of the water.
- Shut down all energy sources
- Listen and act as per potable communication.
- Assemble for assemble area.

8.7 Emergency Action/Response;

Scenario	Emergency Action	Post Emergency Action	PPEs	Equipment Req'd.
Fire – Wood, papers, Ply boards, etc., (A Type)	<ol style="list-style-type: none"> 1. Get the water hose connected to the water tap nearest to the fire point. 2. Direct the water at the base of the fire, till fire brigade comes. 3. If water hose is not available, 	<ol style="list-style-type: none"> 1. Clean the area from debris. 2. Collect the burnt out items and stack them separately. 3. Clean the 	Helmet Safety Shoe Eye goggles	Water type (A) for fire at incipient stage. Stored Water/





HSE Operational Control Procedures

Rev no 02


OCP-015 EMERGENCY PREPAREDNESS AND RESPONSE PLAN

Date: 10-01-2019

	<p>get the water from tanker and pour the water using buckets.</p> <ol style="list-style-type: none"> Spray the water using hose or buckets on nearby buildings, which would facilitate control spread of the fire. On arrival of fire brigade, extend necessary help asked. 	<p>undamaged items and store them away.</p> <ol style="list-style-type: none"> Direct the fire water to the nearest drain channel 		Running water for large fire.
Fire due to Oil, petrol, Diesel, Solvents Chemicals (Liquid), etc.,	<ol style="list-style-type: none"> Close the valve, drum, tin, if possible which act as source for spread of fire and no danger of doing so. Get the Carbon dioxide (CO₂) or Dry Chemical Powder (DCP). Operate the extinguisher and direct the nozzle at the base of the flame. Spray the water using hose or buckets on nearby containers, tins, cylinders, buildings, facilities to control spread of the fire. Help on arrival of fire brigade 	<ol style="list-style-type: none"> Collect the burnt out items and stack the separately. Clean the undamaged items and store them. Clean the area from debris. Collect solvent or chemical containing debris and put them in poly bags and tightly seal them to ensure safe disposal. 	<p>Helmet Safety Shoe Eye goggles Gas Masks</p>	Type (B) for fire at incipient stage. CO ₂ , DCP.
Fire – Gaseous Substances: Methane, LPG, Acetylene etc,	<ol style="list-style-type: none"> Close the valve of the gas holder and open the flare valve. Get the Carbon dioxide (CO₂) or Dry Chemical Powder (DCP). Operate the extinguisher and direct the nozzle at the base of the flame. Spray the water using hose or buckets on nearby cylinders, containers, tins buildings, which would facilitate to control spread of the fire. On arrival of fire brigade, help them if asked. 	<ol style="list-style-type: none"> Collect burnt out items and stack them separately. Clean undamaged items and store them. Clean the area free from debris. 	<p>Helmet Safety Shoe Eye goggles Gas Masks</p>	Type (B) for fire at incipient stage. CO ₂ , DCP.
Electrical Fire	<ol style="list-style-type: none"> Isolate the electrical power supply to the area affected by switching off the power supply. Repeat all the steps above depending upon the types of material involved. NEVER PUT WATER ON ELECTRICAL POWER CABLES, EQUIPMENTS MOTORS, TRANSFORMERS, CONTROL PANELS, etc. Use only CO₂ firefighting 	<ol style="list-style-type: none"> Clean the electrical equipments, etc., Collect the burn out insulation materials and store them in the scrap yard for storage. Clean the area 	<p>Helmet Safety— shoe- Insulation hand gloves</p>	<p>Use CO₂ Extinguisher.</p> <p>Avoid using DCP as far as possible to avoid powder contaminating the electronic components in the panel</p>



	extinguishers on the above electrical items			
Explosion of Digester/ Gas Holder (Bio Gas), LPG, Acetylene etc.	<ol style="list-style-type: none"> 1. Isolate the feed line Valve/inlet gas line valve. 2. Exclude the ignition source. 3. Search for injured persons and give first aid and send to hospital. 4. Trapped if any in the debris, engage hydra / crane for removal and rescue the personnel. 5. Barricade the area. Isolate the exploded area. 6. Secure the area for regulatory authorities' inspection. 	<ol style="list-style-type: none"> 1. Remove the damaged structure, debris, Sludge etc., from the site and preserve for investigation after testing the Sludge. 2. Inspect the nearby area, buildings and structural for the damage due to explosion. 3. Then restore the activities. 	Helmet Safety-Shoe Hand-gloves Eye-goggles	Hydra/crane for removal of debris Gas cutting set for cutting and rescue operations. Search lights
Fall from Height	<ol style="list-style-type: none"> 1. Remove the injured person to the ventilated area. 2. Immobilise the injured person with a well-padded stiff. 3. Rush to Hospital 	<ol style="list-style-type: none"> 1. Remove the damaged structure, form works, scaffolding materials from the site and preserve for investigation. 2. Then restore the activities. 	Helmet Safety Shoe	Ambulance
Collapse of building sheds and structures	<ol style="list-style-type: none"> 1. Isolate the electrical energy for the area Cordoned off. 2. Search for injured persons and give first aid and send to hospital. 3. Trapped if any in the debris, engage hydra / crane for removal and rescue the personnel. 4. Barricade the area. Isolate the exploded area. 5. Secure the area for regulatory authorities' inspection. 	<ol style="list-style-type: none"> 1. Remove the damaged structure, form works, scaffolding materials from the site and preserve for investigation. 2. Then restore the activities. 	Helmet Safety Shoe Hand gloves Eye goggles	Hydra/ crane for removal of debris. Gas cutting set for cutting and rescue operations. Search lights
Toxic Gas Leakages – Methane, H₂S, etc.,	Gas Engine Room, Digester and Gas Holder:: <ol style="list-style-type: none"> 1. Wear the Gas mask and close the gas inlet valve where the leak occurs. 2. Exclude the ignition source. 3. Barricade the area. 4. Search for ill persons and move to the open & well-ventilated area. 5. Loosen the tight clothing's and keep his head upright. 6. If conscious, give little water 	<ol style="list-style-type: none"> 1. Carry out gas test and ensure the permissible limit (Permissible limit: H₂S - <10 PPM LEL - <1%). 2. Preserve for investigation. 3. Then restore the activities 	Gas Masks Helmet Safety Shoe Hand gloves Eye goggles	Gas Detector

 WABAG <small>sustainable solutions. for a better life.</small>	HSE Operational Control Procedures	Rev no 02
	OCP-015 EMERGENCY PREPAREDNESS AND RESPONSE PLAN	Date: 10-01-2019

	and send to hospital. 7. Secure the area for regulatory authorities' inspection.			
Drowning – Open Tanks	<ol style="list-style-type: none"> 1. Rescue the drowned person from the water only through the person who knows swimming. 2. Make to lie on the flat surface and keep the chest upward. 3. Push the stomach with both the palms gently (first-aider) 4. Immediately call the medical attention. 5. Secure the area for regulatory authorities' inspection. 	-	Life jacket or lifebuoy.	-
Collapse of Lifting and transport equipment – Crane, dipper, trucks, etc.,	<ol style="list-style-type: none"> 1. Barricade the area. Isolate the exploded area. 2. Isolate the electrical energy of the area. 3. Cordoned off the area 4. Search for injured persons if trapped under machinery and provide first aid and shift to hospital. 5. Trapped if any under the debris, engage hydra / crane very carefully to isolate and remove the person(s). 6. Secure the area for subsequent inspection by regulatory authorities' inspection. 7. Keep the regulatory authorities informed if accident is fatal. 	<p>Remove the damaged structure, cranes, hydras, dippers and trucks .. from the site and preserve for investigation.</p> <p>Then restore site activities.</p>	<p>Helmet Safety Shoe Hand gloves Eye goggles</p>	<p>Hydra/crane for removal of debris. Gas cutting set, rescue operations. Search lights</p>

9.0 EMERGENCY DO'S AND DON'TS

DO'S	DON'TS
<p>ANY ONE NOTICING AN EMERGENCY: Actuate nearest fire alarm button and / or inform the supervisor. Get back to your normal workstation, if safe or else report to the assembly point.</p>	<p>Do not get panic and avoid running all over the places. Do not enter the site unless instructed.</p>
<p>CONTRACTOR PERSONNEL: Stop work on hearing alarm and assemble at the nearest Assembly Point and wait for the instructions.</p>	<p>Do not enter the site until it is cleared for the normal work by Incident Controller</p>
<p>SECURITY: Keep the Gate Manned. Keep the road clear for the movement of emergency vehicles viz., fire tenders, ambulance, etc... Control the traffic at gates</p>	<p>Do not allow unauthorized persons to enter the site.</p>





HSE Operational Control Procedures

Rev no 02

OCP-015 EMERGENCY PREPAREDNESS AND RESPONSE PLAN

Date: 10-01-2019

VISITORS:

Leave the place from where you are and quickly assemble along with others at assembly point.

Do not enter the site if emergency alarm is heard.

ALL OTHER EMPLOYEES ON SITE:

On hearing emergency alarm, get back to your work place, if it is safe or else quickly assemble at assembly point and await further instructions.

Do not get panic / do not run helter skelter. Do not go to the scene of emergency unless you are specifically instructed by incident controller.





HSE Operational Control Procedures

Rev no 02

OCP-015 EMERGENCY MOCK DRILL REPORT

Date: 10-01-2019

Please put 'X' against the scenario selected for Mock Drill as indicated below

1. Fire	2. Gas Release	3. Electrocution
4. Rescue from confined space	5. Fall from height of personnel	6. Collapse of Excavation
7. Drowning	8. Collapse of lifting equipments/structures	9. Chemical Spill
10. Dangerous Occurrence	11. Natural Calamity (specify)	12. Other (Specify)

Important Note:

Inform about the date of mock drill to the following, well in advance,

1) Client /Consultant 2) Client's Security Staff 3) Contractors working in the neighbouring area so that they can inform their workmen, 4) about the mock drill, contractors and their employees shall be intimated about mock drill well in advance, and it is mandatory

Sl. No.	Activity performed during Emergency Mock drill/Emergency	Tick✓ which is applicable
1	Whether Site Emergency procedure is available and followed	Yes/ No/ NA
2	Is any training provided on the EPRP Procedure to the site emergency team, if yes specify the date on which training was given	Yes/ No
3	Time at which the first responder arrived at the scene of emergency	Hrs.
4	Time at which call for emergency help was given by First responder to his supervisor	Hrs.
5	Time at which call was sent to the Site Emergency team	Hrs.
6	Is the communication to the team and others clear and with no ambiguity on the location of the emergency scene	
7	Start time of mock drill (when first emergency alarm sounded)	
8	Ending time of mock drill (when all clearance signal was given)	
9	Total time taken for the mock drill	Mts.
10	Whether head count was taken (required only in specific cases)? Was the number tallying with number of employees present on duty. If no specify number missing if any noted in the head count.	Nos.
11	Time of arrival of Site Emergency Team 1. Security- Hrs. 3. Fire Team - Hrs. 2. First Aid Team- Hrs. 4. All Others - Hrs.	
12	Was the area cordoned off by the Security personnel	Yes/ No/ NA
13	Was the crowd control by security effective, Describer if any untoward incidents or unusual occurrence noted.	Yes/ No
14	Time at which the emergency equipments and aids were received at the scene of emergency Vis-à-vis 1) First aid kit 2) stretcher 3) Artificial respiratory equipments/masks 4) Fire blanket etc	Hrs.
15	Victims condition (✓ against the one given below or describe actual condition): Conscious and responds well/.....unconscious	





HSE Operational Control Procedures

Rev no 02

OCP-015 EMERGENCY MOCK DRILL REPORT

Date: 10-01-2019

	/.....difficulty in breathing/.....any visible injury on the body/fatality if any.	
16.	Was the victim's clothes loosened and first aid given	Yes/ No
17.	Was the Victim's moved to a well-ventilated area , Specify time taken	Yes/ No
18.	Is CPR provided (if found necessary) to the unresponsive victim till the arrival of ambulance with doctor and paramedical team?	Yes/ No
19	Are first aiders trained and are aware of the rescue method in case of unconscious state of the victim?	Yes/ No
20	Are the fire fighters and first aiders wearing the requisite PPEs?	Yes/ No
21	Was this mock drill taken seriously and every one participated and contributed effectively? If no, describe what could make this mock drill effective	Yes/ No
22	Have the participants understood the importance of this mock drill and responded well	Yes/ No

NOTE:

In case occurrence of any major incidents

Immediate Communication shall be sent to the Statutory bodies vis-à-vis District Collector/ District Magistrate, Director of Factories Inspectorate/ Nearest Police Station/ Fire Station/ Medical Dept.

A) Detail the observations made during the mock drill (especially on the responses from the employees with regard to their swiftness in movement, alertness, seriousness exhibited, performing the defined role effectively etc) :

B) List the drawbacks noted if any during the mock drill and the corrective action required:

Signature of Site Safety Officer	Signature of Site / Plant In-charge
Name:	Name:
Date	Date



HSE Operational Control Procedures

Rev no 02

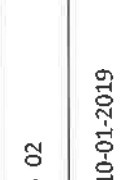
OCP-016 Classification of Wastes, Storage and Disposal Methods: Annexure 1

Date: 10-01-2019

A) HANDLING, STORAGE AND DISPOSAL OF NON-HAZARDOUS WASTES

Classification of Wastes	Method and location of Storage	Monitoring and Records	Responsibility/Authority for disposal/ Remarks
1. Plastic materials like bubble wraps, PVC wastes, foam packing materials, PVC cement bags and others. (Recycle)	Store outdoor in gunny bags /hessian bags in identified location in Sites	None	For Storage and disposal at EPC Sites/O&M Plants: - Store Keeper/RCM/Plant Manager. - Disposal to be authorized by Project. Manager
2. Scrap Metallic materials- Rejected steel components, pipes & fittings , steel cut bits-of plates/pipes, TMT bars/fasteners etc. (Recycle)	Store out door in lots either in PVC bags/gunny bags/ cardboard boxes /steel drums/, preferably on wooden pallet avoiding ground contact. Avoid rusting	Qty/ wt. of materials Date of disposal	
3a. Wood products: Wooden packing cases and other waste wood pieces from Civil form works.	3a) Wood products: Store wooden beams/ runners and planks for reuse, Small bits in bins for disposal	Qty/ wt. of materials Date of disposal	
3b. Paper products: Waste papers, card board materials, other paper based materials (Bio-degradable)	3b) Paper products: Bundle them store at identified place till disposal	Qty/Wt. of materials Date of disposal	For Storage and disposal of Office items (except E-wastes): - Storage to be ensured by In-charge of House Keeping
4. Electrical Scraps- Cable cut bits, fuses, electrical parts, switches, relays etc. (recycle & Non-biodegradable)	Keep in cardboard boxes, stored under covered roof till disposal	Quantity/Weight , Date of disposal	For storage and disposal of E-wastes to authorized e-waste buyer: - Storage and disposal by person authorized by Head-IT
5. Unserviceable field instruments and gauges (Recycle)	Under covered roof , stored as a lot labeled as 'unserviceable instruments' till disposal	None	
6. Printer cartridges, toners etc. (Recycle)	In original packing or card board box., dispose to dealer/ retailer	No. of lots, quantity/ weight of scrap disposed	
7. Unserviceable metallic/non-metallic/ materials/parts- motors, motor parts, pumps & pump parts, metallic gaskets, fasteners and other maintenance scraps etc. (Recycle)	outdoor, lot wise on wooden pallets with tarpaulin or PVC covered till disposal	None	
8. Rejects occurring during construction like concrete wastes, cube test rejects etc. (Non-biodegradable)	To be used for filling low lying areas or pavement roads as landfill	None	As per instructions of Client and Civil Engineer at Site,
9. For O&M Plants Only: STP sludge	Sludge drying beds till drying. Transported to locations identified by the Client as per contract	Weight in tons disposed.	Plant Manager, Disposal authorized by Client
10. For O&M Plants with bio-gas engine in operation. Sludge from Bio- H2 S Scrubber	Sludge drying bed. Keep dry sludge in air tight plastic bags closed tightly. Dispose as bio-sulphur manure or for use in manufacturing paints if qty. is large enough.	Quantity disposed Date of disposal and buyer's details	Plant Manager under authorization by Client



 W A B A G <small>enabling solutions for a better life</small>	HSE Operational Control Procedures		Rev no 02
	OCP-016 Classification of Wastes, Storage and Disposal Methods: Annexure 1		Date: 10-01-2019

12. Food waste (Bio-degradable)	Keep trash bags in the canteen for disposal on daily basis	None.	Disposal by contractor as per contract agreement.
---------------------------------	--	-------	---

B) HANDLING, STORAGE AND DISPOSAL OF HAZARDOUS WASTES


Quantity of hazardous wastes generated by the O&M Plants and EPC Site are minimal like oily wastes/ waste oil etc. Similarly the generation of e-wastes. STP sludge is disposed of to a location identified by Client (as per contract agreement). Handling and disposal of ETP Sludge from O&M Plants is in the scope of Client/Customer and consent /authorization for safe disposal of Haz. Wastes under the Hazardous Wastes (MHTB) Rules, 2008 are in the purview of Client/Customer, being owners of the facilities generating the wastes.

LIST OF HAZARDOUS WASTES AND DISPOSAL METHODS

Classification of Hazardous Wastes	Method and location of Storage	Monitoring and Record	Responsibility/ Remarks
<ul style="list-style-type: none"> - Oil containing metallic parts like oil filters, oil soaked cotton wastes, etc. - Used oil- lubricant oil transformer oil, oily sludge of DG sets etc. - Used Lead Acid batteries. - Paint wastes-, Paint tins containing wet paint residue spent solvents etc., - Left over epoxy/sealant adhesives and resin tubes - Fused lamps - mercury vapour bulbs, tube lights etc. - ETP Sludge - Spent ion exchange resin of DM Plants - Used RO membranes - Electronic wastes like computer monitors, discs peripherals, PCBs etc. (e-Wastes) 	<p>Method and location of Storage</p> <ul style="list-style-type: none"> • Wastes listed in column shall be stored in their identified locations, separately under a covered roof. • Hazardous wastes in liquid form like waste oils etc. shall be stored in a leak proof container with tightly covered lids to prevent from accidental leak and spills • Wastes shall be duly identified with labels indicating their name, category of waste as per Haz. Wastes (MHTB) Rules 2008, date since stored, its quantity and shall be kept on a raised platform • Chemical containing containers shall be thoroughly washed prior to disposal. • Used lead acid batteries shall be kept on wooden plank or any impervious material to avoid land contamination. • Spent resins shall be subjected to de-fouling treatment and then kept in an airtight thick PVC bag, duly identified, and tightly closed or sealed • Used RO membranes shall be kept in air tight thick PVC bag, duly identified and tightly closed or sealed • The area where the Hazardous wastes are stored shall be cordoned off to prevent any unauthorized entry of personnel by displaying a board indicating 'Hazardous Wastes Storage Area - No entry'. Preferably kept under lock and key • Electronic wastes shall be stored in paper cartons at locations identified by Head, Admin in HO /RO 	<p>Monitoring and Record</p> <ul style="list-style-type: none"> - Maintain record as per Hazardous Wastes (MHTB) Rules, for Haz. Wastes- category wise,- Qty Recd. and Qty. disposed month wise. <p>Spent Resins: Used RO Membranes: Currently the Rules do not specify the method of disposal of these types of wastes, hence shall be stored separately till the method of disposal is identified in the Haz. Rules</p>	<p>Responsibility/ Remarks</p> <p>RCMs /Plant Manager or their authorized Supervisors/Store keeper Shall ensure the following,</p> <ul style="list-style-type: none"> • Check periodically the storage of wastes to ensure no spill or leak occur from containers • Labels on containers are intact • No leachant flow from containers/ drums is permitted. • ETP sludge shall be disposed of as per Customer's instructions. • Disposal of paints, solvents and empty paint tins are in the hands of the Painting contractor, as per W.O terms & conditions.



NOTE: For further reading or instructions on hazardous and e-waste management and handling, please refer to The Hazardous Wastes(Management, Handling and Trans boundary Movement) Rules 2008 and E-wastes Management Handling as per E-Wastes (Management and Handling) Rules , 2011

	<h2>HSE Operational Control Procedures</h2>	Rev no 02
OCP-016 Classification of Wastes, Storage and Disposal Methods: Annexure 1		Date: 10-01-2019

Disposal of spent resins are also currently under the scope of Client. Paint tins and paint tins containing left over /dried materials are to be collected and disposed of safely by Painting contractor as given in the work order. For disposal of used membranes guidelines are not provided in the Haz. Wastes (MHTB) Rules, 2008. So, they shall be stored in plastic bags, tightly sealed and stored under covered shed till its disposal for land fill or by alternatives suggested by State PCB.



1.0 PURPOSE

This procedure describes the guidelines and method of handling both hazardous and non-hazardous waste generated by the activities carried out in the company and for,

- a) Effective management supervision and disposal of waste generated.
- b) Establish control measures by which wastes generated from source could be monitored for achieving the planned reduction

2.0 SCOPE

This procedure is applicable to all departments in offices, EPC Sites and O&M Plants to ensure safe disposal of wastes generated and to achieve a targeted reduction in the hazardous waste generation as specified in the Hazardous Waste (Management, Handling and Trans Boundary Movement) Rules, 2008..

3.0 REFERENCE

- 3.1 ISO 14001 – 2004 Environmental Management System – Specification with guidance for use.
- 3.2 Hazardous Wastes (Management and Handling) Rules 2008 (**Haz. Wastes Rules 2008**).

4.0 RESPONSIBILITY

The Department Head/Function Head, RCMs, Plant Managers and the Head of Administration are responsible for the safe collation, handling, accounting, storage, transportation and disposal of hazardous wastes to the authorized waste buyers of CPCB/State PCBs as per the extent rules.

The Stores In-charge of EPC and O&M Plants, Head Administration are responsible for ensuring that the waste buyers have the valid permits from CPCB/State PCBs for collection and safe disposal to the treatment CPCB/Stats PCB authorized facility, meeting requirements specified in the contract executed with the company.

5.0 PROCEDURE

- 5.1 Waste bins shall be colour coded/ painted as follows: RED for Hazardous Wastes: Yellow for non-hazardous recyclable wastes and GREEN for Bio-degradable wastes.
- 5.2 Sufficient qty. and capacity of color coded/painted bins with lid covers shall be provided by Head-Admin in offices and by RCMs/ Plant Managers at respective sites for segregation at source and disposal of wastes generated.
- 5.3 Employees and contract workmen shall be imparted training on color coding of bins and the type of wastes to be deposited category wise.
- 5.4 Employees and workmen shall deposit the wastes generated by their activities in the identified bins only.
- 5.5 Suitable instructions or training if necessary on the **Haz. Wastes Rules 2008** shall be provided to the employees and contract employees handling hazardous wastes may be organized by Department/ Function Head/ Site RCMs and Plant Managers.
- 5.6 Wastes could be collected as frequently as they are getting generated from each area by the House keeping Staff in office buildings and by contractor's staff at Sites/O&M Plant.
- 5.7 The quantity of wastes collected shall be recorded in the register for accounting and disposal.

- 5.8 All saleable scrap shall be transferred to Site Stores and the concerned Stores In-charge shall be responsible for monitoring collection and disposal of scrap for resale
- 5.9 Various categories of wastes, method of handling and storage methods, responsibility etc provided in Annexure-1 for ensuring compliance.

Hazardous Wastes- Handling and disposal


- 5.10 The Handling and safe disposal of Hazardous wastes shall be per **Haz. Wastes Rules 2008**
- 5.11 All hazardous wastes as listed in Annexure-1, shall be collected and stored separately in a well secured and protected place with covered roof, in the Project Sites/Plant Stores.
- 5.12 The Hazardous wastes (liquid form) shall be kept in a leak proof, tightly sealed containers, with its name, quantity, category as per Haz, Rules, date since held written on label pasted on the container, as per **Form-12 of Hazardous Wastes (MHTB) Rules 2008**
- 5.13 All solid hazardous wastes shall be kept on an raised surface (impervious) or in a suitable container kept on raised surface under a covered roof, i.e. to prevent leachant flow during the rainy season from the hazardous wastes polluting the surrounding land.
- 5.14 Records for safe disposal through authorized waste buyers/re-cyclers /re-processors shall be maintained as per the **Hazardous Wastes (MHTB) Rules 2008**
- 5.15 Any emergency occurrence during the handling, storage and disposal of the hazardous wastes shall be dealt with as per the **Emergency Preparedness Response Procedure OCP-015**.
- 5.16 Caution Signs and posters depicting the hazardous nature of the wastes shall be prominently displayed at the storage locations to prevent unauthorized entry.
- 5.17 Where the operating plants are under our direct control (BOOT Projects) , i.e. as owner of the facility, necessary authorization under the **Hazardous Wastes (MHTB) Rules 2008** shall be obtained by the Plant Manager of O&M , by submitting all relevant details in the format specified in the **Hazardous Wastes (MHTB) Rules 2008**, to the State Pollution Control Board along necessary application fees specified there in..

Types of wastes generated, their disposal, monitoring requirement with identified responsibility and are listed in Annexure-1 of this procedure

NOTE

- 1) *Users handling hazardous wastes are further advised to read and understand requirements listed in the Hazardous Wastes (Management, Handling, and Trans Boundary) Rules, 2008, like categorization of wastes, their handling, storage, transportation and the legal requirement to be complied with*
- 2) *Also, users handling E-waste for disposal are further advised to read the requirements listed under E-Wastes (Management & Handling) Rules, 2011.*



	HSE Operational Control Procedures	Rev no 02
	OCP-017 CONTROL OF VEHICULAR EMISSIONS AND NOISE	Date: 10-01-2019

1.0 PURPOSE

To check, control and ensure the vehicles allowed entry in office premises, O&M Plants and Project sites does not cause any impact on the environment or cause health hazard/injury to working personnel.

2.0 SCOPE

This procedure is applicable to all Project Sites, O&M Plants and H.O Chennai and IWG/IEC Pune.

3.0 RESPONSIBILITY

- a) Security In-charge at Project Sites, O&M Plants. Head, Admin for HO and Pune for implementation of this procedure.
- b) Periodic checking and health monitoring to ensure safe health and wellbeing of the employees shall be the primary responsibility of Head- HR
- c) RCM/Plant Manager/Site In-charge/ Site Safety Officers of VATech Wabag shall provide required training and promote awareness on the HSE Management Systems requirements, implement and maintain them to improve the HSE Performance.

4.0 POTENTIAL HAZARDS

- a) Vehicular emissions causing impact on the environment such as global warming
- b) Vehicular emissions also can cause respiratory congestions, asphyxiation
- c) Leakage of oil from vehicle can cause land pollution and potential for slip or trip injury to operating personnel when deposited on a concrete surface involving heavy traffic.
- d) Bodily injury/Fatality: Due to hit by vehicle while moving in the plant site

5.0 PROCEDURE

5.1. Legal Requirement

No.	Control Measures	Responsibility	Records	Checking & Monitoring	Remarks
a	All vehicles, including construction vehicles shall have valid registration and fitness certificate TP insurance, and pollution under control certificate.	All Vehicles owners	Hold copies on record	Random check of records	Violates requirements under CMV Act/ Rules
b	The person driving the vehicle shall have a valid driving license.	All persons	Copy of License	Random verification	
c	For vehicles carrying chemicals or any bulk petroleum products, the driver to have a valid chemical transport license	All vehicle owners	Copy of Chemical Driving License	Verify the License and its validity	
d	Disposal of oil leak or oily waste from vehicle	Vehicle Owners.	—	Disposal in identified waste bins	Land pollution

5.2 Operation controls

No.	Control Activity	Responsibility	Records	Checking & Monitoring	Consequences
I	To check passenger vehicle at entry of premises for availability of valid documents as per Cl.No 5.1 (a),	Security Staff	Maintain record of listed documents	Check vehicles at random	
III	Vehicle with leaking oil or heavy exhaust fumes shall not be allowed access. Oily waste generated shall be disposed of in color coded waste bins	Security Staff	Record of leakage noticed if any	Check Vehicles with oil leakage if any.	Dispose as per Haz.. Wastes Rules, 2008



IV	<p>Vehicle carrying bulk Hazardous chemicals like acids/alkalis etc. used in treatment processes to be checked for,</p> <p>a) Valid chemicals driving license (where applicable).</p> <p>b) Availability of TREM card</p> <p>c) Availability of First Aid Box, Fire extinguisher in driver's cabin.</p> <p>d) Tyres- free from baldness/ defects</p> <p>e) Drive within permitted speed limits</p> <p>f) Use spark arrester and wedge blocks, earthing of the tank while unloading flammable liquids like petrolcum Class A or B</p> <p>g) No unloading of content permitted after the sun set</p> <p>h) A responsible person shall supervise to ensure safety.</p>	<p>Security Staff</p> <p>Site Safety Engineer or Plant Manager</p>	<p>Record details in the vehicle register, and comment on the documents availability</p>	<p>Random check of vehicles allowed entry at the gate by Security</p>	<p>Violation under CMV Act/Rules.</p> <p>Unsafe conditions or incident can occur.</p>
V	<p>Vehicles to adhere to the speed limit specified</p>	<p>Security Staff</p>		<p>check at Random</p>	<p>Chances of Hit by vehicle</p>

5.3 Training and Awareness

No.	Control Activity	Responsibility	Records	Checking & Monitoring	Remarks
I	<p>Promote awareness on HSE requirements through induction training to all employees and conduct tool box talks periodically on the following</p> <ul style="list-style-type: none"> ➤ Potential Hazards ➤ Requirement of this OCP ➤ DO's and DONT's ➤ Use of PPEs 	<p>Discipline Engineer & Safety Officer</p>	<p>Trg. Register</p>	<p>Refresher / Induction training.</p>	—
II	<p>Display Safety posters (pictorial) depicting the hazards and risks in local language/Hindi/English.</p>	<p>Safety Officer</p>	<p>Display of safety posters</p>	<p>Visual</p>	—

6.0 REFERENCES

- Safety Plan

7.0 ATTACHMENTS

- Nil



 <small>A sustainable solution for a better life.</small>	HSE Operational Control Procedures	Rev no 02
	OCP-018 SAFE WORKING IN, ON, OR NEAR WATER BODIES	Date: 10-01-2019

1.0 PURPOSE

To ensure the Health and safety of personnel, properties and the environment, while working in, on or near water bodies.

2.0 SCOPE

This procedure is applicable all the types activities being carried out at EPC and O&M.

3.0 RESPONSIBILITY

RCM/Plant Manager/ Site In-charge, Discipline Engineer and Contractors' Engineer are responsible for workmen's safety while working in, on, or near water bodies.

Site Safety Officer, Head, HSE (H.O.) are responsible for implementing the HSE System through education and training of the site employees and implementation of HSE System.

4.0 POTENTIAL HAZARDS

- 4.1 Drowning
- 4.2 Electrocutation.
- 4.3 Slip, trip and fall
- 4.4 Fall from height
- 4.5 Cold stress and fatigue
- 4.6 Contracting water borne diseases.
- 4.7 Heat and humidity
- 4.8 Danger from aquatic animals
- 4.9 Oxygen deficiency

5.0 PROCEDURE

5.1 Legal Requirement

No.	Control Measures	Responsibility	Records	Checking & Monitoring	Remarks
I	Restrict the number of persons carried in a vessel as certified by Director General of Shipping and Water ways and is marked plainly and conspicuously on such vessels and such number is not exceeded during use of such vessel for carrying persons..	RCM	Copy of Vessel's Certificate	Check Vessel's certification details before boarding	Regulatory violations

5.2 Transport by water

No.	Control Activity	Responsibility	Records	Checking & Monitoring	Consequences
I	Vessels shall be manned by the certified crew	Vessel Captain	Copies of certificates	Check crew certificates.	Drowning hazard
II	Vessel shall be fitted with navigation and communication system	Vessel Captain	—	—	loss of tracking, emergency
III	Stock life jackets in sufficient quantity to rescue drowned person or rescue people marooned or during capsizing of vessels.	Vessel Captain		Inspection	Drowning hazard
IV	If work is to be carried out under water for longer time , provide Oxygen supply for	RCM/ Safety			



 WABAG sustainable solutions for a better life.	HSE Operational Control Procedures	Rev no 02
	OCP-018 SAFE WORKING IN, ON, OR NEAR WATER BODIES	Date: 10-01-2019

respiration to working personnel	Officer			
----------------------------------	---------	--	--	--

5.3 Working in the vicinity and on water bodies / water retaining structures

No.	Control Activity	Responsibility	Records	Checking & Monitoring	Consequences
I	Barricade water storage tanks, reservoir, pond etc., with hard rails, mid rails and toe guard and display danger & warning signage-“Caution-Drowning Hazard” near the water bodies’ at all prominent locations.	Site Safety Officer	—	Physical verification of display of signs, barricaded area	Incident of Falling and drowning can occur.
II	Provide life jacket (floating), swimmer goggles, respirator mask etc. for personnel working in water and other required PPEs while working on or adjacent to water bodies. Provide demonstration on using the PPEs for safe working in, on or near water bodies.	Safety Engineer	Training record	Physical check on usage of life jacket	Possibility of drowning hazard if not trained properly.
III	No live electrical cable shall be laid under the water.	Safety Engineer	—	—	Electrocution

5.4 Training and Awareness

No.	Control Activity	Responsibility	Records	Checking & Monitoring	Remarks
I	Promote awareness on HSE Systems requirement through induction training and organise tool box meetings periodically to all employees and workmen on the following, <ul style="list-style-type: none"> ➤ Potential Hazards and controls to be exercised. ➤ Requirement of this OCP. ➤ DO's and DONT's ➤ Use of PPEs 	Discipline Engineer & Safety Officer	Training Record	HSE Induction Training and Tool Box meeting	—
II	Display safety posters (pictorial) depicting the hazards in, on, or near water bodies in English, Hindi and local language.	Safety Officer	Display of safety posters	Visual	—


6.0 REFERENCES

- HSE Plan

7.0 ATTACHMENTS:

- Nil



 WABAG sustainable solutions for a better life.	HSE Operational Control Procedures	Rev no 02
	OCP-019 SURFACE PREPARATION BY BLAST CLEANING AND PAINTING	Date: 10-01-2019

1.0 PURPOSE

To ensure the absolute Health and safety of personnel, properties and the environment while carrying out shot (grid/metal) blasting, cleaning and painting.

2.0 SCOPE

This procedure is applicable all the activities at sites for carrying out blasting, cleaning and painting. This procedure is applicable for EPC and O&M

3.0 RESPONSIBILITY

Site In charge, Discipline Engineer and Contractors' Engineer are prime responsibility for the safe execution of the work connected with blasting and painting.

Site Safety Officer and Manager Safety (HO) is responsible for putting the safety system viz., Education and training of the site employees, implementation of Work Permit System, work place inspection during blasting and painting.

4.0 POTENTIAL HAZARDS

- 4.0 Fire and Explosion , due to paint & solvent leakage/spillage
- 4.1 Physical Injury due to compressor air receiver and hose failure.
- 4.2 Dust Hazard (Irritation of lungs due to dust and chemical smell)
- 4.3 Suffocation, lack of oxygen in confined space.
- 4.4 Slip, trip and fall hazards,
- 4.5 Eye irritation/ injures from paint falling into eyes.
- 4.6 Vibration causing white finger
- 4.7 Fall from height
- 4.8 Injury from falling objects
- 4.9 Environmental- wastes disposal, fugitive emissions
- 4.10 Health Hazards- asphyxiation, irritation to skin , infection in throat, burning sensation in eyes, lungs infection due to long term inhalation of fugitive emissions etc.

5.0 PROCEDURE

5.1 Legal Requirement

No.	Control Measures	Respon- sibility	Records	Checking & Monitoring	Remarks
I	Blast cleaning to be done inside blasting enclosure only. Every aperture and opening of the enclosure shall be kept closed/ covered.	RCM	—	Inspection	Respiratory diseases
II	Enclosure shall always be maintained in good condition, to prevent dust escaping from the enclosure any time.	Engineer	—	Inspection	Respiratory diseases
III	Separate the abrasive from dust or particles of other materials arising from blasting	Engineer	—	Inspection	Respiratory diseases
IV	Sand shall not be used for blast cleaning purpose as given in the Factories Act/Rules				Violates Factory Act
V	Air receiver of compressor shall have valid certificate of safety issued by competent authority recognised by the State Govt.	RCM Safety officer	Certificate issued	Check for availability of test report	Violation of Factory Act/Rules

5.2 Preparation for Shot Blasting & Painting

No.	Control Activity	Respon-	Records	Checking &	Conse-
-----	------------------	---------	---------	------------	--------



 WABAG Sustainability and Quality for a better life.	HSE Operational Control Procedures	Rev no 02
	OCP-019 SURFACE PREPARATION BY BLAST CLEANING AND PAINTING	Date: 10-01-2019

		Responsibility	Records	Monitoring	Consequences
I	Shot blasting shall be started only after inspection of the enclosure, ventilation system etc.	Engineer	Checklist	Visual inspection	Dust emission
II	Air compressor used for shot blasting/painting should have guard and positioned away from the work place	Engineer	—	Visual inspection	Injury
III	Air receiver of air compressor should be kept away from the blasting/painting enclosure and properly body earthed.	Engineer	—	Visual inspection	Higher severity, in case of incident
IV	Compressor motor shall be properly earthed	Engineer	—	Visual inspection	Electrical shock
V	The hoses used for compressed air should be in good conditions and shall be tied to the structural / wall.	Engineer	—	Visual inspection	Flying of hose
VI	The blast cleaning equipment shall be provided with safety valve on compressor and a dead handle to stop the machine from operation instantly.				

5.3 During Shot Blasting and or Painting

No.	Control Activity	Responsibility	Records	Checking & Monitoring	Consequences
I	The operator of shot blasting/painting shall be provided with adequate PPEs like dust respirators, eye goggles, aprons, hand gloves, face shield or PVC hood with visor.	Supervisor Safety Officer	—	—	Injury/ Lung infection
II	When these activities are done in confined space, ensure adequate ventilation to provide sufficient oxygen as per permit to work.	Engineer	Confined space PTW	Gas Monitoring	Lack of Oxygen
III	Prohibit smoking, lighted matches, mobile phones, naked flames, hot works like chipping or grinding, gas cutting & welding in the vicinity of painting work being done.	Engineer Safety Officer	—	Inspection	Fire and explosion
IV	While painting at height above 1.5 mtrs. Provide proper scaffolds / ladders and carry out work ensuring safety at all times as per the permit to work issued for the purpose.	Safety Officer	Height Work Permit	—	Fall of person
V	The containers having left over paint/ varnishes/ thinner etc. shall not discarded in normal way, they shall be stored separately as Hazardous wastes and disposed of as per the Hazardous Wastes (MHTB) Rules, 2008, to the authorised wastes buyer.	RCM/Site Safety Officer	Waste Inventory	Segregation and storing of hazardous waste	Violation of Hazardous Waste Rules, 2008; Fire & Explosion
VI	To avoid air pollution by emission of VOC from paints and solvents during application. Provide for sufficient air circulation and also respirator/nose masks to operators to reduce inhalation of fugitive emissions and keep upwind direction while applying the paint.	Paint operator	—	Behaviours observation	VOC emission and health hazard

5.4 Training and Awareness





HSE Operational Control Procedures

Rev no 02

OCP-019 SURFACE PREPARATION BY BLAST CLEANING AND PAINTING

Date: 10-01-2019

No	Control Activity	Responsibility	Records	Checking & Monitoring	Remarks
I	Promote awareness on HSE Systems requirements through induction training and organise Tool Box talks at periodic intervals to all employees and workmen on the following, <ul style="list-style-type: none"> ➤ Potential Hazards & control methods ➤ Requirement of this OCP ➤ DO's and DONT's ➤ Use of PPEs 	Safety Officer	Training Record	HSE Induction training and Tool box meeting conducted during the year	—
II	Display Safety posters (pictorial) depicting the hazards in the blasting cleaning and painting operations in local language/Hindi/English	Safety Officer	Display of safety posters	Visual	—

6.0 REFERENCES

- HSE Plan

7.0 ATTACHMENTS

- Nil



 W A B A G <small>sustainable solutions for a better life.</small>	HSE Operational Control Procedures	Rev no 02
	OCP-020 SAFE EXCAVATION	Date: 10-01-2019

1.0 PURPOSE

To ensure health and safety of working personnel involved in the excavation activity and also take adequate care to protect the environmental degradation caused during the excavation activity.

2.0 SCOPE

This procedure is applicable mainly to all EPC Project Sites, and to certain extent in O&M Plants where civil rehabilitation work is involved

3.0 RESPONSIBILITY

- a) Implementation of the Systems at EPC Sites is the primary responsibility of Site RCMs, Discipline Engineers, Site Safety Officer and the Contractors involved in Civil Construction.
- b) Health check and monitoring health condition and ensuring wellbeing of workmen shall be the primary responsibility of Contractor. VA Tech Wabag shall check and ensure this requirement.

Site Safety Officer Head (HSE) are responsible for promoting HSE awareness amongst the employees, through periodic training on HSE requirements including the implementation of Permit to Work System, Checking and monitoring the excavation process to avoid any HSE incident.

4.0 POTENTIAL HAZARDS

- 4.1 Cave in and/or collapse of earth
- 4.2 Surface and ground water
- 4.3 Drowning hazard due to flooding of excavated area either by higher ground water table or inundation by storm water or rain
- 4.4 Asphyxiation - Lack of Oxygen and Chemical Asphyxiation – Displacement of oxygen due to Methane (sewer gas) or Hydrogen Sulphide.
- 4.5 Toxic Hazards : Presence of toxic gases like hydrogen sulphide, carbon monoxide, chlorine gases (traces)
- 4.6 Electrocution due to underground power cable or overhead LT/HT lines.
- 4.7 Slip, trip and fall hazards: Inside the excavated area or from the edges of excavation.
- 4.8 Loss of fertile top soil.
- 4.9 Loss of green cover, trees, etc.

5.0 PROCEDURE

5.1 Legal Requirement

No.	Control Measures	Responsibility	Records	Checking & Monitoring	Remarks
a	Where necessary ensure that written communication is sent to Chief Inspector of Building & Construction, with detailed layout plans, method of excavation and schedule, 30 days in advance before commencement of the work	Principal Employer	Letter to Chief Inspector of Bldg. & Const.	Ensure letter is sent within stipulated time period	
b	Appointment of Civil Engineer as responsible person for excavation and notify his name to the authority as above	Head Construction	Letter		
c	Maintain a separate register for excavation workers and keep up to date and to be shown to the regulatory authorities, when demanded	Civil Engineer	Register excavation workers		



5.2 Prior preparation for Excavation

No.	Control Activity	Responsibility	Records	Checking & Monitoring	Consequences
a	Physically inspect the area for excavation before commencing the activities	Civil Engineer	Inspection	Visual	
b	Identify and locate in the area of excavation the utility installations like –sewer/telephone/ electrical/gas or fuel/Chemical and water pipe lines, or any other underground installations	Civil Engineer	Site Plan	Physical Inspection to verify site conditions	
c	Before commencing the excavation work, contact and inform client or the utility companies or owners of the proposed work to get their consent and clearance for work	Civil Engineer	Excavation work permit		Legal issues Litigation problems may arise
d	Contractor to obtain work permit from Client/ Consultant, power, gas, water public utilities, telephone authorities etc., prior to start of excavation work. Shall ensure all safety requirements are in place. ,	Contractor Civil Engineer	Copy of Work permit issued for excavation	Monitor excavated pit condition on daily basis	Could lead to unsafe conditions and incidents
e	Display Safety warning signs /notices / posters, at conspicuous places in Hindi, English and local languages on the hazards associated with (i) working with compressed air (ii) Hazards like fire and explosion, entrapped gases, caving in, collapse of soil, electrical shock etc. (iii) emergency rescue procedure etc.	Safety Officer	Posters and banners		

5.3 During Excavation

No	Control Activity	Responsibility	Records	Checking & Monitoring	Remarks
a	Barricade (Hard) the excavated trench, ditch, area at a distance of at least 1.5 mtrs. or 1/6 th of the pit depth (whichever is higher) away from the edges of the excavated pits Install warning lights (Red Colour) to warn the public/traffic to keep away from excavated pits	Civil Engineer		Inspect Hard barricading and danger lights.	
b	All materials must be placed at a distance of 1.5 meters or 1/6 th of the depth of the pit (whichever is higher) from the edge of the excavated pit. Sufficient precautions must be taken to prevent fall of material/machine etc. Into the excavated pit (See picture shown in the last page)picture	Civil Engineer			
c	Trenches 1.2 meters or deeper must be shored or sloped back to the angle of repose. Any excavation in unstable ground will require shoring or sloping.	Civil Engineer	Inspection report	Check for provision of slop back, shoring requirement.	Collapse of soil causing injury to workmen
D	Check for presence of obnoxious gases like, Hydrogen Sulphide, Methane and Oxygen level for a trenches exceeding 1.2mtr	Safety Officer	Record of gas levels, calibration	Check gas	Fainting (Lack of oxygen) or

 <small>sustainable solutions. for a better life.</small>	HSE Operational Control Procedures	Rev no 02
	OCP-020 SAFE EXCAVATION	Date: 10-01-2019

	(Applicable for excavation adjacent to heavy vehicle traffic and / or near the gas storage facilities.)		report	levels using Calibrated gas detector.	Fatality due to hydrogen Sulphide
e	Each excavated pit shall be inspected daily by the Civil Engineer or more often, if environmental conditions change rapidly (like rain, flooding due to water ingress etc.). If there is any evidence of caving-in or earth slides, the excavation work must be stopped forthwith until necessary precautions are taken to safeguard the workmen.	Civil Engineer	Checklist for inspection of excavation		Entrapment of workmen, resulting in injury or fatality
f	When vehicles or earth moving equipment operate near excavations, the sides of the pits must be sufficiently shored or braced to withstand the force exerted by the superimposed load. Also stop - logs or other substantial hard barricading must be installed to protect the edge of such excavations	Civil Engineer			Fall of vehicle or materials causing injury to workmen
g	Provide safe access to /from the area of excavations by means of ladders, stairs or ramps. For trenches of depth 1.2 meters (4.2 ft.) and above provide ladders so spaced that lateral travel to a ladder by workmen does not exceed 7.5 meters (25 feet). Install ladders in accordance with OCP-009: Ladder Safety	Civil Engineer			Entrapment of workmen resulting in fatality or injury.

6.0 Training and Awareness

No	Control Activity	Responsibility	Records	Checking & Monitoring	Remarks
a	Promote awareness amongst employees on the HSE requirements through HSE Induction training and by conducting tool box talks periodically on the, <ul style="list-style-type: none"> > Potential Hazards during excavation > Requirement of this OCP > DO's and DONT's > Use of mandatory PPEs 	Discipline Engineer & Safety Officer	Trg. Register	Refresher Induction trg. Every year	
b	Display Safety posters (pictorial) depicting the hazards in excavation close to the excavated areas in English and local vernacular	Safety Officer	Display of safety posters	Check at random locations	

6.0 REFERENCES

- Safety Plan

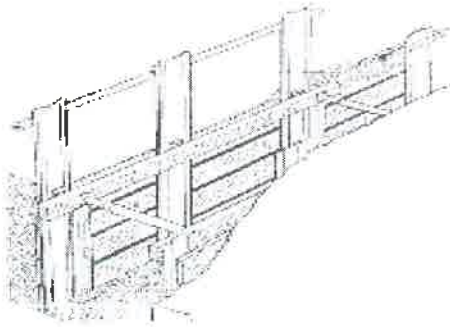
7.0 ATTACHMENTS

- Photographs explaining excavation safety requirements



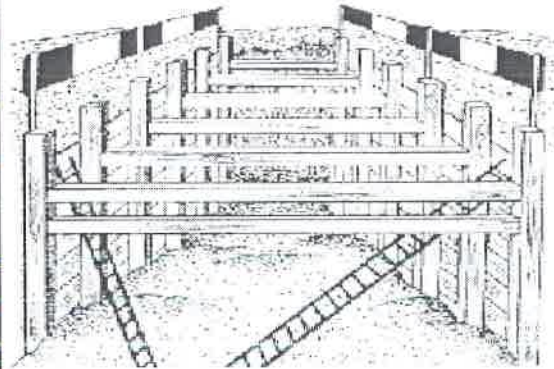
Shoring to prevent the collapse of the sides

Shoring to prevent the collapse of the sides of an excavation consisting of timber or steel frames with close boarding between frames

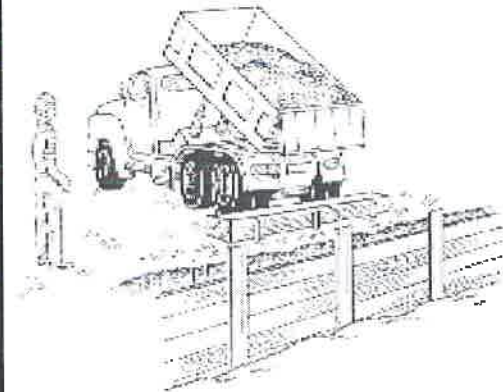
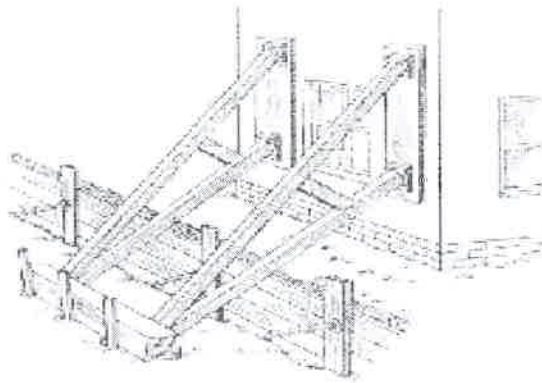



Excavation near a building: Shoring required to prevent collapse of the building

Barriers along the sides of an excavation to prevent workers falling into it



Stop block to prevent vehicles being reversed into an excavation while tipping



	HSE Operational Control Procedures	Rev No 05
	OCP-021: Permit to Work Procedure	Date: 10-01-2019

1.0 PURPOSE

To ensure Health & Safety of operating personnel and to protect the properties & environment from the damages caused, critical and hazardous jobs having a high risk potential, are to be carried out through PERMIT TO WORK (PTW) system.

2.0 SCOPE

This permit to work system cover the following activities carried out at EPC, O&M sites.

- Un protected Height works above 2 mtrs of height
- Confined space work
- Excavation work
- Lock out and Tag out (LOTO)
- Electrical Work
- Hot work and Cold work

3.0 RESPONSIBILITY

Permit Requester/Receiver (person requesting for permit to work, i.e. PTW) - Engineer of Contractor

Prior to commencing any of critical and hazardous jobs, safe work conditions as mentioned in relevant OCP shall be ensured and then the Permit To Work (PTW) shall be raised by filling all relevant details in the PTW format

Permit Issuer / authorizer of the PTW –

Discipline Engineer/Supervisor of Client, Consultant/PMC for EPC Projects and the Plant Manager for O&M Plant, shall check PTW for completeness of information furnished and physically inspect the work place /Job area to satisfy themselves that all the safety precautions mentioned in the PTW are fully in place and then shall authorise/issue the PTW. Additional controls required if any could be added or listed in the permit before issuing it on a case to case basis.

Verifier of PTW:

Site Safety officer / RCM/ Discipline engineer shall verify the details and conditions given, if any, in the work permit, shall physically check and ensure that safety & control measures are in place and that work could be allowed to proceed.

The above requirement is also applicable for renewal of certain work permits.

Site Safety Officer and Head, HSE (HO) are responsible for implementing and maintaining the HSE system by promoting awareness and providing training to all site employees on OCPs & PTW.

4.0 POTENTIAL HAZARDS: Not applicable

5.0 PROCEDURE

5.1 Legal Requirements

No.	Control Measures	Responsibility	Records	Checking & Monitoring	Remarks
I	Dangerous and hazardous jobs/ tasks/operations shall be controlled through permit to work system.	RCM/		To verify PTW status	
II	Display the permit to work (PTW) at the job location.	Engineer	PTW	Display of PTW	

5.2 Permit to Work (PTW) procedure



No.	Control Activity	Responsibility	Records	Checking & Monitoring	Consequences
I	To request for work permit, ensuring all necessary controls are in place.	Contractor	-	-	-
II	Authorize and issue work permit (original) to Contractors' Engineer after due verification of safety requirements as per PTW. A copy to be retained by the permit authoriser	Permit Authoriser	Record of PTW issued	Check controls exercised	Incident
iii	Display PTW at the job locations.	Contractor	-	-	-
IV	Upon satisfactory and safe execution of the work, Permit receiver shall close the permit and hand over to the Permit authoriser. If the permit requires a renewal, procedure as above shall be followed.	Contractor's Engineer (Permit receiver)	PTWs issued for the jobs	Returning the work permit	---
V	Permit Authoriser shall receive closed PTWs from permit receiver, check and ensure work has been done in safe manner and authorise the closer of permit and maintain it on record. Record of closed PTWs shall be retained till the site activity is completed.	Permit Authoriser	Closed PTWs	Check at random, few permits for its satisfactory closure.	---
VI	Safety officer/ Contractor/Plant Manager shall maintain the list of works permits on a day to day basis	Contractor/ Safety Officer/ Plant Mgr	Record of Permits issued	Random verification of permits issued	-----

	HOT WORK	COLD WORK	CONFINED SPACE
DEFINITIONS	Work which may introduce a source of open flame which involves the application of heat or which may produce a spark	Work that does not involve the application of heat or the use of open flame is not capable of producing a spark and does not introduce a source of ignition but by its nature creates a hazardous situation.	Entry means the action by which a person passes through an opening into a confined space. Entry also includes work activities in that space and is considered to have occurred as soon as any part of the entrant's body breaks the plane of an opening into the space. Confined space means a space that: <ol style="list-style-type: none"> 1) Is large enough and so configured that an employee can bodily enter and perform assigned work. 2) Has limited or restricted means for Entry or Exit (access or egress) 3) Is not designed for continuous employee occupancy

<p style="writing-mode: vertical-rl; transform: rotate(180deg);">HAZARDOUS SITUATIONS : REQUIRED A PERMIT TO WORK</p>	<p>Hot work within 25 feet (7.5 meters) of gases or liquids having a flash point below 150 degrees Fahrenheit (65.6 degrees Centigrade)</p> <p>Hot work within or immediately adjacent to spaces that contain or have contained fuel or other petroleum based products or other combustible or flammable material (gaseous, liquid, solid emulsion or a combination)</p> <p>Hot work on pipelines, heating coils, pump fittings or any other accessories that contain or have contained flammable or combustible material, or that are connected to spaces that contain or have contained combustible or flammable material</p> <p>Hot work within, on or immediately adjacent to an area classified as a confined space.</p> <p>Any hot work done directly on a bulk head or deck head.</p>	<p>The temporary removal from service of any safety system or part of any safety system (e.g. fire and gas detection and suppression systems, emergency shutdown systems, process shutdown systems).</p> <p>Excavation that may encounter underground utilities.</p> <p>Radiography in areas that may be occupied by personnel other than those performing the radiography or radiography in closed proximity to other work activities.</p> <p>Removal of grating from walkways or removal of stair treads or ladder rungs.</p> <p>All onshore/offshore commissioning and hookup activities.</p> <p>Hydrotesting</p>	<p>Entry into a confined space that contains or has the potential to contain an atmosphere that is contaminated or is oxygen deficient or is not properly and adequately ventilated.</p> <p>Entry into a confined space that contains material that has the potential for engulfing a person.</p> <p>Entry into a confined space that is dangerous by design (products held in the space; shape of the space is such that entrant could be trapped or asphyxiated by inwardly converging walls or floor which slopes downward and tapers to a smaller cross-section)</p> <p>Entry into a confined space that contains mechanical or electrical equipment that may injure person if activated.</p> <p>Entry into a confined space that may become hazardous because of materials or items held in space.</p>
<p style="writing-mode: vertical-rl; transform: rotate(180deg);">EXAMPLES</p>	<p>Welding, Brazing and Soldering</p> <p>Burning and Arc Gouging</p> <p>Grinding and Chipping</p> <p>Power Sawing</p> <p>Stress Relieving Hot Tapping</p> <p>Internal Combustion Engines</p> <p>Electrical Power Tools and Equipment</p> <p>Electric Lights</p> <p>Opening Flame Proof Enclosures Impact Tools</p> <p>Concrete Chipping and Drilling</p> <p>Battery Powered Cameras</p> <p>Flash</p>	<p>Temporary deactivation, bypass or otherwise removal from service of gas detectors</p> <p>Excavation</p> <p>Radiography</p> <p>Hydrotesting</p> <p>Diving</p> <p>Handling Potential Asbestos Containing Material(ACM)</p>	<p>Storage tanks process vessels, boilers, ballast tanks, void spaces, lockers or bilges that have not been confirmed safe</p> <p>Pits, trenches, cellars and caissons more than 5 feet(1.5 Meters)deep</p> <p>Pipes, sumps sewers, tunnels, shafts and ducts jacket legs and braces</p> <p>Engine crankcases</p> <p>Sand and cement silos</p>

5.4 Training and Awareness

No.	Control Activity	Responsibility	Records	Checking & Monitoring	Remarks
I	Promote awareness on HSE Systems requirements through induction training and conduct Tool Box talks periodically to the employees and workmen on the following. > Potential Hazards and controls to be exercised > Requirement of this OCP > DO's and DONT's > Use of PPEs	Discipline Engineer & Safety Officer	Trg. Register	Refresher Induction trg. Every year	
II	Display Safety posters (pictorial) depicting the hazards associated and requirement for PTW, in local language/Hindi/English.	Safety Officer	Display of safety posters	Visual	

6.0 REFERENCES

- Safety Plan

7.0 ATTACHMENTS

- Work Permits



 <small>sustainable solutions for a better life.</small>	HSE Operational Control Procedures	Rev No 05
	OCP-021: Permit to Work Procedure	Date: 10-01-2019

EXCAVATION PERMIT

Permit No/Year: XXXX/ YY

Contractors Name:

Name of the Supervisor In-Charge:

Location of excavation:

Drawing No. / Rev. No

Length Width Depth

CHECKLISTS

1. Identification and Isolation of underground electrical power: Identified /Isolated
2. Identification and Isolation of underground utilities/service \lines
 - Data / Telephone cable
 - Water / Chemicals lines
3. How is the soil condition? Mention the angle of repose and benching / sloping required.
4. Whether hard barricading done around excavated pit and danger lights displayed: Yes/No.

THIS AREA HAS BEEN INSPECTED AND THE PROPOSED EXCAVATION WORK IS APPROVED SUBJECT TO ADOPTING THE SPECIAL SAFETY PRECAUTION LISTED BELOW.

- Special safety precautions (Shoring, Sloping, etc.) required for excavation:

- Clearance for existing facilities (if, any and mention the precautions required:

Signature of Contractor' Discipline Engineer

Name: Date: Time:

I WILL ABIDE BY THE REQUIREMENT OF THIS OCP -020 AND UNDERTAKE THE WORK ADOPTING ALL NECESSARY SAFETY PRECAUTIONS INCLUDING PROVIDING REQUISITE PPEs TO WORKMEN

- Time for which the excavation / trench will be kept open: from To.....

Permit Receiver's Name: Sign. Date

(Contractors Engineer must take clearance from WABAG / PMC / Employer for existing facility)

Permit No: Project No/HWP/.....

date:

I consider the area safe to work adopting all site safety procedures:

Signature of Permit Issuer

Name: Designation: Date: Time:

This permit may be extended for further 7 days after due inspection of the condition of the excavated pit and other safety measures undertaken for deficiencies noticed if any during inspection.

Date	Date	Date	Date	Date	Date	Date
------	------	------	------	------	------	------



 <small>enabling solutions for a better life.</small>	HSE Operational Control Procedures	Rev No 05
	OCP-021: Permit to Work Procedure	Date: 10-01-2019

<i>Time</i>	<i>Time</i>	<i>Time</i>	<i>Time</i>	<i>Time</i>	<i>Time</i>	<i>Time</i>
<i>Sign. of Contractor</i>	<i>Sign. of Contractor</i>	<i>Sign. of Contractor</i>	<i>Sign. of Contractor</i>	<i>Sign. of Contractor</i>	<i>Sign. of Contractor</i>	<i>Sign. of Contractor</i>
<i>Sign. of PMC</i>	<i>Sign. of PMC</i>	<i>Sign. of PMC</i>	<i>Sign. of PMC</i>	<i>Sign. of PMC</i>	<i>Sign. of PMC</i>	<i>Sign. of PMC</i>

CLOSURE OF EXCAVATION PERMIT


Certified that above said work has been satisfactorily executed and completed in safe manner and hence the Permit No: Project No/Ex. WP/..... Issued on date: may please closed

Signature of Permit Receiver
Name:
Designation:
Date:
Time:

The permit issued under Project No/Ex. WP/..... on date: is closed after verification of the work executed in safe manner

Signature of Permit Issuer
Name:
Designation:
Date:
Time:



 <small>sustainable solutions for a better life.</small>	HSE Operational Control Procedures	Rev No 05
	OCP-021: Permit to Work Procedure	Date: 10-01-2019

HOT WORK PERMIT

This format must be completed in all respects for obtaining work permit for all types of welding/gas or arc cutting operations, which might be performed in a non-designated welding area in the Project Site. Sections under Operational permits are to be completed prior to obtaining approval of permit (This section must be completed prior to approving this permit.)

Date: Nature of Work: _____

Work Location(s) & work description: _____

Employee(s) Performing the Job: _____

Fire Watch & Ward (Guard on Duty): From: _____ To: _____

OPERATIONAL REQUIREMENTS (Tick against 'Yes' or 'No' for all that apply)

S.N o.	Description of requirement	YES	NO	Specify action taken if answer is 'NO'
1	Posting of Fire Watch (during activity & 30 minutes after)			
2	Are the Fire Extinguisher(s) placed (Type: ABC)			
3	Is the area, free of combustibles (35 ft. radius)			
4	Is the area, free from any flammable liquids/vapours			
5	Is the local ventilation adequate?			
6	What type respiratory protection is provided?			
7	Is confined space permit obtained (applicable for working confined space)			
8	Is Job safety analysis documented and are controls in place as per JSA			
9	Any air monitoring done in the area			
10	Is hearing protection provided			
11	Are pressurized cylinders provided (2 Nos. min)			

Name & Emp. No. of Fire Watch: _____

Signature: _____

I WILL ABIDE BY THE REQUIREMENT OF THIS OCP -006 AND UNDERTAKE THE WORK ADOPTING ALL NECESSARY SAFETY PRECAUTIONS INCLUDING PROVIDING REQUISITE PPEs TO WORKMEN

Time for which the hot work will be executed: from _____ To: _____

Signature of Permit Receiver's _____ Name: _____
 Designation. _____ Date: _____

Permit No: Project No/HWP/xx date:


I consider the area safe to work by adopting all site safety procedures:

Signature of Permit issuer

Name: _____ Designation: _____ Date: Time: _____

CLOSURE OF HOT WORK PERMIT



	HSE Operational Control Procedures	Rev No 05
	OCP-021: Permit to Work Procedure	Date: 10-01-2019

Certified that above said work has been satisfactorily executed and completed in safe manner and hence the Permit No: Project No/Hot WP/..... Issued on date: may please closed

Signature of Permit Receiver

Name:
Designation:
Date:
Time:

The permit Issued under Project No/Hot WP/..... On date; is closed after verification of the work executed in safe manner

Signature of Permit Issuer

Name:
Designation:
Date:
Time:
Time:





HSE Operational Control Procedures

Rev No 05

OCP-021: Permit to Work Procedure

Date: 10-01-2019

LOCK OUT AND TAG OUT (LOTO) PERMIT

Work Performed by:Equipment to be Isolated:

Location of work:

Brief description of nature work to be carried out on the energized system:

Period of work with date & time of work: From DD/MM/YY XX/YY hrs. To: DD/MM/YY XX/YY hrs.

Work will be supervised by responsible person:

Signature:

Name and designation:

Date: Time:

Check Lists


- Is the electrical supply switched of YES/NO/NA
- Is the rotary/reciprocating equipment completely stopped? YES/NO/NA
- Is the system pressure is brought to atmospheric pressure? YES/NO/NA
- Is the equipments/car/lift/boom etc., lowered and brought down? YES/NO/NA
- Are the valves closed/locked/blinded? YES/NO/NA
- Is the energy in the magnetic/ spring loaded systems completely released? YES/NO/NA
- Name of the person who locked the MCBs/ Control Panels after removal of electrical fuse:
Name:
Designation:
Discipline: Date: Time:
- Are LOTO and caution boards displayed? YES/NO
- Are the people working in the area and others operating of the system communicated in advance about the maintenance work planned with date and time period? YES/NO

LOTO ensured by Permit Receiver:	LOTO Checked by:	Approved by Permit Issuer
Signature	Signature	Signature
Name Designation Date & Time:	Name Designation Date & Time:	Name Designation Date & Time:

Revoking of LOTO after completion of work on electrical systems:

LOTO removed by Permit Receiver:	Checked by:	LOTO Removal approved by: Permit Issuer
Signature	Signature	Signature
Name Designation Date & Time:	Name Designation Date & Time:	Name Designation Date & Time:



	HSE Operational Control Procedures	Rev No 05
	OCP-021: Permit to Work Procedure	Date: 10-01-2019

Signature of permit raiser/receiver

Name: Designation:
Date: Time:

I will abide by the requirement of this OCP -003 and undertake the work adopting all safety precautions including providing requisite PPEs to workmen

- Time for which the hot work will be executed: From To.....

Signature of permit raiser/receiver
Name: Designation:
Date Time:

Permit No: Project No. /Confid Spce WP/..... Date: Time:

I consider the area safe to work, adopting all site safety procedures:

Signature of Permit issuer
Name:

Designation: Date:

CLOSURE OF CONFINED SPACE WORK PERMIT

Certified that above said work has been satisfactorily executed and completed in safe manner and hence the Permit No: Project No/Confid.Spce. WP/..... Issued on date: may please closed

Signature of Permit Receiver
Name:
Designation:
Date:
Time:

The permit issued under Project No/Confid.Spce. WP/..... on date: is closed after verification of the work executed in safe manner

Signature of Permit Issuer
Name:
Designation:
Date:
Time:



 <small>Sustainable solutions for a better life.</small>	HSE Operational Control Procedures	Rev No 05
	OCP-021: Permit to Work Procedure	Date: 10-01-2019

HEIGHT WORK PERMIT

Location:

Brief description of work:

Details the nature of work to be carried out (Hot work / Cold Work/Others):
 (In case of hot work, separate hot work permit should be obtained and attached along with this permit request)

Name of the person supervising the work:

Is any equipment being used? If so, specify their details:

Check List

	Description of requirement	YES	NO/ NA
1	Is any scaffolding used? If Yes, then attach the filled in scaffolding checklist along with this permit		
2	Is scaffold structure rigid enough and secured to a permanent member?		
3	Is the work platform safe to withstand the load and spacious for free movement Weight of material plus workmen		
4	Is access way provided to the reach work platform?		
5	Details the type of fall protection provided for workmen and materials		
6	Is the scaffold structure earthed properly		
7	Are there any OH Electricals near by the scaffold structure? If yes, is required care taken to avoid contact of lifting equipments with it or electrocution of working personnel		
8	Are fire extinguishers kept near to the work platform for carrying out any hot work		
9	Are all electrical connections free from bare joints and routed through ELCB		
10	Are necessary PPEs provided and used by all workmen		

NOTE: 1) If the answer to the question is 'NO', indicate action taken to meet the stated requirements before submitting the request for Height Work Permit.

IMPORTANT NOTE: In case of continuation the work at night, a separate night work permit is to be filled up and attached.

THIS AREA HAS BEEN INSPECTED AND THE PROPOSED HOT WORK PERMIT IS APPROVED SUBJECT TO ADOPTING THE SPECIAL SAFETY PRECAUTION LISTED BELOW.

List special safety precautions being adopted during the HOT WORK PERMIT

Signature of permit raiser/receiver

Name:

Designation:

Date:Time:

I will abide by the requirement and undertake the work adopting all safety precautions including providing requisite PPEs to workmen

- Time for which the hot work will be executed: From To.....

Signature of permit raiser/receiver

Name: Designation:

Date Time:

Permit No: Project No/Hgt. WP/..... Date: Time:

I consider the area safe to work adopting all site safety procedures:



	HSE Operational Control Procedures	Rev No 05
	OCP-021: Permit to Work Procedure	Date: 10-01-2019

Signature of Permit issuer

Name:

Designation: Date:

CLOSURE OF HEIGHT WORK PERMIT

Certified that above said work has been satisfactorily executed and completed in safe manner and hence the Permit No: Project No/Hgt. WP/..... Issued on date: may please closed

Signature of Permit Receiver

Name:

Designation:

Date:

Time:

The permit issued under Project No/Hgt. WP/..... On date: is closed after verification of the work executed in safe manner

Signature of Permit Issuer


Name:

Designation:

Date:

Time:



 <small>innovative solutions for a better life.</small>	HSE Operational Control Procedures	Rev no 05
	OCP-022: Reporting Incidents, Near Misses & Investigation, Correction and Corrective Action	Date: 10.01.2019

1.0 Purpose

To ensure that all HSE incidents are identified, reported, recorded and investigated to find out the root causes. Based on the root causes, corrective action needs to be taken to prevent recurrence of the incident.

2.0 Scope

This procedure is applicable to all Project Sites, EPC sites, O&M Plants and Head Office, all regional offices.

3.0 Definitions

Near miss: An unplanned, unwanted event that had the potential to lead to injury, damage or loss but did not do so. E.g.: Worker standing below a piling rig narrowly misses a tool that falls from above.

Occupational Accident: An occurrence arising out of or in the course of work that results in a fatal or non-fatal occupational injury.

Occupational Injury: Death, personal injury or disease resulting from an occupational accident.

Commuting (travel) accident: An accident resulting in occupational injury involving loss of working time occurring on the direct way between the place of work


1. The workers principal or secondary residence
2. The place where the worker takes his/her meals
3. The place where the worker usually receives his/her remuneration.

Occupational illness: A disease or medical condition that is directly attributed to work. It includes any acute or chronic ill-health caused by physical, chemical or biological agents as well as adverse effects on mental health. E.g. Skin burn due to contact of skin and wet cement.

Environmental Damage: Unexpected or potentially dangerous occurrence of pollution, contamination or degradation in the quality of environment related to a specific event. E.g. Unauthorized environmental release of toxic substances.

Property damage: Damage to property due to willful negligence, intentional damage or natural phenomenon.



 <small>W A B A G</small> <small>Water & Air Pollution Control Solutions for a better life.</small>	HSE Operational Control Procedures	Rev no 05
	OCP-022: Reporting Incidents, Near Misses & Investigation, Correction and Corrective Action	Date: 10.01.2019

Corrective action: An action taken to control the risk and reduce the likelihood of injury following an incident occurring or hazard present. In simple Action to eliminate the cause of a nonconformity and to prevent recurrence.

4. PROCEDURE

In case of a Near Miss:

1. Immediately alert the responsible supervisor/site engineer that a near miss has occurred.
2. Inform the RCM and the Site Safety Officer about the incident.
3. The Site Safety Officer, concerned discipline engineer and the concerned contractor shall investigate the incident and identify the root cause.
4. On the day of the Near Miss, the details of the incident are to be mailed to the Corporate QHSE.
5. Incident reporting form to be filled and sent to the Corporate QHSE within a period of two days, from the day of the incident.
6. The report is to be signed by the RCM and circulated to the Project Manager and Corporate QHSE.
7. The corrective action and preventive actions needed is to be identified, implemented and recorded.
8. Ensure the corrective action has been implemented within the given time frame.
9. The effectiveness of implementation is to be checked and recorded by the Site Safety Officer.
10. The Corporate QHSE is to analyze the data and provide necessary support.
11. The near miss incidents are to be forwarded across all project sites.
12. The near miss incident is to be discussed in a tool box talk and communicated to all the employees, contractors and the workmen in the project site.
13. The weekly meeting at site must address the near miss incidents, their root causes and the status of implementation of Corrective action and Preventive action.

In case of an Occupational Accident/Injury:

1. In the event of an injury the person(s) involved should seek first aid or medical treatment as per the emergency response procedure.
2. Stop all work in that area where the incident has occurred immediately and barricade it.
3. Report fatal and reportable incident like injury, major air pollution, water pollution and spillage of chemicals affecting the nearby population, immediately by telephone to the RCM, Client/Consultant/PCM's, Project Manager, Head QHSE and MD immediately for Fatal incidents and reportable incidents.



	HSE Operational Control Procedures	Rev no 05
	OCP-022: Reporting Incidents, Near Misses & Investigation, Correction and Corrective Action	Date: 10.01.2019

4. The fatal incident report is to be prepared by the Site Safety Officer and RCM, and is to be sent to CEO, COO, Head QHSE, Project Manager, Head HR, Head Admin and Head Legal within 12 hours of fatal incidents.
5. The reportable incidents report is to be sent to CEO, COO, Head QHSE, and Project Manager within 12 hours of incident.
6. The physical examination of the area is to be done to ascertain what exactly occurred and if further risk exists.
7. In case of loss of containment, like spills or toxic release, the material is to be contained as per the Emergency Response Procedure using adequate PPE's.
8. The Site Safety Officer, concerned discipline engineer and the concerned contractor shall investigate the incident and identify the root cause.
9. In case of a fatal incident, a committee will be nominated by CEO and Head QHSE to investigate into the incident and the committee recommendation will be implemented. The committee shall consist of one HSE expert having relevant safety qualifications like NEBOSH and must be a Lead OSHAS 18001 Auditor from an external agency.
10. The corrective action and preventive actions needed is to be identified, implemented and recorded.
11. Ensure the corrective action has been implemented within the given time frame.
12. Only after the implementation of Corrective actions and Preventive actions, the work will resume with the approval of Head QHSE.
13. The effectiveness of implementation is to be check and recorded by the Site Safety Officer.
14. Fatal and reportable accidents are to be analyzed by the Project Manager, Head Construction and Head QHSE and plans are to be made to prevent them in the future.
15. The details of the incident are to be communicated to all sites to prevent similar incidents.
16. The details of the incident are to be discussed in the form of tool box talks and should be communicated to all employees, contractors and workmen in the site area.
17. The weekly meeting at site must address the incident, its root causes and the status of implementation of Corrective action and Preventive action. The same shall be audited and verified by Project Manager.

Procedure:

Legal Requirements:

No.	Activity	Responsibility	Records	Checking & Monitoring





HSE Operational Control Procedures

Rev no 05

OCP-022: Reporting Incidents, Near Misses & Investigation, Correction and Corrective Action


Date: 10.01.2019

1	Send communication in writing to Client/Consultant/PMCs for reporting incidents/accidents which are Fatal/ Reportable/ Toxic release/ Major release/major spillages of chemicals, excessive and continuous discharges of pollutants to land/air/pollution, and water bodies to the statutory authorities	Site I/C	Incident report	Issue report as per time frame given in Factories Act, BOCW Rules, EP Act, Water Act etc.
2	210. Reporting of accidents:-(1) Notice of any accident on the construction site which either— (a) causes loss of life; or (b) disables a building worker from working for a period of forty-eight hours or more immediately following the accident, shall forthwith be sent by telegram, telephone, fax or similar other means including special messenger within four hours in case of fatal accidents and seventy-two hours, in case of other accidents involving building workers	Site I/C	Incident report	As per BOCW Rules.



OH & S Near miss

No.	Activity	Responsibility	Records	Checking & Monitoring
1	Immediately alert the responsible supervisor/site engineer that a near miss has occurred	Workmen/Observer		
2	Inform the RCM and the Site Safety Officer about the incident.	Supervisor		
3	The Site Safety Officer, concerned discipline engineer and the concerned contractor shall investigate the incident and identify the root cause.		Near miss report	
4	On the day of the Near Miss, the details of the incident are to be mailed to the Corporate QHSE	RCM		
5	Near miss reporting form to be filled and sent to the Corporate QHSE within a period of two days, from the day of the incident	Site safety officer	Near miss report	
6	The report is to be signed by the RCM and circulated to the Project Manager and Corporate QHSE.	Site safety officer		
7	The corrective action and preventive actions needed is to be identified, implemented and recorded.	Site safety officer	Near miss report	
8	Ensure the corrective action has been implemented within the given time frame.	Site safety officer	Near miss report	
9	The effectiveness of implementation is to be checked and recorded	Site safety officer	Near miss report	

 <small>sustainable solutions. for a better life.</small>	HSE Operational Control Procedures	Rev no 05
	OCP-022: Reporting Incidents, Near Misses & Investigation, Correction and Corrective Action	Date: 10.01.2019

10	The Corporate QHSE is to analyze the data and provide necessary support.			
11	The near miss incidents are to be forwarded across all project sites.	Corporate QHSE	Communication records	
12	The near miss incident is to be discussed in a tool box talk and communicated to all the employees, contractors and the workmen in the project site.	Site safety officer	Tool box talks/Training records	Effectiveness of Tool box and safety awareness
13	The weekly meeting at site must address the near miss incidents, their root causes and the status of implementation of Corrective action and Preventive action.	RCM & Site Safety Officer	Minutes of the meeting	

OH & S Incident Reporting

S.No	Activity	Responsibility	Records	Checking & Monitoring
1	In the event of an injury the person(s) involved should seek first aid or medical treatment as per the emergency response procedure.	Site Safety Officer	First Aid Record	
2	Stop all work in that area where the incident has occurred immediately and barricade it.	Site Safety Officer & Supervisor		
3	Report fatal and reportable incident like injury, major air pollution, water pollution and spillage of chemicals affecting the nearby population, immediately by telephone to the RCM, Client/Consultant/PCM's, Project Manager, Head QHSE and MD immediately for Fatal incidents and reportable incidents.	Site Safety Officer	Incident Report (Form -1 and Form- 2)	
4	The fatal incident report is to be sent to CEO, COO, Head QHSE, Project Manager, Head HR, Head Admin and Head Legal within 2 hours and the reportable incidents within 12 hours of fatal incidents.	Site Safety Officer & RCM		





HSE Operational Control Procedures


Rev no 05

OCP-022: Reporting Incidents, Near Misses & Investigation, Correction and Corrective Action

Date: 10.01.2019

5	The reportable incidents report is to be sent to CEO, COO, Head QHSE, and Project Manager within 12 hours of incident. Form -1 within 4 hrs and form-2 detailed action within 24hrs.	Site Safety Officer & RCM	Form -1 and Form- 2	
6	The physical examination of the area is to be done to ascertain what exactly occurred and if further risk exists.	Site safety Officer		
7	In case of loss of containment, like spills or toxic release, the material is to be contained as per the Emergency Response Procedure using adequate PPE's.	Site safety Officer	Emergency Response Procedure	
8	The investigation of the incident is to be done to identify the root cause.	Site safety Officer, concerned discipline engineer and the concerned contractor		
9	In case of a fatal incident, a committee will be nominated by CEO and Head QHSE to investigate into the incident and the committee recommendation will be implemented. The committee shall consist of one HSE expert having relevant safety qualifications like NEBOSH and must be a Lead OSHAS 18001 Auditor from an external agency.		Incident Investigation Report	
10	The corrective action and preventive actions needed is to be identified, implemented and recorded.	Site Safety Officer	Near Miss report	
11	Ensure the corrective action has been implemented within the given time frame.	RCM & Site Safety Officer	CAPA Effectiveness Record	
12	Only after the implementation of Corrective actions and Preventive actions, the work will resume with the approval of Head QHSE.			
13	The effectiveness of implementation is to be check and recorded	Site Safety Officer	CAPA Effectiveness Record	



	HSE Operational Control Procedures	Rev no 05
	OCP-022: Reporting Incidents, Near Misses & Investigation, Correction and Corrective Action	Date: 10.01.2019

14	Fatal and reportable accidents are to be analyzed by the Project Manager, Head Construction and Head QHSE and plans are to be made to prevent them in the future.	Head QHSE		
15	The details of the incident are to be communicated to all sites to prevent similar incidents.	Corporate QHSE	Communication records	Incident Statistics
16	The details of the incident are to be discussed in the form of tool box talks and should be communicated to all employees, contractors and workmen in the site area.	Site Safety Officer	Tool box talk record & Training records	
17	The weekly meeting at site must address the incident, its root causes and the status of implementation of Corrective action and Preventive action. The same shall be audited and verified by Project Manager.	RCM & Site Safety Officer	Minutes of the meeting	Effectiveness of implementation of CAPA





HSE Operational Control Procedures

Rev no 05

OCP-022: Reporting Incidents, Near Misses & Investigation, Correction and Corrective Action

Date: 10.01.2019

ACCIDENT / INCIDENT REPORT – FORM 1 (To be submitted by the Site I/C within 4 Hours)

Report No		Project Name & No.	
Date & Time of Incident		Type of Incident	
Details of the Injured Person			
Name		Name of subcontractor	
Age		Sex: Male/Female	
Father/Husband Name		Address	
Details of job being carried out			
Details of the Incident			
Location			
Description			
Root Cause			
Contributing Factors			
Immediate Action Taken			





HSE Operational Control Procedures

Rev no 05

OCP-022: Reporting Incidents, Near Misses & Investigation, Correction and Corrective Action

Date: 10.01.2019

First Aid/Treatment given

Prepared by:

Approved by:

Name:
Designation:
Sign:

Name:
Designation:
Sign:





HSE Operational Control Procedures

Rev no 05

OCP-022: Reporting Incidents, Near Misses & Investigation, Correction and Corrective Action

Date: 10.01.2019

ACCIDENT/INCIDENT INVESTIGATION REPORT – FORM 2

(To be submitted by the Site I/C within 24 Hours)

Report No		Project Name & No.	
Date & Time of Incident		Type of Incident	
Details of the Injured Person			
Name		Name of subcontractor	
Age		Sex: Male/Female	
Father/Husband Name		Address	
Details of job being carried out			
Details of the Incident			
Location			
Description			
Root Cause			
Contributing Factors			
Immediate Action Taken			





HSE Operational Control Procedures

Rev no 05

OCP-022: Reporting Incidents, Near Misses & Investigation, Correction and Corrective Action

Date: 10.01.2019

First Aid/Treatment given

Root cause

Corrective Action Plan

S. No	Functional Area	Root Cause	Corrective Action	Responsibility	Due date
1					
2					
3					
4					


Prepared by:

Approved by:

Name:
Designation:
Sign:

Name:
Designation:
Sign:



 <small>sustainable solutions for a better life.</small>	HSE Operational Control Procedures	Rev no 05
	OCP-022: Reporting Incidents, Near Misses & Investigation, Correction and Corrective Action	Date: 10.01.2019

NEAR MISS FORMAT

	VATECH WABAG LTD	Format No: HSE/NEAR/O1A/R0
---	-------------------------	----------------------------

<u>NEAR MISS/OBSERVATIONS REPORTING FORM</u>			
Project Reference		Report dated	
Name of the Observer and Mobile no		Location where the incident observed	
Designation			
Company		Contractor safety In charge/Supervisor	
Low Risk <input type="checkbox"/> Medium Risk <input type="checkbox"/> High Risk <input type="checkbox"/>		Unsafe act <input type="checkbox"/> Unsafe condition <input type="checkbox"/> Near miss <input type="checkbox"/>	
(To be filled in by observer or his representative)		(To be filled in by Wabag Safety officer)	
Description of the event or situation which might lead to incident/Accident (Potential Hazard)		Immediate corrective action proposed by Safety officer (after discussion with discipline lead)	





HSE Operational Control Procedures

Rev no 05

OCP-022: Reporting Incidents, Near Misses & Investigation, Correction and Corrective Action

Date: 10.01.2019

Name and Signature of the observer/Supervisor		Name and Signature of Wabag Safety officer	
Status	Action implemented <input type="checkbox"/>		Action not implemented <input type="checkbox"/>
If not implemented state the reason			
Name & Sign of the Area In charge/Observer:		Date & Signature	
Reviewed and accepted by			
Safety Officer		Date & Signature	
RCM/Plant In charge		Date & Signature	
Report copy to: RCM/PM/Plant In charge /Project Head/ Corporate QHSE (Attach Photos where ever possible)			



	HSE Operational Control Procedures	Rev no 05
	OCP-023: HSE Violation Policy & Procedure	Date: 10.01.2019

CONTENTS

S.no	Description	Page No.
1	Introduction	3
2	Scope	3
3	Definition/Acronyms	3
4	Purpose	4
5	Responsibilities	4
6	General procedure for Issuance	5
7	Control Measure	7
8	Record	7
9	Review of non-conformity	7
10	Format(Appendix A)	8
11	Format(Appendix B)	9



	HSE Operational Control Procedures	Rev no 05
	OCP-023: HSE Violation Policy & Procedure	Date: 10.01.2019

1. Introduction:

To realize VA Tech Wabag's goal of achieving Zero incident at our EPC sites and O&M plants .We need to have a strong commitment from all the employees irrespective of cadre. This Disciplinary System in support of safety does not exist to punish the employees but the purpose is to help control the work environment, so that workers are protected and accidents are prevented. The disciplinary system helps ensure workplace safety and health by letting the company's employees know what is expected of them. It provides employees and workmen with opportunities to correct their behavior before an accident happens.

2. Scope

The standard applies to all EPC sites and O&M Plants of VA Tech Wabag limited.

3. Definitions/Acronyms

CONTRACTOR

Wabag / Wabag JV (Partner)

COMPANY

Client or Project Management Representative on behalf of Client

LOWER TIER SUBCONTRACTOR

Means any person or company of any tier, including but not limited to, suppliers or vendors of MATERIALS, supplier or SUBCONTRACTOR EQUIPMENT and erection contractors, having a contract with SUBCONTRACTOR or a LOWER TIER SUBCONTRACTOR for the performance of any part of the WORKS.

SUBCONTRACTOR

Means any contractor hired to provide materials, services or work on XXX project.

EMPLOYEE



 <small>W A B A G</small> <small>sustainable solutions for a better life</small>	HSE Operational Control Procedures	Rev no 05
	OCP-023: HSE Violation Policy & Procedure	Date: 10.01.2019

Any person engaged in activities for the benefit of the project and who receives payment, even on a temporary basis.

COMPETENT PERSON

A person who, because of qualifications and experience, has the skills necessary to perform the stated duties.

HSE

Health, Safety and Environment

4. Purpose

The disciplinary system is one of the keys to successfully implementing the company's HSE program. It ensures that the company's rules and safe working practices are taken seriously by employees and are actually followed. It lets employees know how the company expects them to operate in relation to the goals of the company's HSE program. And it lays out the actions; the company will take if individuals do not meet the company's requirements. The employees' supervisor and all members of management are responsible for the enforcement of this disciplinary program.

5. Responsibility:

Overall responsibility for ensuring appropriate corrective action is carried out with the Project Head in consultation with HSE team. The Project manager has the overall responsibility for the effective operation. The Line Manager/HSE should implement the NCR/ work stoppage memo, if he finds any lack in the safety procedure being followed during the work. Failing to fulfill responsibilities and requirements, comes under the Safety Violation policy & as per the safety violation policy he must take action against the person who fails to implement the requirement. It shall be the responsibility of all contractor's and subcontractor's supervisors to ensure that all employees adhere to the requirements of the procedure.



	HSE Operational Control Procedures	Rev no 05
	OCP-023: HSE Violation Policy & Procedure	Date: 10.01.2019

RCM/Project Head/HSE Lead: To ensure that the procedure is followed, reported & appropriate records are maintained.

6. General Procedure for Issuance:

The Engineer/Manager, Supervisor personnel who have specific responsibilities for implementation and management of safety are expected to know, understand, support, implement and enforce the company's policies, procedures, posted instructions and work practices related to safety. Appropriate actions are to be taken against anyone who breaches the relevant HSE rules and procedures while on project site. This includes worksite, temporary facilities, driving, and transportation as well.

(Note: The violations lists reported below shall not be considered comprehensive and exclusive, other actions or behaviors that breach HSE requirements not reported in the lists will be evaluated by CONTRACTOR and COMPANY taking in consideration the potential effect and/or risk created and consequently inserted in one of the three category of severity)

Disciplinary violations that are grounds for immediate suspension and penalties up to and including termination of employment specifically as follows:


Minor Offences

- Failure to wear PPE
- Failure to wear the correct PPE
- Failure to be in possession of a site ID Pass. Using defective tools or equipment.
- Failure to comply with transport safety rules.

Serious Offences

- Threatening behaviors



 WABAG <small>sustainable energy for a better life.</small>	HSE Operational Control Procedures	Rev no 05
	OCP-023: HSE Violation Policy & Procedure	Date: 10.01.2019

- Instructing an employee to violate a safety instruction or commit an unsafe act.
- Failure to comply with valid instructions
- Failure to comply with warning notices
- Tampering with, or abuse of, safety devices or equipment.
- Entry to Restricted areas without authority.
- Irresponsible driving or operation of mobile equipment

Dismissal Offences

- Fighting Gambling
- Willful damage to equipment or property belonging to the project.
- Theft
- Alcohol consumption on site, use of illegal substances on site or under the influence of alcohol or illegal substances while on site.
- Smoking in a non-approved area
- Sleeping in the work area
- Ordering an employee to violate a published safety rule/procedure or perform an unsafe act.
- Falsifying a Project permit, Project personal identification or required reports.
- Where there has been a violation of Indian or international law.

Minor Violation

For a first offence the person concerned will be issued with a *warning letter*.



	HSE Operational Control Procedures	Rev no 05
	OCP-023: HSE Violation Policy & Procedure	Date: 10.01.2019

Immediate supervisor will be informed of the violation and implement corrective action as necessary to comply with the site HSE requirements before the work activity is permitted to recommence.

For a second offence *second warning letter* will be issued along with a fine of Rs. 1000/- .for Wabag employee whereas for the contractor the site RCM/Project Manager/Safety officer will decided on the appropriate penalty.

The supervisor and crew of the offending employee shall collectively review the training outline for Site Orientation of new employees. Offending person and their supervisor shall each demonstrate correct work method. (This retraining will be conducted at the SUBCONTRACTOR's expense).

CONTRACTOR will withdraw the offender's right to work on project for 1 working day.

For a third offence CONTRACTOR will withdraw the offender's right to work for three working days without pay, for Wabag employees.

Supervisor responsible for sub-contractor employee shall receive a *warning letter*.

Serious Offences

For a first offence Contractor will withdraw the offender's right to work on Project for 3 days. Safety Induction retraining for the offender, his supervisor and work crew will be undertaken before return to work.

For a second offence within 30 days Contractor will withdraw the offender's right to work on the project and the SUBCONTRACTOR liable to a fine.

Dismissal Offences

Contractor will immediately withdraw the offender's right to work on project and, where there has been a violation of India or international law will inform the relevant Government Authorities of the offence, Subcontractor will be liable to a fine.



	HSE Operational Control Procedures	Rev no 05
	OCP-023: HSE Violation Policy & Procedure	Date: 10.01.2019

6. Control Measures

a) Disciplinary actions need to be proportionate to the seriousness of the offense and the frequency of its occurrence. It is certainly inappropriate to fire someone for occasional tardiness. It is equally inappropriate to issue only oral warnings to an employee who repeatedly violating the safety procedure. Appendix A provides format of disciplinary actions in a four-step disciplinary system & Appendix B provides format of Disciplinary action.

b) Disciplinary procedures should not be instituted without explanation. The company will provide feedback to the employee on what behavior is unacceptable, why the corrective action is necessary, and how the employee can prevent future violations and disciplinary action.

7. Records:

Records of all Disciplinary actions taken for safety violation shall be retained by QHSE department.

8. Review of Non-Conformities

All non-conformities report will be reviewed at the Management review meeting to ensure that the successful corrective action have been taken.



 <small>Sustainable life solutions for a better life.</small>	HSE Operational Control Procedures	Rev no 05
	OCP-023: HSE Violation Policy & Procedure	Date: 10.01.2019

Appendix – A

Tracking of Individual Safety Disciplinary Actions

Employee Name: _____

TRACKING	First Offense Date & Response	Second Offense Date & Response	Repeated Violations Date & Response
Unsafe Work Habits			
Refusal to Follow Safety Instructions			


Flagrant or repetitive violations of safety will result in corrective and /or disciplinary action as follows (For Wabag employees):

S.No	Tracking of Violation Memo	Actions against the employee
1	1 st offence	Written Warning
2	2 nd offence	Warning with penalty of Rs 1000/-
3	3 rd Offence	3 day suspension without pay
4	4 th offence	Recommend separation from employment with Wabag.

Appendix-B



 <small>sustainable solutions for a better life.</small>	HSE Operational Control Procedures	Rev no 05
	OCP-023: HSE Violation Policy & Procedure	Date: 10.01.2019

	VATECH WABAG LTD	Ref Format No:	SAF/VIO/01A/R1
CONTRACTOR SAFETY VIOLATION MEMO			
HSE Memo No		Memo Date	Project Ref no and Name
Name of the contractor		Date of violation	Contractor scope of work
Violation : (Specify the stated requirements as per Wabag HSE Contractual requirements / Client Specification / OSHAS 18001/ISO 14001 and Impact of violation)			
Details of Violation;			
Corrective action and closure date:			
Preventive action and closure date:			



 WABAG <small>Sustainable solutions for a better life.</small>	HSE Operational Control Procedures	Rev no 05
	OCP-023: HSE Violation Policy & Procedure	Date: 10.01.2019

Penalty recommendation by Safety officer and RCM:			
Issue raised by: HSE Officer Name Designation Employee ID		Accepted by: Contractor / Designation	
Verification of corrective action/ Effectiveness of the corrective action by the Site safety officer:		Verification of preventive action/Effectiveness of the corrective action by the Site safety officer:	
Comments:		Comments:	
Evidence:		Evidence:	
Satisfactory <input type="checkbox"/> Unsatisfactory <input type="checkbox"/>		Satisfactory <input type="checkbox"/> Unsatisfactory <input type="checkbox"/>	
Copy to : RCM/PM/COO/Finance Head/ Corporate QHSE		Copy to : RCM/PM/COO/Finance Head/Corporate QHSE	

Attachment – Photograph



 WABAG sustainable solutions for a better life.	HSE Operational Control Procedures	Rev no 05
	OCP-023: HSE Violation Policy & Procedure	Date: 10.01.2019

	VATECH WABAG LTD	Ref Format No:	SAF/VIO/O1A/R1
---	-------------------------	----------------	-----------------------

EMPLOYEE SAFETY VIOLATION MEMO

HSE Memo No	Memo Date	Safety Violation By: Employee Name & ID
Designation of employee	Date of violation	Project Ref no and Name

Violation : (Specify the stated requirements as per Wabag HSE Contractual requirements / Client Specification /OSHAS 18001/ISO 14001 and impact of violation)

Details of Violation of employee:

Violation raised by: Name Designation Employee ID Signature	Approved by Name/Designation /Employee ID/Signature
--	--

I, have read and understood the HSE requirements of VA Tech

Wabag Limited. I agree to act in accordance with the safety rules at all times while working, and understand that the violation of any rule is cause for stern disciplinary action, which could include suspension or termination of employment.

Employee Signature & Date:

Copy to

1. CEO
2. COO
3. India Cluster Project Head
4. Project Manager /RCM
5. HR Head for recording the violation on personal file
6. Corporate HSE Record



 W A B A G Sustainable solutions for a better life.	HSE Operational Control Procedures	Rev no 05
	OCP-023: HSE Violation Policy & Procedure	Date: 10.01.2019

Tracking of violation memo	1st Offence	2nd Offence	3rd Offence	4th Offence
Actions taken against employee	Written warning	Warning with a penalty of Rs. 1000/-	3 days suspension without pay	Recommend separation from employment with Wabag
Memo issue date				
Signature of Corporate HR				

Attachment – Photograph



 WABAG <small>sustainable solutions for a better life.</small>	HSE Operational Control Procedures	Rev no 02
	OCP-024 HSE Contractual Condition and Agreement	Date: 10.01.2019

HSE Contractual Condition and Agreement

Doc Number: OCP/024 dated 05.04.2018

Scope
<p>Document applicable to</p> <ul style="list-style-type: none"> • The Project Management Team for sending bid enquiry to contractor • The EPC contractors for implementing the stated requirements during project execution. • Wabag and Contractor to sign MOU on HSE understanding prior to awarding of the contract

Date	Rev no	Description of changes	Prepared by	Reviewed by	Approved by
04/04/2018	00	Initial issue	Sweeti Jha/Dipti Sharath Tech Coordinator	Benny John Head QHSE	Pankaj Sachdeva CEO India Cluster
Signature →					

VA TECH WABAG LIMITED
Global Headquarters

address: WABAG HOUSE, No. 17, 200 Feet Thoraipakkam - Pallavaram Main Road, Sunnambu Kolathur, Chennai - 600 117, Tamil Nadu, India

mail: Benny_John@wabag.in

office: +91 (44) 3923 2323

direct: +91 (44) 3623 2246 **fax:** +91 (44) 3923 2324



 WABAG Sustained solutions for a better life.	HSE Operational Control Procedures	Rev no 02
	OCP-024 HSE Contractual Condition and Agreement	Date: 10.01.2019

Table of Contents

Sr. No	Particulars	Page Number
1	General 1.1 Introduction 1.2 Purpose 1.3 Objective 1.4 Definition	3 3 3 3-4
2	Abbreviation	4
3	Health, Safety and Environment Compliance 3.1 MOU 3.2 EHS Policy 3.3 Statutory requirements	4 4 4-5
4	Contents of HSE Organization 4.1 Contractors Project Specific HSE Plan 4.2 Contractors HSE Organization 4.3 Standard Operational Procedures to be submitted by the contractor 4.4 Safety Measures 4.5 Emergency Response Plan 4.6 Occupational Health and Hygiene 4.7 Incident Reporting 4.8 Contractors Safety Committee and Near Miss Committee	5 5 6-7 7-8 8 8-9 9 9
5	Environment Protection	9
6	Monitoring of EHS performance and close out report	10
7	Suspension and stoppage of work	10
8	Reward and Recognition	10-11
9	Penalties	11-14

ATTACHMENTS

Attachment 1	Memorandum of understanding	15-16
Attachment 2	Wabag EHS Policy	17
Attachment 3	PPE Matrix	19



 <p>WABAG sustainable solutions for a better life.</p>	HSE Operational Control Procedures	Rev no 02
	OCP-024 HSE Contractual Condition and Agreement	Date: 10.01.2019

General

1.1. Introduction

WABAG is an Indian Multinational which provides Water Technology solution with a presence in more than 23 countries. Being one of the world's leading suppliers of water and wastewater treatment plant, Wabag offers sustainable solutions that can serve as the economic basis for a region and provide enhanced quality of life for the local population. The health, safety and welfare of its stakeholders form the basis of the value system. Wabag is certified to ISO 9001, ISO 14001 and OSHAS 18001 and has developed as elaborated process and procedures to ensure its stake holders safety and Health.

1.2. Purpose

The purpose of this agreement is to ensure that

- 1.2.1. The contractors and their sub-contractors are familiar with Wabag HSE process and procedures
- 1.2.2. The statutory and regulatory requirements as per the National and International requirements are well understood and followed at site.
- 1.2.3. The contractors executes the work as per the Wabag and Client requirements

1.3. Objective

The objectives that are to be achieved while project execution are as follows:

- 1.3.1. Zero incident
- 1.3.2. Zero LTI
- 1.3.3. Compliance to all applicable statutory and legal requirements
- 1.3.4. 100% compliance to job specific personal protective equipment
- 1.3.5. Value human life of all the stake holders engaged in the project
- 1.3.6. Ensure positive physical and mental health of all the workmen at site
- 1.3.7. Best construction practices are followed to ensure safety with productivity
- 1.3.8. Minimize environmental damage caused due to the construction activities
- 1.3.9. Improvising the productivity by implementing best HSE Standards

1.4. Definitions

- 1.4.1. The use of "shall" indicates a mandatory requirement.
- 1.4.2. The use of "should" indicates a strongly recommended
- 1.4.3. The use of "may" indicates is to be considered
- 1.4.4. **Contractor:** The person/firm whose tender has been accepted by Wabag and is responsible for project execution till the handover of the project to Wabag.
- 1.4.5. **Residential Construction Manager (RCM):** The purpose of RCM is to control the project's time, cost and quality. RCM is compatible with all project delivery system including design-bid-build, design-build, CM At-Risk and Public Private Partnerships.



	HSE Operational Control Procedures	Rev no 02
	OCP-024 HSE Contractual Condition and Agreement	Date: 10.01.2019

- 1.4.6. **Project manager:** The project manager is responsible for the overall planning and execution of a particular project for Wabag.
- 1.4.7. **Safety engineer:** A safety engineer is a contractor's employee whose primary responsibility should be designing the procedures and implementing systems to keep project site safe.
- 1.4.8. **Safety In charge/ Safety Officer:** A person responsible for ensuring safety regulations are adhered to, and for assessing the unsafe conditions or hazards at the project site.
- 1.4.9. **QHSE:** Quality, Health, Safety and Environment
- 1.4.10. **CSE:** Confined Space Entry
- 1.4.11. **PPE:** Personal Protective Equipment
- 1.4.12. **LTI:** Lost Time Injury

2. Abbreviation

- 2.1. **PM- Project Manger**
- 2.2. **RCM – Resident Construction Manager**
- 2.3. **QHSE – Quality Health Safety and Environment**
- 2.4. **PPE – Personal Protective Equipment**
- 2.5. **BOCW- Building and Other Construction Workers Act**
- 2.6. **LTI - : Lost time Injury**
- 2.7. **MOU – Memorandum of understanding**
- 2.8. **ISO – International Organization for Standardization**
- 2.9. **OHSAS – Occupational Health and Safety Assessment Series**
- 2.10. **HSE –Health Safety and Environment**
- 2.11. **HIRA – Hazard Identification and Risk assessment**

3. Health Safety and Environment Compliance

3.1. Memorandum of Understanding

A Memorandum of Understanding placed at Attachment No: 1 shall be executed before the award of the contract by the contractor with regard to the provisions on Health, Safety and Environment to be followed and implemented during the Project execution.

3.2. EHS Policy

The construction works shall be undertaken in accordance with EHS policy of Wabag as provided in Attachment No: 2

3.3. Statutory requirements

- 3.3.1. The contractor including sub-contractor shall be solely responsible for all the compliances with applicable legal and other requirement of area of jurisdiction in respect of services under this contract.



	HSE Operational Control Procedures	Rev no 02
	OCP-024 HSE Contractual Condition and Agreement	Date: 10.01.2019

3.3.2. The contractor shall comply with the relevant statutory requirement of various acts as per applicable local/State/national law including BOCW Act, Labour Law, Environment act, Water act, Electricity act, Pollution control board..

4. Contents of HSE Organization

4.1 Contractors Project Specific HSE Plan

The contractor shall prepare and submit a detailed Project HSE plan covering the following aspects which shall be as per ISO 14001/OSHAS 18001/Wabag QHSE plan and project specifications and requirement. In case of labor contract or small contracts of value less than 10 crores, Wabag HSE Project Plan shall be followed. The contractor's HSE Plan should be in line with the below guidelines. The Contractor HSE plan must include:

- 4.1.1. **Contractor safety policy statement**
- 4.1.2. **Purpose**
- 4.1.3. **Targets and Goals/ Objectives**
- 4.1.4. **Resource management**

4.2 Contractors HSE Organization

The contractor shall appoint one Safety Head with a minimum of 12- 15 years of EPC experience having relevant HSE qualification like BE in Fire Safety, Industrial Diploma in HSE, NEBOSH, irrespective of the number of workmen. However if the number of workmen exceeds 100, an addition safety officer shall be engaged thereof having 8-10 years of experience having same qualification as detailed above.

- The senior most Contractor safety person should be designated as EHS Head and his/her status in organization shall be similar to other departmental heads.
- The work experience and qualification credential of HSE officers shall be submitted to Wabag for approval prior to execution of the work. In case if any EHS personnel is replaced , the contractor shall intimate Wabag HSE officer and necessary approval shall be taken for replacement

4.2.1 Project Organization chart

Project organization chart stating Contractor HSE Engineers reporting shall be prepared and submitted for Wabag review and approval.

4.2.2 Roles and responsibilities

Contractor should designate specific roles and responsibilities for the implementation of the HSE plan as per the project organization chart.



	HSE Operational Control Procedures	Rev no 02
	OCP-024 HSE Contractual Condition and Agreement	Date: 10.01.2019

4.3 Standard Operational Procedures to be submitted by the contractor

The contractor shall submit the standard work procedures as per the project requirement along with the Project HSE Plan.

4.3.1 Operational Procedures:

The contractor must provide the safe working procedures for all activities that they will perform at site. All activities may not be applicable to the contractor. Depending on the activity to be performed the contractor must choose the activities relevant to the job being performed. This is above and beyond the following activities that are deemed critical as per Wabag requirements.

1. Material transportation and logistics (loading and receiving end)
2. Material handling (storage, transportation, surface preparation, lifting, erection and alignment)
3. Pilling and capping
4. Excavation and Trenching
5. Confined space work
6. Concrete works and reinforcement
7. Formwork
8. Welding and gas-cutting
9. Fabrication of steel structures
10. Grit blasting
11. Erection and installation of electrical equipment
12. Plastering
13. Painting
14. Storage of cement and handling
15. Work at height
16. Handling of chemicals and spill control
17. Scaffolding
18. Hydrostatic and pneumatic testing
19. LOTO
20. Incident investigation

4.3.2 Project HSE Documentation

- a. The following documents shall be available with the contractor for verification and audit
 1. HSE plan
 2. Standard operating procedures
 3. Hazard and Risk Assessment for all activities
 4. Work permits
 5. Housekeeping schedule for each area.
 6. Emergency response procedures
 7. Daily safety report
 8. Monthly safety report



	HSE Operational Control Procedures	Rev no 02
	OCP-024 HSE Contractual Condition and Agreement	Date: 10.01.2019

9. Internal audit reports
10. Legal compliance reports
11. Environmental monitoring reports
12. Certification by competent authority for critical equipment's and machineries
13. Incident/ Near miss reports
14. Violation reports
15. Minutes of meeting of safety and near miss committee meetings
16. Induction training records
17. First aid records
18. Training records
19. Medical checkup records
20. PPE issue register

4.4 Safety Measures

4.4.1 General safety requirements

- 4.4.1.1 All personnel shall undergo safety induction training. The contractor workers shall have induction stickers on their helmets which will specify:



- 4.4.1.2 **The PPE Mandatory requirements are attached in Annex - 3**
- 4.4.1.3 The contractor personal shall not enter the site premises without wearing a hard hat and safety shoes.
- 4.4.1.4 All site personnel, for their own safety and for the safety of others, are required to fully comply with their employer's statement of safe working method and participate in tool box, safety programs, mass meeting, orientation programs and trainings.
- 4.3.1.4 Contractor personnel shall not enter the work premises under the influence of alcohol, drugs or other intoxicating substances.
- 4.3.1.5 The work site shall be non-smoking zone
- 4.3.1.6 Gate entry system is to be devised so that all visitors shall report to security and will be allowed entry. HSE officer of contractor/ Wabag shall be informed by the security if induction is required.
- 4.3.1.7 Its Mandatory that all the visitors shall wear appropriate PPE during their entry into construction area.
- 4.3.1.8 Carrying arms and ammunition into the site is strictly prohibited.



 WABAG <small>WABAG GROUP CO., LTD. for a better life.</small>	HSE Operational Control Procedures	Rev no 02
	OCP-024 HSE Contractual Condition and Agreement	Date: 10.01.2019

4.3.1.9 No personnel shall indulge in fighting, horseplay or practical jokes within the site or its perimeter.

4.3.1.10 Offensive or inappropriate language and provocative gestures are not allowed

4.3.1.11 Gambling is prohibited in the site premises

4.5 Emergency response plan

The emergency response plan has to be designed for all possible contingencies and must be communicated to all employees. It should include the following:

1. The procedures to be adopted for all applicable emergencies
2. The roles and responsibilities of the personnel in case of an emergency
3. Details of persons to be contacted during an emergency. This information is also to be displayed at site.
4. Details of local hospitals, response support agencies like ambulance and fire-fighting. This information is also to be displayed at site.
5. Essential emergency equipment should be available at site, and it must be checked periodically to ensure its efficiency.
6. Emergency mock drill is to be conducted once in three months.
7. Assembly point, evacuation route and plan shall also be included, displayed and communicated

4.5 Occupational Health and Hygiene

- The contractor shall be responsible for the providing health, hygiene and welfare facilities to his personnel. The contractor shall provide the following basic facilities:
 - Medical examinations for Height, Trench and confined space workers
 - Welfare of labor camps by ensuring hygienic living quarters.
 - Provide the highest quality of sanitary facilities to the labor camp
 - Conducting regular medical checkup for the contractor workers
- It is essential that good housekeeping be maintained throughout the period of any work, both at work site and around any temporary building/store.
- The working area shall be cleaned on a regular basis to ensure good housekeeping.
- Escape and other access ways must be kept clear, safety equipment kept accessible and surplus/scrap material must be removed daily.

4.6 Incident reporting

The contractor shall have an incident reporting system in line with HSE procedures/ Plan / Manual. The contractor shall immediately notify of all incidents resulting in:

- First aid cases
- Injury to third parties
- Damage to plant or machinery



	HSE Operational Control Procedures	Rev no 02
	OCP-024 HSE Contractual Condition and Agreement	Date: 10.01.2019

- An outbreak of fire or explosion
- Loss of containment of inflammable material/chemicals
- Fatalities and lost time Injuries to its personnel
- Other medical or health issues

Any unsafe acts and conditions are to be communicated daily to the Wabag HSE officer.

4.7 Contractors Safety Committee and Near Miss Committee

Contractor shall form a Safety Committee and near miss committee. And meeting shall be held every month. The meeting will be attended by Wabag HSE Engineer and RCM

- Responsibility of safety committee:
 - Discuss client complaints and feedback
 - Review of previous MOM and its compliance
 - NCR and observations review
 - First aid cases/Reportable injuries
 - Planning future jobs ahead and specific requirements
 - Sub-contractor performance
 - Need for training, resources, PPE.
 - Observation of HSE committee during safety walks and resolution.
- Responsibility of near miss committee:
 - The near miss committee shall comprise of supervisors, skilled and unskilled labours and engineers from all work areas.
 - The committee is to encourage reporting of near miss by all workers, by communicating the importance of near miss.
 - The near miss reported is to be communicated to all site employees along with the corrective actions.
- Contractor shall send the Near miss report to Wabag on a daily basis.
- Copies of minutes of contractor's safety committee meetings shall be sent to Wabag EHS Head RCM and Project Manager every month
- Near Miss Observation committee and meeting MOMs are to be sent to the Wabag EHS Head RCM and Project Manager every month
- Contractor representatives shall attend the Wabag Safety Committee meeting and Near miss committee meeting regularly

5.0 Environment protection

The contractor shall take necessary actions for protecting air, water, soil and vegetation from the adverse effects of the construction activities and must minimize any nuisance to the public, which may arise from such operations. Contractor shall follow the environmental guidelines as issued from by Client and Wabag.

6.0 Monitoring of Contractors HSE performance and close out report

6.1 Contractor shall share the monitoring reports every month.



 WABAG sustainable solutions for a better life.	HSE Operational Control Procedures	Rev no 02
	OCP-024 HSE Contractual Condition and Agreement	Date: 10.01.2019

6.2 On project completion, the contractor shall submit the HSE close out report and subsequent final dossier along with the project statistics to the Wabag HSE head for approval. The final payment will not be released without the approval of Wabag Head HSE. The satisfactory HSE performance certificate shall be obtained from Head QHSE.

7.0 Suspension/Stoppage of work

7.1 Wabag shall have the right to suspend/stop the work at its sole discretion, if in its opinion the work is being carried out in an unsafe manner that may pose a risk to the worker, people working nearby, equipment, or environment. Or if it violates a mandatory requirement of Wabag or the Client

7.2 The contractor shall not proceed with the work until he has complied with the Wabag HSE requirements or the instructions of Wabag RCM/HSE Head

7.3 The Contractor shall not be entitled for any damages/compensation for stoppage of work, due to reasons mentioned in 7.1 and the period of such stoppage of work shall not be taken as an extension of time for completion of the work and will not be the ground for waiver of levy of liquidated damages.

8.0 Rewards and Recognitions

Wabag appreciates the commitment of its stakeholders towards maintaining a safe working environment and recognizes the same accordingly. Below mentioned is the selection criteria for rewards.

Sl No	Indicators	Criteria for selection	Reward frequency	Target Personnel's
1	Reporting of Unsafe conditions , near miss, Incidents	Workman who adhere to the safety norms at site and promptly reports any unsafe acts, conditions and near misses to his supervisor and co-workmen. He encourages his co-workmen to follow the safe practices of work.	Once in a week	Workmen
2	Speaking up during a safety committee meeting and sharing innovative ways of improving safety	Idea acceptance by Project Manager and QHSE Corporate office. The employee showing concerns and proposing ways for improvement in project site	Monthly – Pan India only one will be selected	Contractor Supervisor/ Engineers
3	Stopping an Unsafe Activity (own work or others) and assisting co-work to avoid risk situation	Activity was a potential threat to the work environment including life and property.	Monthly	Workmen/ Contractor or Engineers



 <small>sustainable solutions for a better life.</small>	HSE Operational Control Procedures	Rev no 02
	OCP-024 HSE Contractual Condition and Agreement	Date: 10.01.2019

4	Best contractors award	The audit will be conducted by Wabag HO on specific parameters and the highest rating will be the qualifying criteria	Once in a year. Pan India.	Contractor
5	Safety officer of the year	Excellent contribution to the department of HSE in terms of Reporting / Sharing information / Transparency/ compliances / documentation / implementation of initiatives/house keeping	Once in a year	Contractor Safety Engineer

9.0 Penalties

The intent of this system is not to penalize any stakeholders, but to have a better control and discipline as well as to ensure a safe working environment. Safety is of prime importance to Wabag and its clients, and the same is enforced through this process.

The work place violation like, non-compliance to procedures / guidelines / safe work practices/ unsafe acts/ behaviors shall be dealt according to penalty system as follows:

S. No	Violation of EHS Norms Unsafe act/condition	1st Violation	2nd Violation	3rd Violation	Remarks
1	PPE Non compliance Any of the Engineers/ Supervisors/ workmen without safety hard hat or safety shoes.	Violation notice to contractor and contractor is advised to issue the PPE immediately. Workers without PPE are not permitted to work at site.	Contractors Managing director is informed. Safety officers recommends to procure PPE and debit from contractor account	PPE available and not wearing will result in one day suspension from work	Recommendation for PPE purchase is to be taken from the Project Manager and the amount will be debited to contractors account
2	No Work permit Working without work permit/clearance	Violation Memo to the contractor and suspension of work. Work to resume only after necessary permits are in place.	If the violation repeated recommendation to suspend the respective Engineer. Approval from RCM and PM/PH	Further action to be recommended by COO and CEO	----
3	Site Electricity : a) ELCB not installed b) Inserting of bare wires into the socket	Work stoppage. One hour training on electrical safety. Immediate corrective action.	----	----	Work stoppage report to PM/PH/COO/CEO



 <p>WABAG Quality. Reliability. Solutions. For a better life.</p>	HSE Operational Control Procedures	Rev no 02
	OCP-024 HSE Contractual Condition and Agreement	Date: 10.01.2019

4	Noncompliance of Working at height: <ul style="list-style-type: none"> • No full body harness • No safety net • No life line or anchorage point • Bamboo scaffold / ladders • Broken/ weak ladders • Re-bar welded ladders • No guardrail, toe board, barriers • No working platform • Working at unprotected edges 	<ol style="list-style-type: none"> 1 Two hours training on work at height to contactor and employees 2 Training on impact of fall 3 Video session on fall from height 4 Behavioral training <p><u>Poor condition of scaffolds/ladders/platforms:</u></p> <ol style="list-style-type: none"> 1. Violation memo 2. Ensure immediate action plan for replacement 	<p>Escalation to the Project Manager and Project Head.</p> <p>Written communication to contractor's Managing Director to take corrective and proactive actions</p>	<p>Recommending suspension of contractors supervisor for his inability to execute safety requirements and posing threat to human life</p>	<p>If the violation is repeated further escalation to COO and CEO for necessary action</p>
5	Gas cutting: <ul style="list-style-type: none"> • Flash back arrester, non-return valve and regulator not in working condition • Using domestic LPG cylinders • Fire extinguisher not placed in the vicinity during operation 	<p>Issue violation memo to the responsible contractor. Brief the workers and contractor on the use of flash back arrestors, Cylinders and control measures.</p>	<p>Issue of violation memo. Work is stopped, and the work can be started only after taking corrective action</p>	Nil	<p>Work stoppage report is to be sent to the Project Head and COO.</p>
6	Welding : <ul style="list-style-type: none"> • Improper grounding and return path. • Damaged welding cable 	<p>Issue violation memo to the responsible contractor. Brief the workers on welding and control measures.</p>	<p>Welders shall undergo 2 hour full training on welding safety and control measures.</p>	<p>The matter to be escalated to the RCM/PM</p>	<p>In case of no resolution the items will be purchase or rectified using external source.</p>
7	Occupational Health	<p>Intimate the contractor of further</p>			<p>The medical examination will</p>



 <p>WABAG Sustainable construction for a better life.</p>	HSE Operational Control Procedures	Rev no 02
	OCP-024 HSE Contractual Condition and Agreement	Date: 10.01.2019

	Fail to conduct medical examination to workers who are working at Height, Trenches and confined space	course of action if the medical checkup is not conducted within in the stipulated time	----	----	be conducted by Wabag Safety office and the amount will be taken from the contractor in the form of a debit note. Approval from PM/Project Head
8	Display of Signage's Non display of safety signage's emergency telephone number at work locations	Violation memo to be issued to the contractor along with an implementation date for the signage.	If not implemented, issue a second warning and communicate about Wabag procurement and cost deduction.	Wabag will initiate procurement of signage's and will deduct from the contractors bill	Approval will be taken from the Project Head /COO
9	Safety supervisors Failure to appoint safety supervisors as specified in the contract.	Intimate the contractor of further course of action if the manpower is not deployed within in the stipulated time	----	----	Wabag will appoint the safety engineers on a man month basis through consultants and deduct the charges as applicable Approval from COO/CEO
10	Housekeeping : Material/ tools/ construction material etc. not in designated area and clean working environment is not maintained	Briefing to be given regarding the hazards that are resulted from improper housekeeping practices by HSE / Lead Engineers Follow up to be done to ensure compliance	Violation to be issued by RCM. Briefing to be given regarding the hazards that are resulted from improper housekeeping practices.	Warning letter to the contractor by the Project Head / PM regarding the compliance to housekeeping requirements.	In case of further violation the PM/Project Head will decide the course of action
11	Failure to report incident including near miss reporting system	Provide awareness training regarding: Importance of incident reporting and Near miss reporting.	Violation memo to be issued. Conduct a near miss awareness training session and meeting.	Violation memo to be issued. Conduct a near miss awareness training	Repeated violation - Review of contractor performance and report to COO/CEO for further action





HSE Operational Control Procedures

Rev no 02

OCP-024 HSE Contractual Condition and Agreement

Date: 10.01.2019

			Conduct a near miss committee meeting and raise the issue.	session and meeting. Conduct a near miss committee meeting and raise the issue.	
12	Any major/serious EHS violation other than above mentioned violation	----	----	----	The safety committee and the Wabag Management will take appropriate decision

Note: Violation reporting

1. The evidence has to be in the form of a photograph.
2. The communication has to be in the form of formal written mails, along with acknowledgement that the contractor has understood and accepted the violation.
3. The evidence has to be submitted along with the violation memo.
4. The violation report has to be approved by the RCM and signed by the contractor.
5. In case of any disputes the matter is to be escalated to the Project Manager & the Head, QHSE for resolution.
6. The penalty is to be debited from the contractor in the form of a debit note.


----- END -----



	HSE Operational Control Procedures	Rev no 02
	OCP-024 HSE Contractual Condition and Agreement	Date: 10.01.2019

Attachment No. 1

Memorandum of understanding between Wabag and the Contractor for safe execution of contract work

	HSE MANAGEMENT SYSTEMS	Date: Project:
	Memorandum of understanding between Wabag and the Contractor for safe execution of contract work	

This memorandum of understanding is made and executed by and between Wabag M/s _____ an office at _____ or their authorized representative (s), hereinafter referred to as "WABAG" (Which expression shall wherever the context so requires or admits be deemed to mean and include its successors in business and assigns) of the one party

AND

M/s _____ Having its registered office at _____ hereinafter referred to as the "CONTRACTOR" (Which expression shall wherever the context so requires or admits be deemed to mean and include its successors in business and assigns) of the other party

WITNESSETH THAT

WHEREAS the WABAG gives highest importance to the occupational safety, health and environment during execution of work, seeks cooperation from the CONTRACTOR in this endeavor.

Thus, this memorandum of understanding is for promoting the safety health and environment aspects required to be followed at workplace/site and will be applicable to any site job to be done by the CONTRACTOR

AND

WHEREAS the CONTRACTOR has read all the terms and condition of the and whereas the CONTRACTOR has studied the following documents

- a. Tender documents, including Notice inviting tender, general and conditions, special conditions.
- b. Conditions of contract of safety, Health and Environment.
- c. Corresponding applicable acts and Rules.



	HSE Operational Control Procedures	Rev no 02
	OCP-024 HSE Contractual Condition and Agreement	Date: 10.01.2019

The amendments to any of the above rules and any other rules & regulations or procedures circulars notices & advices laid down by the WABAG from time to time.

Now it is hereby AGREED AND DECLARED by and between the WABAG and the CONTRACTOR as follows:

Clause - I the contractor shall abide by the terms and conditions stipulated in Condition of Contract on Health, Safety & Environment.

Clause - II The CONTRACTOR shall undertake full responsibility for safe execution of job at work place/site and safety of this personnel and adjoining road users during work.

Clause - III Without giving any prior notice, the WABAG shall from time to time be entitled to add/or amend any or all terms and conditions with a view to improving safety and occupational health of personnel and safety of work, With immediate effect and the same shall be binding on the CONTRACTOR. The contractor agrees to implement all such amendments, which shall be laid down by the WABAG.

Clause - IV Besides following the guidelines, safety rules and regulations, safety codes given in various safety procedures/documents mentioned above, the CONTRACTOR shall also prepare detailed method statement which includes job safety analysis where there are complication and hazardous/high risks working involved and get it approved from Wabag before execution of work.

Clause -V Any negligence or violation in implementing any of the provision of the conditions of contract on Health, Safety & Environment shall be viewed seriously and the contractor is liable to compensate the Wabag for the loss of reputation. The cost of damage shall be fixed on case-to-case basis

In Witness there of the Parties here to by representatives duly authorized have executed this memorandum of Understanding on _____ day of _____ 20_____

Signed on

Signed on

For and on behalf of Wabag

For and on behalf of Contractor

Sign:

Sign:

Date:

Date:



 <p>WABAG Sustainable Infrastructure for a better life.</p>	<p>HSE Operational Control Procedures</p>	<p>Rev no 02</p>
	<p>OCP-024 HSE Contractual Condition and Agreement</p>	<p>Date: 10.01.2019</p>

Attachment No. 2


OCCUPATIONAL HEALTH, SAFETY AND ENVIRONMENTAL POLICY



VA TECH WABAG LTD. as a market leader in the Indian water technology offers portfolio in the areas of municipal, industrial water and wastewater treatment, besides offering a full fledged state-of-the-art engineering services in line with global standards both in terms of quality and delivery.

VA TECH WABAG LTD will undertake every reasonable effort to eliminate the hazards that cause incidents and injuries and aim to control or reduce wastage of natural resources, energy, materials and chemicals.

We shall strive to continually improve our Occupational Health, Safety and Environmental performance in our activities, products and services by implementing and maintaining the HSE Management Systems and by,

- ❖ Ensuring compliance with applicable legal and other requirements.
- ❖ Avoidance of incidents through prevention and Safety awareness.
- ❖ Promotion of activities that could minimise environmental pollution.
- ❖ Optimising the utilisation of natural resources like energy, construction materials and reducing the waste generation.
- ❖ Promotion of measures aimed at enhancing the physical and emotional health of the people who work with or for our company.
- ❖ Creating awareness amongst our employees and stake holders by proactive communication, training and felicitation.
- ❖ Increasing green cover in and around the operational sites.

Date : 23.08.2010


RAJIV MITTAL



Attachment no: 3

PPE MATRIX

Work Description/PPEs	Safety Helmet	Safety Shoes/Composites	Safety Goggles	Protective Vest	Apron	Ear Plug	Dust / Respiratory Mask	Full body harness - 2 yard	Fall Arrestor	Life Line	Welding face shield	Grinding Goggles	Cotton Gloves	Rubber/Leather gloves
General work	✓	✓		✓		✓	✓							
Welding/Gas cutting	✓	✓	✓		✓		✓				✓			✓
Grinding and chipping	✓	✓	✓	✓	✓	✓	✓					✓		✓
Confined space	✓	✓	✓	✓				✓						✓
Working at height	✓	✓	✓	✓				✓	✓	✓				✓
Erection (Structures / Equipment etc)	✓	✓	✓	✓			✓							✓
Excavation /Trenching	✓	✓	✓	✓			✓	✓	✓					
Foundation /Concreting	✓	✓	✓	✓		✓	✓							✓
Paint Manual/Spray	✓	✓	✓	✓	✓		✓							✓
Road Works	✓	✓	✓	✓										✓
Electrical work	✓	✓	✓	✓										✓
Site office employee		✓												





sustainable solutions for a better life.

HSE Operational Control Procedures

Rev no 02

OCP-025 Site HSE Management Procedures

Date: 10.01.2019

S No	Requirements	Description	Responsibility
1	Induction training room for all Project site except nearing completion projects	<ol style="list-style-type: none"> Minimum 20 ft X 10 Ft room with all necessary amenities like AC/fans, properly ventilated room, lighting, seating arrangements, White board, Flip charts etc. Projector can be rented for selected trainings. Informative posters related to job safety shall be displayed around the room. Display of forms like Work Permit/Violation Memo/Feedback form/Near miss report. Display of all safety PPE preferably dummy wearing all safety PPE (Coveralls/Helmet/Shoes/Gloves/Harness/Fall arrestor/respiratory mask/goggles/ear plugs etc.) 	Project Manager/ RCM
2	Safety Man Poster	Safety man poster 6 feet X 3 Feet to be installed near the entrance/gate on a rectangular frame with steel pipes/ Heavy gauge angles with legs buried in concrete.	Corp /Safety charge/Lead engineer
3	Induction training and induction cards	<ol style="list-style-type: none"> All the workmen shall receive general induction on the day of joining before entering the work area. Job specific training shall be given after general induction depending on the nature of work which is to be done. Induction cards are to be given to each worker after the training specifying basic information and nature of work. Induction training/Job specific training records are to be maintained. The effectiveness of the trainings are to be measured by means of quiz, verbal discussions and during TBT. 	Corp QHSE /Safety in charge
4	Workmen identification	All the workmen helmets shall have induction sticker with Wabag logo. The induction card will serve as identification which is to be with the worker at all times when working at site. During routine inspection rounds, safety walk through and audits, the same has to be verified to ensure that all workers are inducted and have their induction cards with them.	Corp /Safety in charge
5	Tool box talk and TBT Message board	<ol style="list-style-type: none"> The content of the message board shall be: <ol style="list-style-type: none"> Work instructions/ methodology/ safe work practices Hazards, Controls and precautions which is relevant to the job that is being carried out in that period. It shall be displayed at a prominent location for Engineers, Supervisors and workers for their job references. 	Safety In-charge/ Corp QHSE



HSE Operational Control Procedures

Rev no 02

OCP-025 Site HSE Management Procedures

Date: 10.01.2019

		<ol style="list-style-type: none"> 2. The safety in charge shall lead the tool box talk and ensure that all workmen are covered before the start of the work. 3. The safety in charge shall also assign the lead engineer/contractor supervisor on the subject which they have to discuss with the workmen on day to day basis. 4. The Safety officer should be present at site before work commences to supervise the tool box talk and ensure all the worker group receive the necessary instructions. 5. The safety officer shall attend evening meetings to understand the next day activities and plan for TBT accordingly. 6. The tool box talk has to be given in the mother tongue for better understanding. If the safety officer cannot speak that language, help of engineers/supervisors is to be taken for the same. 7. Safety officer shall circulate the daily TBT Topic a day before to lead engineers/supervisor/contractor through mail and hard copy 	
6	PPE Inventory for Wabag/ Client /Contractors	<ol style="list-style-type: none"> 1. A minimum stock of 20 helmets and 20 shoes shall be maintained at all times for Wabag Employees and Clients which shall be managed by the store keeper. Issue and return register shall be maintained. 2. The safety officer shall ensure 30% mandatory PPE stock is available with the contractors and in case of non-availability the same shall be brought to the notice of Project Manager/Project Head and QHSE Corporate for further action 	Corporate QHSE
7	Construction Equipment and Utility Management	<p>All the heavy construction equipment entering the work area shall be inspected and checked for safe operation certificate from a competent authority. A visual inspection shall be carried out to verify the condition and healthiness of the machineries/equipment. Records shall be maintained for the same.</p> <p>The inspection is to be done as per the checklist, and the same is to be maintained as record. During audits/inspections the records are to be verified.</p>	Safety in charge/ Lead engineer/RCM
8	Labor Colony	<ol style="list-style-type: none"> 1. Labor hutment inside the site premises shall be inspected fortnightly. The following are minimum mandatory requirements for inspection and reporting: <ol style="list-style-type: none"> a. Quality and regularity of housekeeping of the living area, toilets and washing areas b. Hygiene of the living area 	Safety in charge/ Lead engineer/RCM



sustainable solutions for a better life.

HSE Operational Control Procedures

Rev no 02

OCP-025 Site HSE Management Procedures

Date: 10.01.2019

9	HIRA/JSA	<p>c. Structural integrity of the huts</p> <p>d. Condition of electrical connections (Protection from shocks, ELCB, no loose wiring etc.)</p> <p>e. Availability of clean drinking water</p> <p>f. Streetlight</p> <p>g. First aid box (under lock and key), fire extinguisher to be made available in the labor colonies present within site.</p> <ul style="list-style-type: none"> • Protection from pests like, rats, mosquitos, cockroach and snakes. • Drinking water tank cleaning schedule to be maintained • Camp officer name to be displayed. (Suitable trainings are to be provided) <p>HIRA and JSA shall be referred for all activities and control measures should be implemented. If JSA or HIRA is not available for any activity, it has to be prepared before the start of work. It is the responsibility of the safety officer to organize the meeting with the site construction team for preparing the HIRA/JSA. No work shall be proceeded without JSA implementation. The permit shall not be signed without adequate safety measures, arrangements and implementation.</p>	Safety Officer
10	Safety Walk through	<p>HIRA/JSA to be revised every six months and revision sheet to be maintained.</p> <p>It is the responsibility of the Safety officer to plan an safety walk through with the following personnel</p> <ol style="list-style-type: none"> 1. RCM – Weekly 2. Project Manager – Fortnightly 3. Client representative – Weekly 4. Corporate Senior Management (MD/CEO/COO/ Project Head / Functional Head : Site visits) 5. Sub-contractor senior management also to be included <p>Safety officer shall give a five minute briefing on the areas they should be focusing on and the report shall be prepared immediately and should be signed off. Action plan is to be prepared for the problem areas.</p>	RCM/PM/ Safety in charge
11	Safety Committee	<p>Safety meeting shall be conducted monthly and the following personnel shall be the attendees (Agenda should be circulated one week in advance)</p> <ol style="list-style-type: none"> 1. Client Representative 2. Project Manager 	RCM/PM/ Safety in charge



HSE Operational Control Procedures

Rev no 02

OCP-025 Site HSE Management Procedures

Date: 10.01.2019

12	Display of Safety Signage	<p>3. RCM 4. Lead Engineers 5. Contractor Senior Management, Project Manager and Safety Engineer 6. Supervisors 7. Workmen Representatives</p> <p>The safety signage shall be installed at strategic locations. It shall be displayed on a steel frame and the legs concreted with night visibility. It should be selected depending on the nature of work being carried out.</p>	Corp /Safety In charge/ Lead Engineer	QHSE
13	Daily work responsibility of Safety officer	<p>The safety officer shall be responsible and accountable for the following:</p> <ol style="list-style-type: none"> 1. The Safety officer should be present at site before work commences to supervise the tool box talk and ensure all the worker group receive the necessary instructions 2. Induction to new workers/ re-induction to workers every 3 months 3. Inspection of site, identifying the Hazard / unsafe act/Unsafe condition and ensuring implementation of corrective actions. <ol style="list-style-type: none"> a. PPE Compliance b. Lifting and Excavating equipment c. Safe Walkways d. Safe Platform e. Safe Barriers f. Fall arrestors/Life line g. Confined areas of working h. Work permit implementation i. Electrical hazards j. Improper cylinder usage k. Housekeeping l. Chemical handling m. Material lifting and handling n. All construction activities 8. The daily observations noted shall be discussed with the RCM, PM, Lead Engineers, Contractor every evening and shall have a sign off on the improvement plan. 	Safety In-charge	

HSE Operational Control Procedures

Rev no 02

OCP-025 Site HSE Management Procedures

Date: 10.01.2019

14	Emergency Drills	<p>9. Resolution of Safety observations made in Client Register</p> <p>10. Implementation of actions points of Safety committee meeting/ Safety walk through.</p> <p>11. Resolution of client complaints and feedback.</p> <p>12. A detailed report of non-compliance of sub-contractors is to be prepared every quarter, and a consolidated report is to be prepared during the completion of works.</p>	Corporate QHSE/
15	Reporting and Non-compliance escalation Matrix	<p>Conduct Emergency mock drill under the supervision of competent personnel (person certified to perform and evaluate the emergency mock drill) and record the observation and implement the improvement plan. The emergency scenarios selected should be such that they are relevant to the current work being carried out. All personnel at site which includes, Wabag employees, contractors, clients and consultants are to be involved in the activity, and specific roles and responsibilities are to be defined.</p> <p>Daily reporting The reports are to be sent on daily basis to:</p> <ol style="list-style-type: none"> RCM , Lead Engineers, Project Managers, Corporate HSE (Dipti Sharath and Benny John) <p>Noncompliance Escalation Matrix In case of any non-compliance/unsafe act/unsafe condition/equipment validity/unavailability of PPE/intentional violation of HSE requirements, the following escalation is to be followed.</p> <ol style="list-style-type: none"> 1st Level: The verbal communication has to be established with the contractor, along with the RCM and Lead Engineers. 2nd Level: If it is not resolved in one day then the issue is to be mailed to the RCM and lead engineer. If there is no response within 2 days, reminder mail is to be sent. (Note: If the issue is highly critical, then the officer need not wait for 2 days before proceeding to the third level) 3rd Level: Forward the mail to the Project Manager / Project Lead /Construction Head/Corporate HSE addressing the issue, with a copy to RCM / Lead Engineers if there is no response within 4 days then communication is to be made to the fourth level) 	Safety In-charge

HSE Operational Control Procedures

Rev no 02

OCP-025 Site HSE Management Procedures

Date: 10.01.2019

16	External and Internal training	<p>4. 4th Level: Address the mail to the COO/ CEO with a copy to Project Manager / Project Lead / Construction Head/Corporate/ RCM / Lead Engineers.</p> <ul style="list-style-type: none"> Responsibility of closure will be with HSE Corporate In case of any emergencies, like major injury, fatality, fire, chemical release etc, the issue is to be immediately communicated to the RCM/PM/QHSE Head. <p>1. Fatigue and stress management Awareness training is to be conducted for the site execution team, on how to understand and deal with work related stress and fatigue. The training is to be done by an external trainer, once in a month, for a period of three months. Subsequently the training can be done quarterly.</p> <p>2. GET training Training on job specific and general topics is to be done for all trainees at sites. The training will be two hours on weekly basis. The records for the same is to be maintained.</p> <p>3. Contractor engineers/supervisors/support staff training</p> <p>4. Training on job-specific topics, contractual conditions and Wabag HSE requirements is to be given to the contractor staff, every month. This should include the senior management, engineers, supervisors etc.</p>	Corp QHSE / Safety in charge
17	HSE Project Specific Plan	Implement client approved project specific HSE plan and perform internal audit once in a month.	RCM/Safety in charge
18	HSE Index	<p>The HSE index helps assess the healthiness of a project with respect to the implementation of the various mandatory HSE requirements.</p> <ol style="list-style-type: none"> The safety officer is to perform a self-evaluation of his site He has to perform 8 man-days of assessment and evaluation of other sites in a year. <p>The schedule of the assessment program shall be shared separately. Records of both are to be maintained and communicated.</p>	Corp QHSE /Safety in charge
19	Internal Audit	<p>Those safety officers who are qualified and certified in Internal Auditor ISO 45001 have to perform Internal audit of other sites. The safety officer is to perform at least 6 man-days of audit in one year. The schedule will be shared separately.</p>	Safety in charge/ Corp QHSE



HSE Operational Control Procedures

Rev no 02

OCP-025 Site HSE Management Procedures

Date: 10.01.2019

20	Statutory and Regulatory requirements	Monitor the compliance to BOCW, Labour laws, Electricity act, PCB norms, Laws pertaining to environment and any other local, national, international regulations applicable to the project. The record of compliance is to be maintained.	Safety in charge
21	Communication/Reporting to Corp QHSE department	The following reports shall be sent to the corporate office regularly: <ol style="list-style-type: none"> 1. Daily report 2. Monthly report 3. Weekly dashboard inputs 4. Incident report (First aid, Form1 and Form 2) 5. Near Miss report 6. Violation report 7. Safety committee meeting MOM 8. Safety walkthrough MOM and Report 9. Client feedback/complaint 10. Best Practices followed at site 11. Legal compliances: Monthly basis 12. Non compliances and corrective action reports 13. External/Internal Training report 14. QRM inputs 15. Internal and external audit reports 16. HSE index reports 	Safety in charge

ANNEXURE – 11

VA Tech WABAG has its projects both, in EPC (Engineering, Procurement and construction) and O&M Plants (Operation and Maintenance plants), for a range of water solutions. The nature of PPE that is provided and used depends on the nature of work that is to be carried out.

The technical specifications for the PPE is as per the Indian Standards.
They have been listed down:

1. IS 1179 : 2017 Equipment for eye and face protection during welding
2. IS 2573 : 1986 Specification for Leather Gauntlets and Mittens
3. IS 2925 : 1984 Specification for Industrial Safety Helmets
4. IS 3521 : 1999 Industrial safety belts and harnesses - Specification
5. IS 6685 : 2009 Specification for Life Jackets
6. IS 6994 : Part 1 : 1973 : Specification for safety gloves Part 1 Leather and cotton gloves
7. IS 8520 : 1977 : Guide for selection of industrial safety equipment for eye, face and ear protection
8. IS 9167 : 1979 : Specification for ear protectors
9. IS 9623 : 2008 : Recommendations for the selection, use and maintenance of respiratory protective devices
10. IS 10667 : 1983 : Guide for selection for industrial safety equipment for protection of foot and leg
11. IS 15298 (Part 1) : 2011 : Test methods for footwear
12. IS 15298 : Part 2 : 2011 Safety, Protective and Occupational Footwear for Professional use - Specification for Safety Footwear
13. IS 15298 (Part 3) : 2011 : Protective Footwear
14. IS 8519 : 1977 Guide for selection of industrial safety equipment for body protection
15. IS 8940 : 2011 : Code of practice for maintenance and care of industrial safety equipment for eyes and face protection
16. IS 15071 : 2002 : Chemical Protective Clothing Specification
17. IS 8990 : 1978 : Code of practice for maintenance and care of industrial safety clothing
18. IS 8807 : 1978 : Guide for selection of industrial safety equipment for protection of arms and hands
19. IS 10592 : 1982 : Specification for industrial emergency showers, eye and face fountains and combination units
20. IS 15322 : 2003 : Particle Filters Used in Respiratory Protective Equipment - Specification
21. IS 15323 : 2003 : Gas Filters and Combined Filters Used in Respiratory Protective Equipment - Specification
22. IS 8523 : 1977 : Respirators, canister type (gas masks)
23. IS 9473 : 2002 : Respiratory Protective Devices - Filtering Half Masks to Protect Against Particles - Specification
24. IS 14166 : 1994 Respiratory protective devices : Full face masks: Specification
25. IS 2315 : 1978 Specification for Thimbles for Wire Ropes



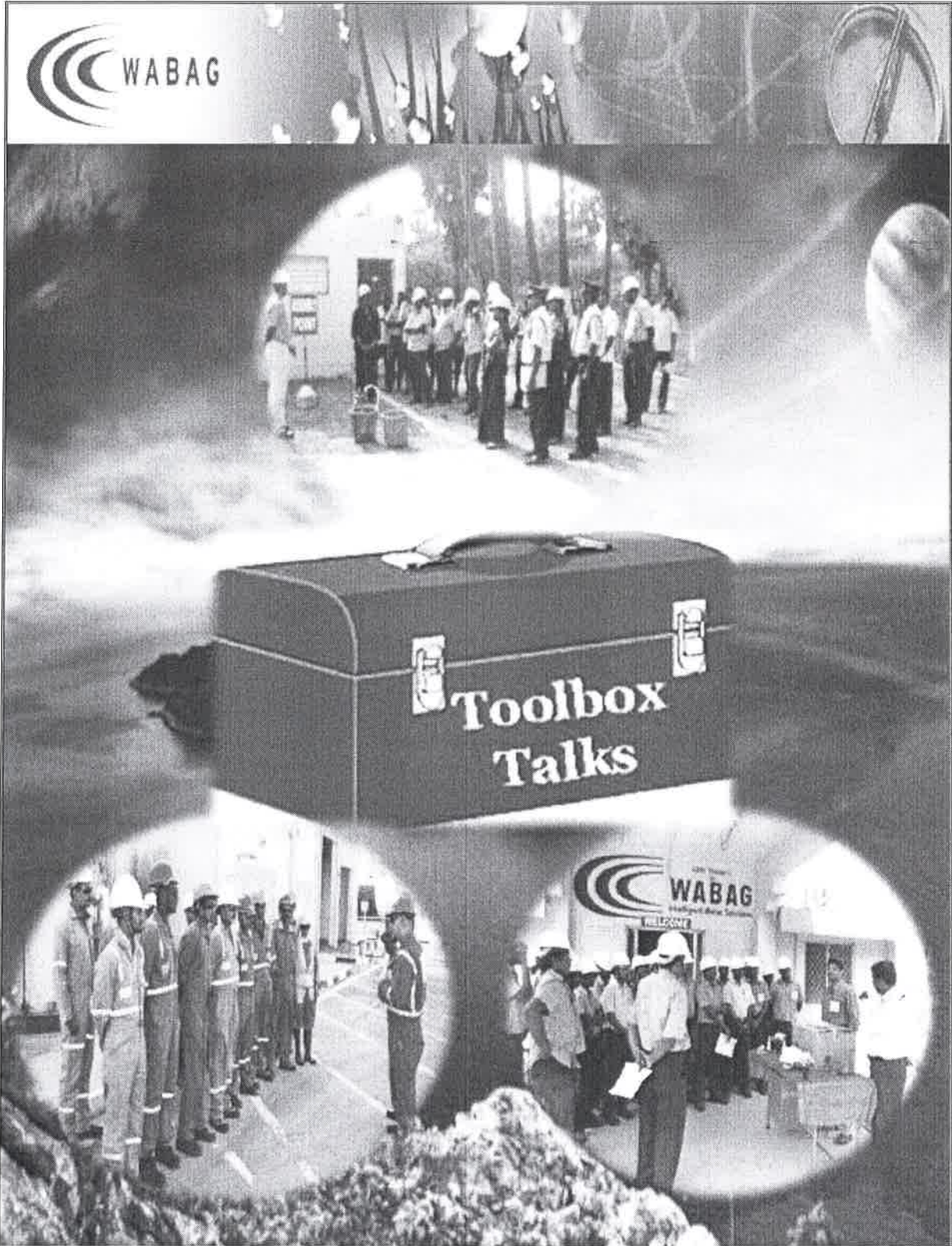
26. IS 15298 : Part 4 :2011 : Safety, Protective and Occupational Footwear for Professional Use - Part 4 : Specification for Occupational Footwear
27. IS 6229 : 1980 : Method for Measurement of Real-ear Protection of Hearing Protectors and Physical Attenuation of Earmuffs
28. IS 7524 : Part 1 : 1980 : Methods of test for eye protectors: Part 1 Non-optical tests
29. IS 7524 : Part II :1979 : Methods of Test for Eye-protectors - Part II : Optical Tests
30. IS 7194 : 1994: Assessment of Noise Exposure During Work for Hearing Conservation Purpose
31. IS 11446 : 2004 : Method of Measurement of Airborne Noise Emitted by Compressor Units Intended for Outdoor Use
32. IS 13416 : Part 1 :1992 : Recommendations for preventive measures against hazards at workplaces : Part 1 Falling material hazards prevention
33. IS 13416 : Part 3 : 1994 : Recommendations for preventive measures against hazards at workplaces Part 3 Disposal of debris
34. IS 13416 : Part 4 :1994 : Recommendations for preventive measures against hazards at workplaces : Part 4 Timber structure
35. IS 3786 : 1983 Methods for computation of frequency and severity rates for industrial injuries and classification of industrial accidents
36. IS 10592 : 1982 Specification for industrial emergency showers, eye and face fountains and combination units
37. IS 14489 : 1998 Code of practice on occupational safety and health audit

A general list of PPE used for standard activities carried out in the various projects are mentioned below. These are commonly used and the as per the specifications in the above mentioned in the Indian Standards.

- ✓ **Hard hat/Helmet, Safety Shoes, reflective vests:** These are mandatorily to be worn in the site premises irrespective of the type of being carried out.
- ✓ **Hand Gloves:** for manual handling of materials, chemicals, while using certain electrical tools, heavy machinery, while working on electrical equipment etc.
- ✓ **Safety Goggles, Face Mask, Face shield, ear muff, aprons, gumboots, respirators, etc.:** are provided as applicable to the activity / specialized task concerned, like grinding, cutting, welding operations etc.
- ✓ **Safety Harness & lifelines:** for personnel working at height and deep excavations
- ✓ **Gas Masks / SCBA:** It is to be used in areas where there is a chance of moderate to high level of toxic gases, and the concentration of oxygen is not sufficient. SCBA sets to be used when the concentration of the toxic gases is very high. It provides complete protection, but the time limitations are to be kept in mind.
- ✓ **Diver's suit:** For any activity that involves getting to a water body, there must be a good quality suit and related equipment available. The suit must have the provision of attaching an oxygen cylinder if required.



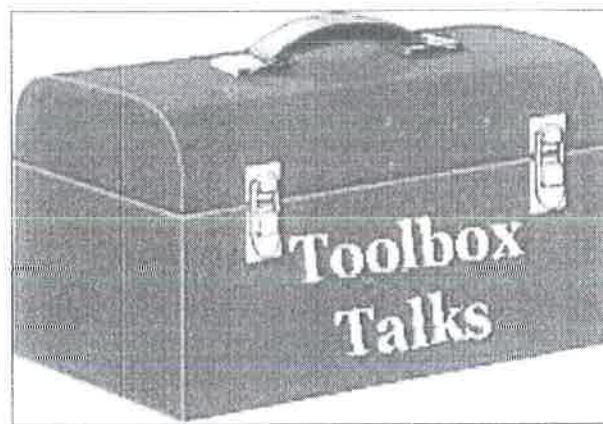
ANNEXURE – 12



sustainable solutions. for a better life



TOOLBOX TALKS



Prepared by	Reviewed by	Approved by
 8/6/2015	 8/6/2015	 8/6/15
Anjana Elizabeth David	K. Sekar	Shiv Narayan Saraf

VA TECH WABAG LIMITED
'WABAG HOUSE', NO. 17, 200 FEET RADIAL ROAD,
S. KOLATHUR, CHENNAI 600 117, INDIA.





TOOLBOX TALKS

Rev. No.: 0

Date: 28/5/2015

TABLE OF CONTENTS

SL. NO.	TOPIC	PAGE NO.
1	Toolbox Talk	5
2	HSE Policy	6
3	Risk Assessment	7
4	Incident/ Accident reporting	9
5	Near miss Incident reporting	10
6	Housekeeping	11
7	PPE- Head Protection	12
8	PPE- Eye Protection	13
9	PPE- Ear Protection	14
10	PPE- Hand Protection	15
11	PPE- Foot Protection	16
12	Manual Handling	17
13	Hand & Power tools	19
14	Permit to Work	20
15	Safe Excavation	21
16	Vehicle Operation	25
17	Piling	27
18	Demolition	29
19	Ladder safety	30

Prepared By QHSE Department



**WABAG****TOOLBOX TALKS**

Rev. No.: 0

Date: 28/5/2015

SL. NO.	TOPIC	PAGE NO.
20	Scaffolding	31
21	Reinforcement	32
22	Formwork	33
23	Concreting	34
24	Confined space	35
25	Welding	37
26	Gas cylinders	39
27	Fire Hazards	41
28	Sand/ Grit Blasting	45
29	Radiation- Gamma rays	46
30	Pressure testing	48
31	Hoist & Chain Pulley Safety	50
32	Rotating equipment	51
33	Machine guarding	52
34	Vibration	54
35	Painting	56
36	Chemical Handling	57
37	Sulphuric acid	61
38	Hydrogen Sulphide	62
39	Caustic Soda	63
40	Methane	64
41	Electrical Hazards	65
42	Fuse	68

Prepared By QHSE Department

**WABAG****TOOLBOX TALKS**

Rev. No.: 0

Date: 28/5/2015

SL. NO.	TOPIC	PAGE NO.
43	Earth Leakage Circuit Breaker (ELCB)	68
44	Miniature Circuit Breaker (MCB)	69
45	Earth pit	69
46	Transformers	70
47	Lighting	71
48	Heat Stress	73
49	Ventilation	74
50	Humidity	75
51	Drinking Water	76
52	Canteen/ Eating area/ Lunch room	77
53	Toilets	78
54	Medical facility	79
55	First- aid kit	80
56	Cardiopulmonary Resuscitation (CPR)	82
57	Musculoskeletal Disorder	83
58	Water Pollution	87
59	Land Pollution	88
60	Air Pollution	89
61	Noise Pollution	90
62	Flooding	91
63	Earthquake Safety	92
64	Color Coding of Waste Bins	94
65	Stacking of materials	95

Prepared By QHSE Department



WABAG

TOOLBOX TALKS

Rev. No.: 0

Date: 28/5/2015

SL. NO.	TOPIC	PAGE NO.
66	Storage of Cement	96
67	Storage of Steel pipes	97
68	Storage of Rubber lined vessels	98
69	Storage of HDPE pipes	99
70	Office Safety	100

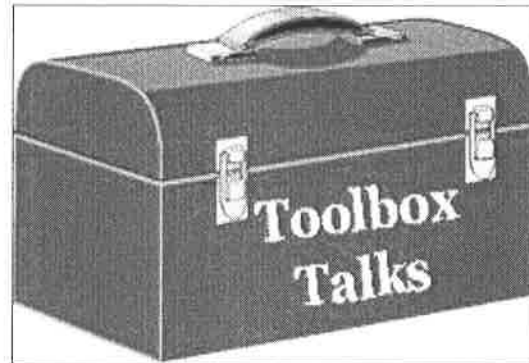
Prepared By QHSE Department



TOOLBOX TALK

Doc. No. QHSE/TBT/01

Toolbox talks are quick and easy trainings to enhance OSHA's safety requirements. Toolbox talk help in creating an environment to discuss task specific or timely safety communications, identify problems or highlight specific safety concerns or risks.



What is a Toolbox Talk?

It is a group discussion among employees on a particular safety issue.

Who conducts toolbox talk?

Supervisor, foreman or Engineer having expertise on the given topic can conduct toolbox talks.

What should be the frequency of toolbox talk?

Toolbox talks can be conducted on a daily basis for about 15-30 minutes.

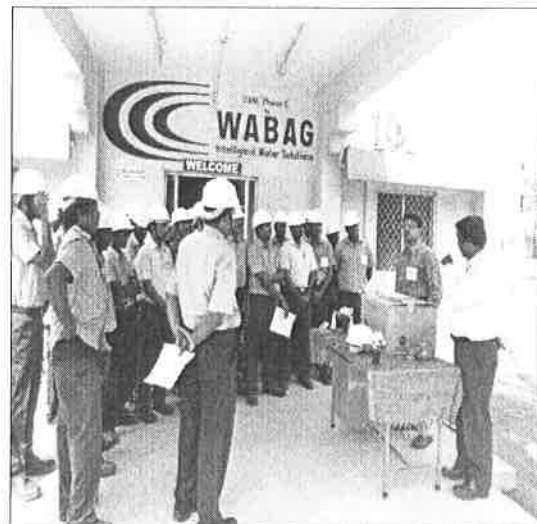


Other application of toolbox talks

Toolbox talks can be used for post- accident communication, re-enforcement of safe work practice, pre- task planning and talking points for hands on training or table top exercises.

Documentation

Maintain a record of the people who attended. Medium of communication (English/ local language) and the topic discussed. Obtain signature from delegates to confirm attendance and keep on file.



Prepared By QHSE Department

HSE POLICY

Doc. No. QHSE/TBT/02

Legal Requirement

Building and Other Construction Worker Rules, 1998- Chapter VI, Cl. 39
 ISO 14001: 2004 (E) Environmental Management System – Cl. 4.2
 Factories Rules, 1950- Chapter V, Cl. 62B

Requirements of HSE Policy

- Every organization to have defined HSE policy
- It is to be appropriate to the nature of work handled
- It should include commitment to health, safety and protection of environment
- It should ensure commitment to comply with legal and other requirements to which organization relates with
- All employees should be made aware of the policy
- The organization should ensure training arrangements for employees
- The operations of organization should promote reduction of pollution
- The HSE policy is to documented and made available to all
- The HSE policy is to be communicated to all working for or on behalf of organization
- HSE policy is to be signed and authorized by the ultimate authority of the organization (Managing Director)



OCCUPATIONAL HEALTH, SAFETY AND ENVIRONMENTAL POLICY

VA TECH WABAG LTD. as a market leader in the Indian water technology offers portfolio in the areas of municipal, industrial water and wastewater treatment, besides offering a full fledged state-of-the-art engineering services in line with global standards both in terms of quality and delivery.

VA TECH WABAG LTD will undertake every reasonable effort to eliminate the hazards that cause incidents and injuries and aim to control or reduce wastage of natural resources, energy, materials and chemicals.

We shall strive to continually improve our Occupational Health, Safety and Environmental performance in our activities, products and services by implementing and maintaining the HSE Management Systems and by,

- ✦ Ensuring compliance with applicable legal and other requirements.
- ✦ Avoidance of incidents through prevention and Safety awareness
- ✦ Promotion of activities that could minimise environmental pollution
- ✦ Optimising the utilisation of natural resources like energy, construction materials and reducing the waste generation
- ✦ Promotion of measures aimed at enhancing the physical and emotional health of the people who work with or for our company.
- ✦ Creating awareness amongst our employees and stake holders by productive communication, training and felicitation.
- ✦ Increasing green cover in and around the operational sites

Date : 23.08.2010


RAJIV MITTAL

RISK ASSESSMENT

Doc. No. QHSE/TBT/03

Risk assessment is a careful examination of anything in your workplace that could cause people to suffer injury or ill- health while they are at work.

Risk assessment enables:

- To know whether enough measures are taken to protect workforce and others from harm (training and awareness, PPE, health surveillance)
- To meet your legal requirements



How to assess risk?

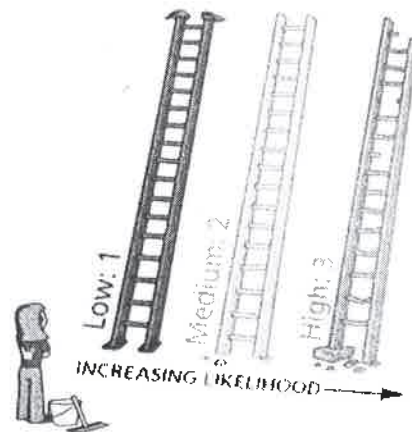
Stage 1: List the work task that are your responsibility

- Activities carried out at location(s)
- People in the area- Construction workers (EPC site), operators (O&M plant), Site/ Plant in Charge and other staffs, visitors & public
- Permanent and temporary equipment & machinery and chemicals used at the location

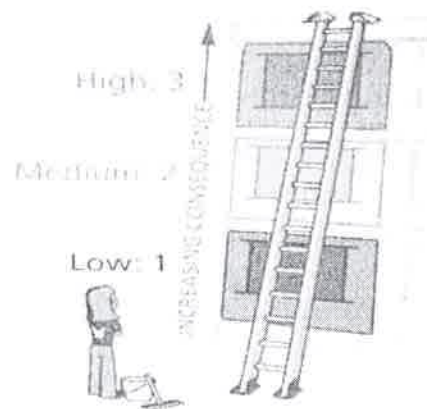
Stage 2: Identify the risks- what are the hazards, who might be harmed and how?

- Observe physical layout at each location and activities being carried out. E.g.: site layout, drawings, tie-in points
- Communication with other staff to know about any hazards they noticed. E.g.: Tool box talks
- Inspect accident reports, manufacturer's instructions, MSDS, etc.

Study of relevant hazards associated with work. E.g.: chemical hazard, physical hazard, biological hazard, electrical hazard.



Likelihood



Consequence

Stage 3: Estimate the risk

Two things to consider while estimating risk

- How likely it is that something could go wrong (Likelihood/Probability)
- How serious the outcome could be (Consequence/Impact)

Stage 4: Evaluate the risk

Using 5x5 matrix method

Stage 5: Record your findings

- Details of the location, people, equipment & machinery and activity(s) you are assessing
- Hazards you have identified together with risk level (Stage 4)
- Study of existing control measures and how well they work
- Details of person carrying out the risk assessment (competency)
- Date and time of assessment
- Date for review of the assessment (tentative)

Risk controls:

1. Eliminating hazard
2. Reducing hazard
3. Preventing human contact with hazard
4. Safe systems of work:
5. Personal Protective Equipment:

Stage 6: Review your findings

- When there is a change in process, work procedure, equipment & machinery, or staff, method statement, JSA (Job Safety Analysis), SOP (Safe Operating Procedure)
- On obtaining new information about work

Likelihood		Consequence	
R a n k	Description	R a n k	Description
1	Very unlikely to occur- 1 in million chance	1	Insignificant
2	Unlikely to occur- 1 in 100,000 chance	2	Minor
3	Fairly likely to occur- 1 in 10,000 chance	3	Moderate
4	Likely to occur- 1 in 1,000 chance	4	Major
5	Very likely to occur- 1 in 100 chance	5	Catastrophical

	5	10	15	20	25
4	4	8	12	16	20
3	3	6	9	12	15
2	2	4	6	8	10
1	1	2	3	4	5
	LIKELIHOOD				

CONSEQUENCE

Evaluation:

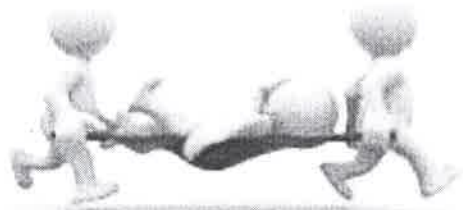
- 17-25: UNACCEPTABLE- Take immediate action
- 10-16: TOLERABLE- Look to improve within specified timescale
- 5-9: ADEQUATE- Look to improve at next review
- 1-2: ACCEPTABLE- No further action, but ensure controls are maintained

INCIDENT / ACCIDENT REPORTING

Doc. No. QHSE/TBT/04

Legal Requirement

Building and Other Construction Worker Rules, 1998- Chapter XXI, Cl. 210
Factories Rules, 1950- Chapter IX, Cl. 96



Initial medical treatment

Procedure

- Provide immediate first-aid/ medical treatment to the injured
- Barricade the area of incident
- Contain the spillage or toxic release
- Site Safety Engineer or concerned personnel to identify root cause and do correction. The corrective actions to be implemented will be reported to Head – HSE
- In case of fatal incidents, it is to be informed immediately to Site Head or client and Form 1 to be filled within 2 hours of occurrence of incident
- Site Safety Engineer or concerned personnel to identify root cause and do correction. The corrective actions to be implemented will be reported to Head – HSE within 24 hours
- HIRADC shall be re-visited and updated.



Barricading accident area



Accident investigation

NEAR MISS INCIDENT REPORTING

Doc. No. QHSE/TBT/05

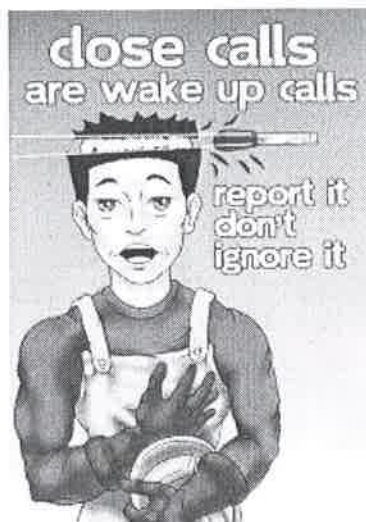
Near Miss is an unplanned event which did not result in an injury, illness, damage or product loss but had the potential to do so.

Near miss is a forewarning of an impending accident in the making. By looking for such forewarnings, identifying the root causes and taking corrective measures prevent the occurrence of an incident/accident.

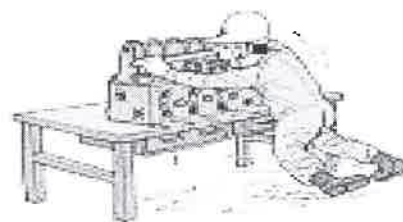
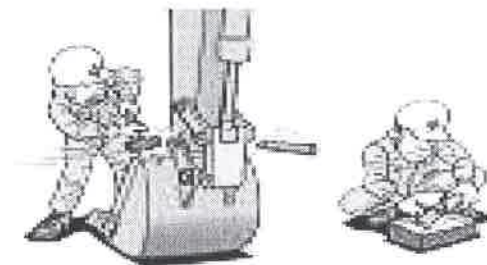
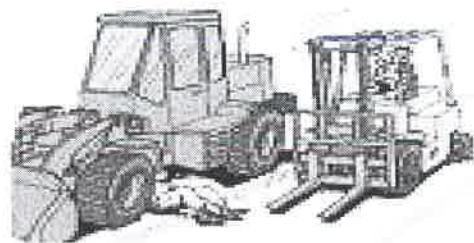
Why to report near miss?

So as to facilitate the elimination or prevention of occurrence of accidents.

On reporting a near miss, an investigation will be carried out to identify the probable root causes for occurrence of accident. The corrective actions will be taken to prevent its occurrence thus ensuring safety.



Report Near Misses



HOUSEKEEPING

Doc. No. QHSE/TBT/06

Legal requirement

Factories Rules, 1950
OSHA Rules- 1926.25

Hazards

- Tripping, falling, slipping hazards
- Improper storage of materials
- Unhygienic condition
- Electrical hazards

Risks

- Body injury
- Fire
- Spread of diseases
- Shock/ electrocution

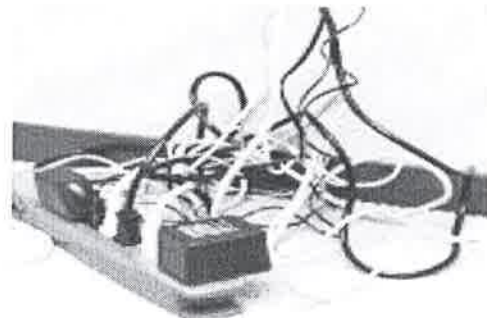
All personnel in site may face these hazards

Housekeeping guide

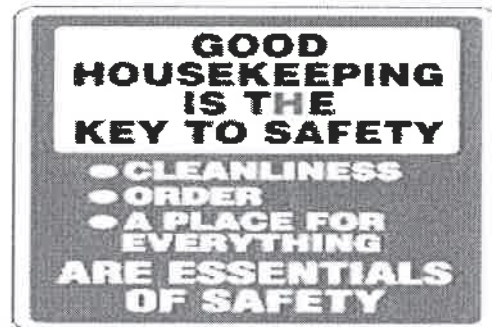
- Keep walkway, aisles, stair free of tools and materials
- Clean up or block off areas of chemical spills
- Repair or report floor problems such as cracks, holes, missing tiles, etc.
- Always put trash in proper disposal container
- Keep cords, cables and air hoses untangled
- Keep drawers closed
- Prohibit food and beverages in the workplace
- Do not pile up scraps
- Clean light fixtures
- Keep exit paths free of obstruction
- Tools to be orderly arranged to prevent misplacement
- Do not store incompatible materials together
- Display sign boards



Tripping, slipping, falling hazard



Prevent entanglement of cables & wires



Sign boards



PPE- HEAD PROTECTION

Legal Requirement

OSHA Rules- 1910.135

Hazards& Risks

Head injury from falling, flying or thrown objects or other harmful contact

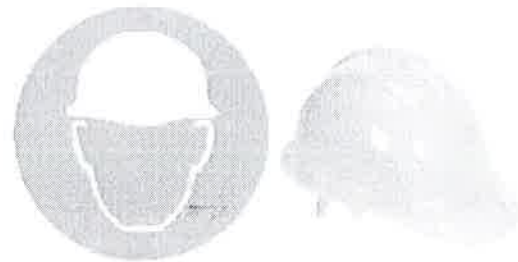
Head protection

Helmets are provided to workers. Helmets are classified as per ANSI:

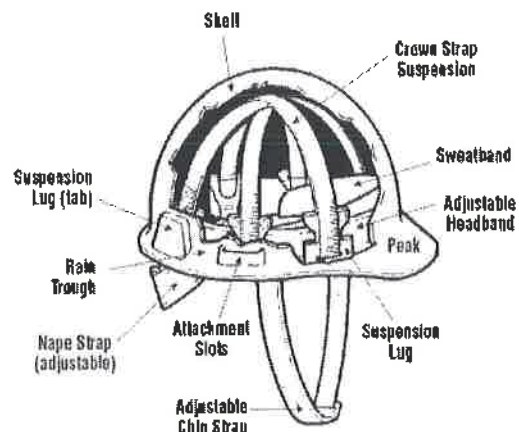
- Type 1: brimless helmet with penetration at crown
- Type 2: helmets with full brim

Helmets consists of a shell and suspension.

- The **shell** is rigid, light and shaped to deflect falling objects.
- The **suspension** holds shell away from head, act as a shock- absorber and allows air to flow freely.
- For the proper seating of headwear, it is provided with adjustable headband, nape strap and chin strap.
- A flexible **headband** of adequate width and contoured both vertically and horizontally to fit the forehead.
- An absorbent **sweatband** provided is easy to clean or replace.
- **Chin straps** (when fitted) which fit around the ears prevents falling off of helmets when you are required to bend forward or down, look up or work where it is windy.



Head injury from falling objects



PPE- EYE PROTECTION

Legal Requirement

OSHA Rules- 1910.133

Hazards& Risks

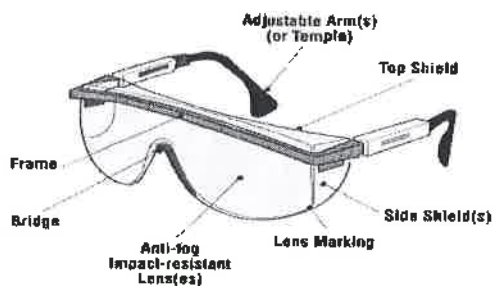
Eye injury or loss of vision may occur from flying objects, light glare, contact with chemicals or exposure to harmful radiation

Eye protection

Eyewear are provided to workers.

- **Safety glass** with sides are adequate to protect against flying objects.
- To protect against chemical splash, **goggles** are to be worn
- When handling highly reactive chemicals, **face shield** should be used
- During hot works such as welding, **face/hand shield** are used to protect against UV radiation
- **Anti-glare glass** used in case of light glares

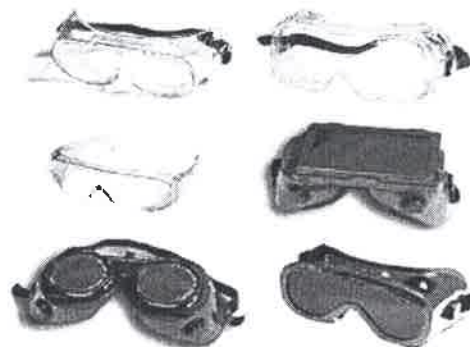
Despite all precautions, emergency shower and eye wash should also be provided in chemical handling areas for flushing eyes in case of chemical splashing.



Prepared By QHSE Department



Eye injury



Eye protection

PPE- EAR PROTECTION

Doc. No. QHSE/TBT/09

Legal Requirement

OSHA Rules- 1910.95

Hazards& Risks

Hearing impairment or loss may occur on exposure to high noise



Ear protection

Types of ear protection devices are:

1. Ear plug
 2. Earmuff
 3. Canal caps
- Provide the right hearing protectors for the type of work, and make sure workers know how to fit them
 - Choose protectors that reduce noise to an acceptable level, while allowing for safety and communication
 - Display sign boards indicating noisy area and the need to wear an ear protection



Canal caps



Ear plugs



Earmuff

PPE- HAND PROTECTION

Legal Requirement

OSHA Rules- 1910.138

Hazards& Risks

- Hand injury on using tools/ machines/ sharp objects
- Hand burns on contact with reactive materials or power lines
- Hand Arm Vibration Syndrome (HAVS) from using vibrating tools



Hand injury



Hand protection

- Wear anti-vibration gloves while handling machinery producing vibrations
- Non conducting gloves to be worn while working on electrical circuits
- Welding gloves for welding works
- Coated gloves are to be worn while handling chemicals
- Display adequate no. of sign boards



Welding gloves



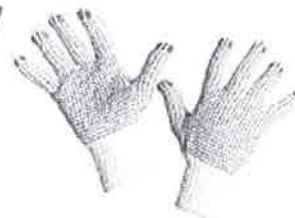
Non-conducting gloves



Anti-vibration gloves



Chemical resistant gloves



Material handling gloves

PPE- FOOT PROTECTION

Legal Requirement

OSHA Rules- 1910. 136

Hazards& Risks

- Foot injury due to sharp objects scattered on floor
- Crushing of foot due to falling objects
- Shocks on contact with electrical lines
- Skin burns on contact with reactive materials such as cement, chemicals, etc.
- Injury from slipping hazard

Foot protection

- Footwear with sole puncture protection to be worn in heavy work environment
- Electric shock resistant footwear to be worn during electrical works
- Chemical resistant footwear to be worn while handling chemicals
- Safety footwear to be worn at all times when inside work premises.
- Strict no to sandals at work
- Employer responsible for providing workers with safety footwear



Foot injury



Foot protection for heavy work



Chemical resistant footwear

MANUAL HANDLING

Doc. No. QHSE/TBT/12

Legal Requirement

Factories Rules, 1950- Chapter IV, Cl. 57

Hazards

- Carrying weight greater than 20kg (woman) and 50kg (man)
- Repeated load carrying lead to tripping/ falling/ slipping hazard

Risks

- back pain
- injury

All workers performing load bearing works can be affected.

Control measures

Engineering controls

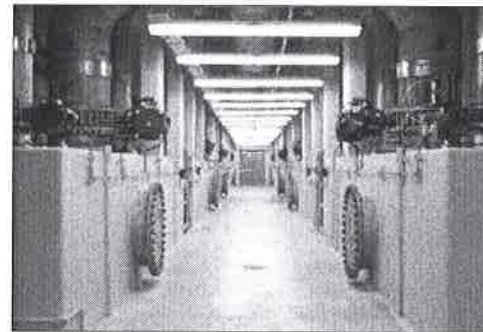
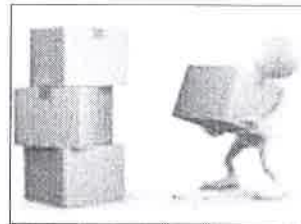
- Ensure pathway is free of tripping and slipping hazard and properly lit
- Elimination using mechanical lifting equipment, if possible
- Use supporting devices such as trolley, hoists, etc.

Administrative controls

- Train employees on proper lifting technique
- Job rotation to prevent repetitive handling
- Display caution boards

PPE

- Safety gloves
- Steel toe shoes



Well- lighted, obstruction free pathways



Mechanical Handling Trolley support

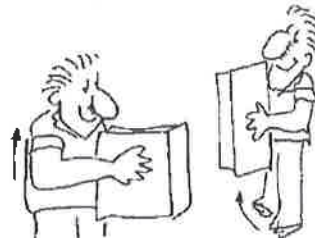
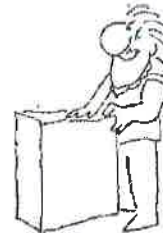


Sign boards



Safe lifting technique

- Plan the lifting operation and clear away any obstacles.
- Size up the load to ascertain whether it is within your capacity.
- Proper foot position: Front foot beside object and back foot slightly behind and hip width apart to allow even distribution of weight
- Proper hold: hands should be diagonally opposite for security and comfort. Use full length of fingers and wherever possible, the palms to avoid fatigue
- Bend the knees to get down to the load and use legs to lift it.
- Keep your back as straight as possible, raise your head and chin in enabling proper vision.
- During lift, keep arms straight and elbow in. Don't change grip.
- Never combine lifting with twisting of body. It will result in back injury.



HAND & POWER TOOLS

Legal Requirement

Building and Other Construction Worker Rules, 1998

Hazards

- Mishandling of tools
- High noise exposure
- Electrical hazards from power tools

Risks

- Hand injury
- Hearing impairment or loss
- Shock or electrocution

All workers handling tools may face these hazards.

Control measures

Engineering controls

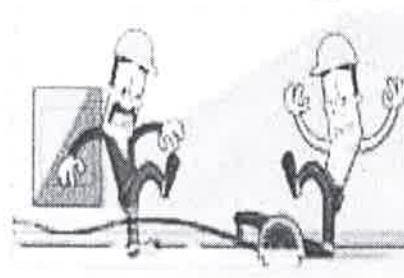
- Install machine guards for tools
- Provide noise enclosures

Administrative controls

- Inspection check for insulation damages
- Display sign boards
- Trained personnel to handle tools
- Re- place the tools in designated place after use to prevent misplacement
- Proper maintenance of tools

PPE

- Safety gloves
- Earmuff/ ear plug



PERMIT TO WORK

Doc. No. QHSE/TBT/14

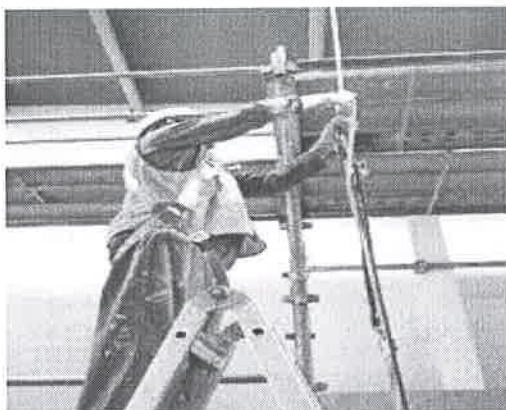
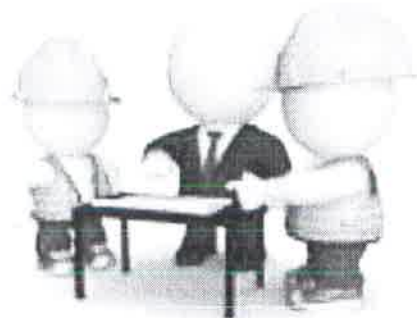
A Permit-to-Work system is an extension of a safe system of work or method statement and requires written permission before a particular job can commence.

Permits-to-Work will be used in a considerable range of circumstances:

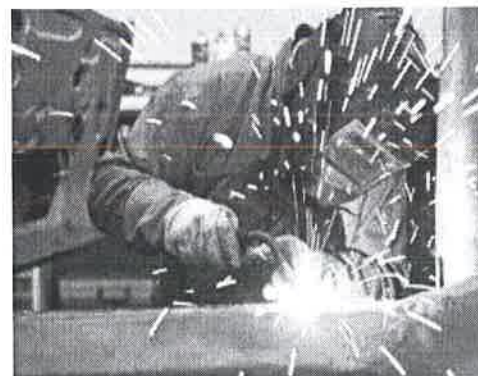
- Hot works
- Height works
- Entry into confined spaces
- Entry into tanks and vessels
- Use of highly flammable materials
- Any work involving live electrical circuits.

An essential part of a Permit-to-Work system is the formal recording by those in charge that the precautions have been taken and it is safe for the work to proceed.

Display boards to create awareness among employees.



Height work



Welding



Confined space entry

SAFE EXCAVATION

Doc. No. QHSE/TBT/15

Legal Requirement

OSHA Rules- 1926.651

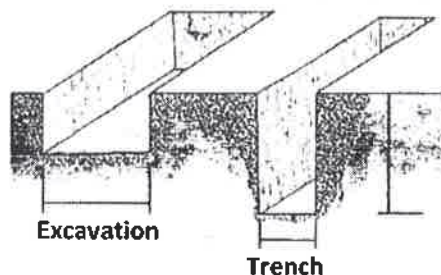
Building and Other Construction Workers
Rules, 1998- Chapter XIII

A) Excavation

Excavation is any man-made cut, cavity or depression on earth surface that is formed by earth removal

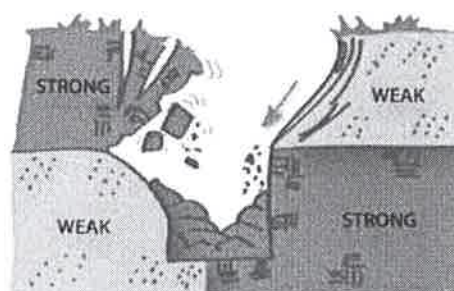
B) Trench

Trench is a narrow excavation where depth is greater than width.



Excavation

Trench



Excavation collapse

Hazards

- Caving in or hazardous atmosphere in open trenches.
- Falling of personnel or excavation machinery during operation
- Water ingress in trenches
- Contact with overhead and underground cables
- Exposure to toxic gaseous

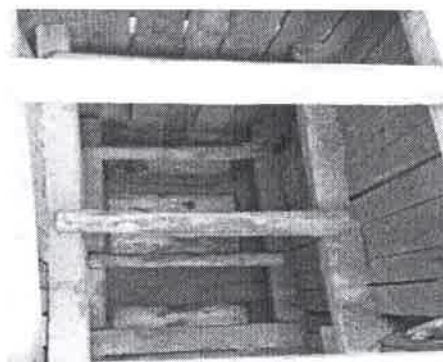


Risks in excavation

Risks

- Asphyxiation/ death
- Body injury
- Drowning
- Electrocutation

All personnel in the proximity of excavating area especially excavators may face these hazards.



Timber shoring

Control measures

Engineering controls

- Shoring to be done to prevent collapse of trenches
- Barricading to prevent falling
- Providing safe access such as ladders, scaffolding, etc.
- Provide trench ventilation
- Monitor hazardous gases
- Provide pumps to dewater trench
- Mark route of underground cable
- Inspect for water seepage before commencement
- Cordon off swing area

Administrative controls

- Permit to work
- Display caution boards
- Standby rescue team
- Training to workers

PPE

- Respiratory masks
- Mandatory PPE: helmets, boots, gloves
- High visibility jacket



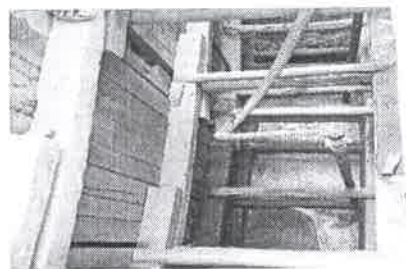
Sheet piling



Barricade trench



Trench ventilation



Trench dewatering



Sign boards

Shoring is the provision of support for excavated face(s) to prevent the movement of soil and therefore ground collapse. Shoring the face of an excavation should proceed as the work of excavation progresses.

Doc. No. QHSE/TBT/15

Types of Shoring:

a) Timber shoring

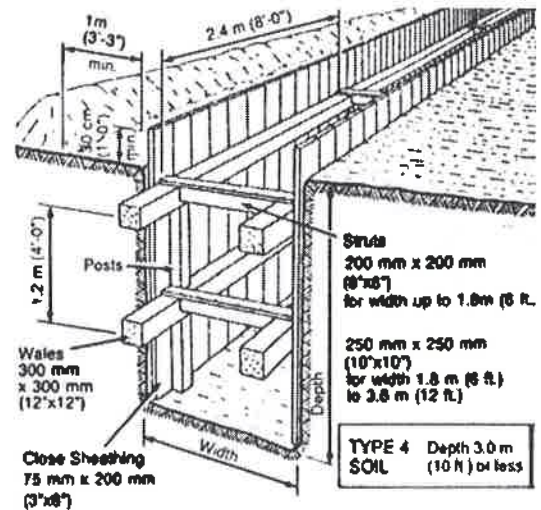
- Timber shoring has the following components:

Uprights: members placed vertically against the trench wall

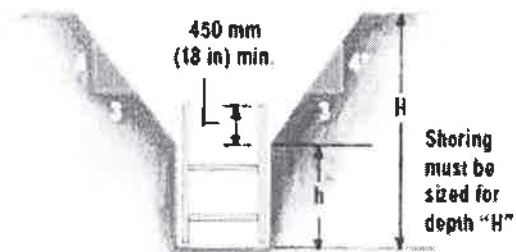
Wales: horizontal members that press against uprights

Cross-brace: horizontal members extending perpendicular to each trench wall

- Uprights to extend at least 1ft above top of trench wall
- When placing a conduit on the floor of a trench, it is helpful to have the bottom cross-brace as high as possible
- The span from the top cross-brace to the top of the trench shall be no more than 1/2 of the vertical cross-brace spacing.
- Ladder provided for access to extend from bottom to at least 1m above ground level.
- Do not allow workers in unprotected trench while constructing shoring system
- Members to be loaded during construction. Do not overload members
- Timber shoring to be inspected for tightness of members, member fitting to soil, placing of cross-braces



Sketch of typical timber shoring showing components

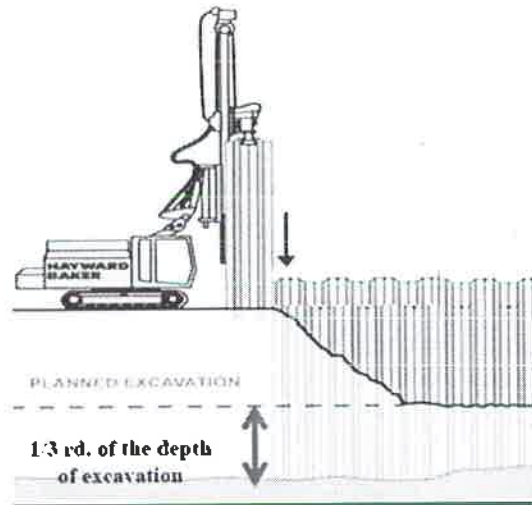


Combination of sloping and shoring

- The system should be dismantled by disconnecting bottom first and working towards top.
- Combination of sloping and shoring is the best preventive measure against trench collapse

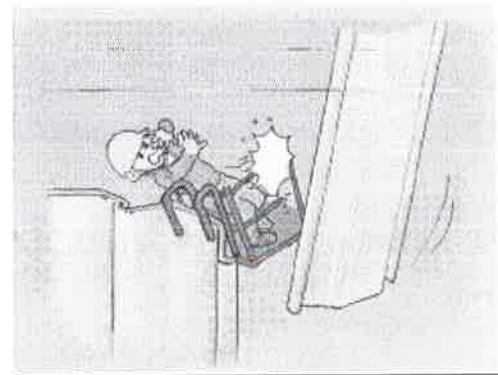
Maximum allowable slopes for excavations less than 20 ft.

Soil type	Height/ Depth ratio
Stable Rock	Vertical
Type A	¾:1
Type B	1:1
Type C	1½:1

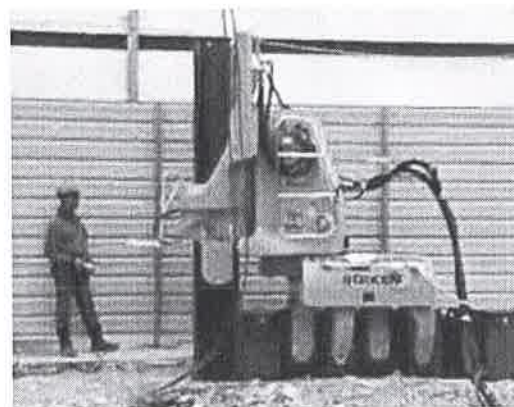


b) Sheet Piling

- Sheet piling is another form of shoring.
- Sheet piling is a form of driven piling using thin interlocking sheets of steel to obtain a continuous barrier in the ground thus retaining soils during deep excavations.
- Sheet piles to be at least 1m above finished ground level.
- The bottom of sheet pile to penetrate at least one- third more of the excavation depth.
- Height work involved in interlocking sheets poses falling hazard
- Usage of mechanical device for pile driving eliminates height work
- Sheet pile are placed in position using guide structures and driven using proper size of hammer.
- Protection cap to be provided at top of sheet pile to prevent damage during driving with hammer



Fall of personnel on getting struck by hoisted sheet pile



Sheet pile threader

VEHICLE OPERATION

Doc. No. QHSE/TBT/16

Legal Requirement

OSHA Rules- 1926.601
Building and Other Construction Workers
Rules, 1998– Chapter VI, Cl. 48

Hazards

- Rash driving
- Mud on road
- Mechanical failure
- Adverse weather
- Ergonomics
- Reversing and parking
- Wrong choice/ poor condition of vehicle

Risks

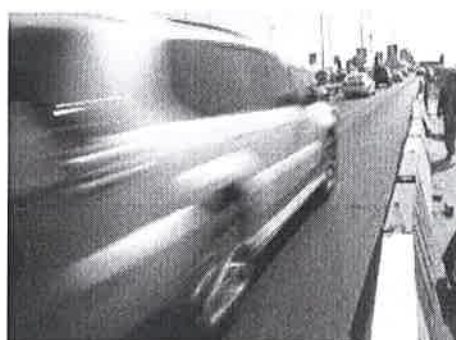
- Road accidents causing human injury or death

Any pedestrian or passenger can be affected.

Control measures

Engineering controls

- Install speed governor in vehicles
- Sweep roads to keep road mud-free
- Check vehicle operability before start of journey
- Provide fog lamps
- Check functioning of wiper
- Provide sun proof front glass
- Plan journey with proper breaks and provide comfortable seating
- Provide sensors/ camera in vehicles
- Check suitability to intended use
- Provide safety options like seat belt, air bags, etc.



Rash driving



Bad weather



Speed governor in vehicles



Mechanical road sweeper

Administrative controls

- Mandate licensed and authorized driver
- Provide caution boards and sign boards for speed limit
- Proper maintenance of vehicles
- Provide fencing to roads isolate crossing area
- Take breaks and don't use alcohol or phone
- Employee workers to signal



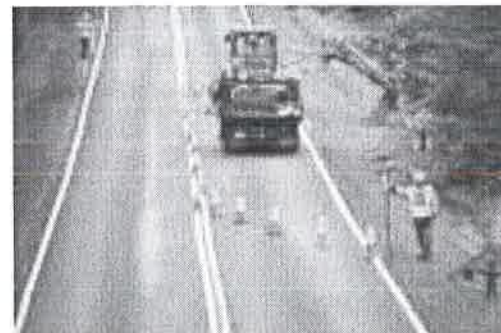
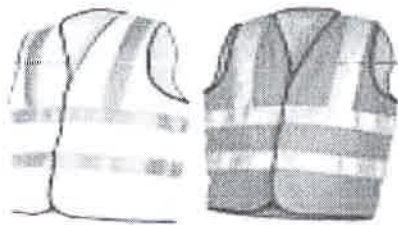
Sensor/ camera



Air bag Seat belt

PPE

- High visibility clothing



Signaling and fencing road



Limit vehicle speed

PILING

Legal Requirement

Building and Other Construction Workers Rules, 1998- Chapter XXIII

Hazards

- Gas release
- High noise exposure
- Falling of personnel/ collapse of hammer

Risks

- Respiratory problems to the workers
- Hearing impairment or loss
- Body injury or death

All personnel in the proximity of piling area especially operator, supervisor and helpers may face these hazards.

Control measures

Engineering controls

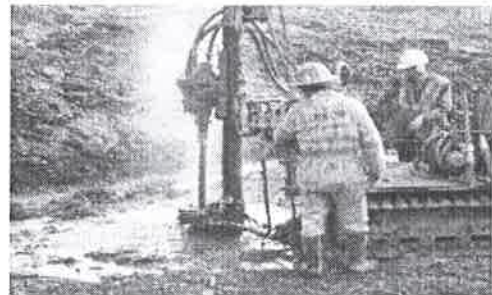
- Arising analyzed, if found hazardous, - contained, treated, disposed or landfilled
- Provide noise enclosure
- Continuous gas monitoring
- Provide for collection and treatment of used water

Administrative controls

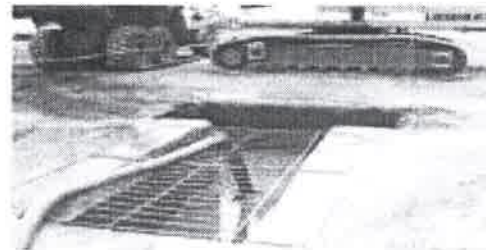
- Restricted entry of personnel
- Display sign boards
- Provide training to employees
- Regular inspection and maintenance of pile drive

PPE

- Safety gum boots
- Safety Gloves
- Earmuff/ ear plug



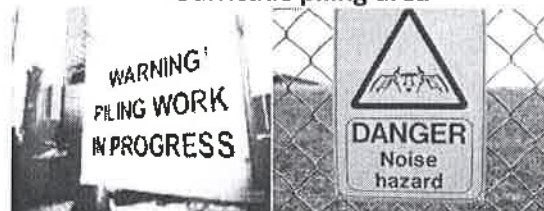
Gas release



Slurry collection pit



Barricade piling area



Sign board



DEMOLITION

Legal Requirement

OSHA Rules- 1926.850
 Building and Other Construction Workers
 Rules, 1998- Chapter XII



Demolition in confined space

Hazards

- Confined space or falling of objects/ personnel
- Exposure to noise
- Dust inhalation



Risks

- Asphyxiation, injury or death
- Hearing impairment/ loss
- Respiratory illness



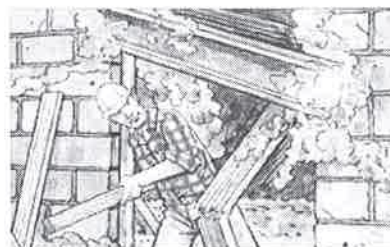
Noise from demolition activity

All personnel in demolition area especially operator, supervisor and helpers affect by these hazards.

Control measures

Engineering controls

- Isolate water, gas, electricity and other supplies
- Surface wetting to prevent fugitive dust.
- Airborne dust capture using electrostatically charged fog or atomized spray.
- Provide enclosure for noise control
- Provide barricade or nets when working at height and for materials stacked at height
- Ensure proper ventilation



Demolition dust

Accident

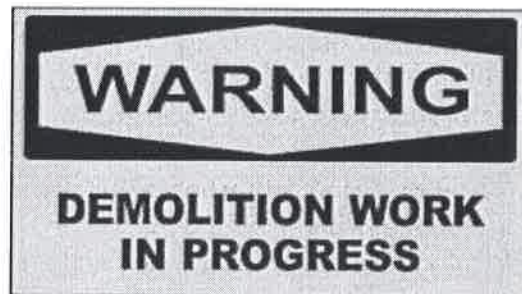
Administrative controls

- Permit to work
- Restrict access to passer-by
- Trained workers to be employed
- Provide caution boards

- Maintenance of tools and equipment

PPE

- Safety helmets
- Safety shoes with steel toe
- Safety gloves
- Face shield
- Earmuff

**Dust suppression****Restricted Entry****PPE****Sign boards**

LADDER SAFETY

Doc. No. QHSE/TBT/19

Legal requirement

OSHA Rules- 1926.1053
Building and Other Construction Worker
Rules, 1998- Chapter XV

Hazards & Risks

- Falling hazard leading to body injury or death

The workers using ladders may face these hazards.

Safety measures

- Stay off ladder if not well
- Stay off ladder in wind or storm
- Wear slip resistant shoes
- Do a pre-use check of stiles, feet, rungs, locking mechanism (if any)
- Ensure level and stable ground for resting the ladder
- Use towlines to convey materials to facilitate hands free climbing
- Do not overreach or lean when on ladders
- Do not pull ladder when on it
- Do not overload the ladder
- Make sure the ladder angle is 75°
- Do not work on the top three rungs and make sure ladder extends at least 1m above your working point
- Do not work within 6m horizontally of any overhead power line
- At all times, maintain three point contact, either two hands and one feet or two feet and one hand.
- Always face the ladder when ascending and descending



Ladder to be placed at an angle of 75°



Three point contact



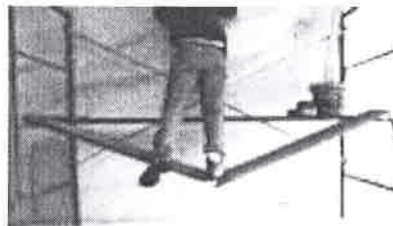
Securing ladder at top stiles and part way down

SCAFFOLDING

Doc. No. QHSE/TBT/20

Legal Requirement

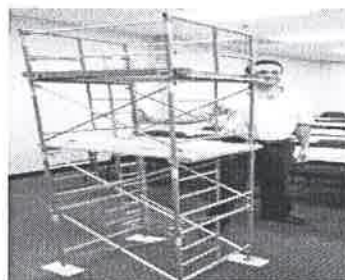
OSHA Rules- 1910.28, 1926.451
 Building and Other Construction Worker
 Rules, 1998- Chapter XIX



Collapse of scaffold on using defective components

Hazards

- Collapse of scaffold
- Falling of personnel
- Falling of materials



Scaffold training

Risks

- Body injury or death

All personnel in the vicinity of height work may face these hazards.

Control measures

Engineering controls

- Application of rust protection on scaffold components
- Barricade the area of height work
- Secure scaffold components while erection.
- Start dismantling from top of scaffolding
- Provide guard rails and toe boards
- Train personnel on erection & dismantling.



Worker harnessed to the scaffold component

Administrative controls

- Inspection of scaffold components
- Display warning sign boards



Sign Boards

PPE

- Safety helmets. Gloves, shoes
- Full body harness

REINFORCEMENT

Doc. No. QHSE/TBT/21

Hazards

- Littering of scrap metal/ walking over steel
- Sharp ends of rebar's
- Falling from height while laying rebar
- Manual handling
- Electrical shock while Cutting steel using electric saw



Cutting steel bars using electric saw

Risks

- Body injury
- Shock/ electrocution



Reinforcement caps prevent cuts from sharp end of rebars

Control measures

Engineering control

- Unattended sharp ends of steel bars should be capped
- Proper insulation and earthing of cutting tools
- Stable scaffold for height work

Administrative control

- Pictorial display of warning signs
- Improve housekeeping
- Training on manual handling
- Permit to work

PPE

- Leather heavy duty gloves
- Steel- capped shoes
- Safety glass
- Safety helmet



Heavy duty leather gloves to be worn while handling steel bars

FORMWORK

Doc. No. QHSE/TBT/22

Legal Requirement

Building and Other Construction Worker Rules, 1998- Chapter XVII

Hazards

- Falling hazard- material/ personnel
- Collapse of formwork

Risks

- Body injury/ death
- Resource wastage

Control measures

Engineering control

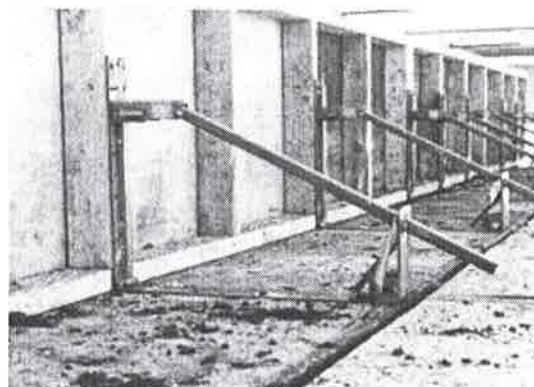
- Proper designing of formwork to bear the imposed load
- Provide appropriate bracing
- Check sheet/planks are properly supported and clamped
- Provide safe access for workers to erect/ dismantle formwork at height
- Provide adequate lighting during staging work for safe entry & exit.

Administrative controls

- Supervisor to look over the erection and dismantling operation.
- Trained workers only to be employed
- Pictorial warning signs to be displayed- restricted entry, falling hazard, etc.
- Permit to work

PPE

- Safety harness with life line , if height work involved
- Safety helmet
- Safety shoe



Bracing for formwork



Support for formwork



CONCRETING

Doc. No. QHSE/TBT/23

Legal Requirement

Building and Other Construction Worker Rules, 1998- Chapter XI

Hazards

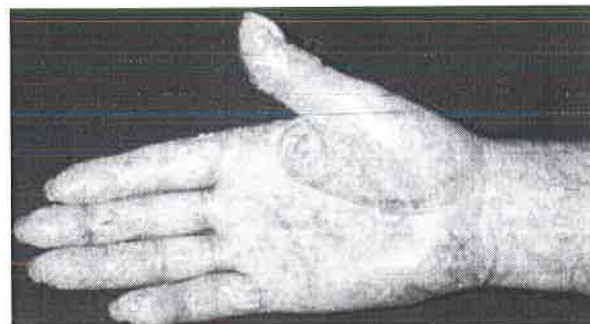
- Fall from height/slip on wet concrete/ trip on laid reinforcement
- Formwork / scaffold collapse
- Skin contact in Manual handling of concrete
- High noise- vibrator & concrete pumping
- Vibration from compactor
- Bursting of concrete pouring pipe
- Fire hazard in vibrator



Concrete poured by pumping, placed manually using shovels and compacted using needle vibrator

Risks

- Wastage of concrete (resources)
- Rash/ allergy
- Hearing impairment/ loss
- HAV syndrome in workers
- Strain/ sprain/ fracture/ cut injury



Skin problems from contact with concrete

Control measures

Engineering control

- Check for stability of formwork, scaffold for height work
- Acoustic enclosure for pumps
- Proper earthing of vibrators

Administrative control

- Permit to work
- Pictorial display of warning sign
- Training to workers
- Job rotation

PPE

- Gumboots, gloves



Wear gumboots while concreting

CONFINED SPACE

Legal requirement

- OSHA Rules- 1910.146

Hazards

- Oxygen deficiency
- Radiation hazard from welding activities
- Electrical hazards
- Use of hand tools
- Tripping and falling hazard due to inadequate lighting
- Water ingress

Risks

- Asphyxiation
- Vision damage
- Shock or electrocution
- Hand or body injury
- Drowning

The confined space workers may face these hazards.

Control measures

Engineering control

- Provide for mechanical ventilation
- Continuous monitoring of oxygen and flammable gases while doing hot work
- Isolate all pipes opening into the space to prevent water entry
- All electrical tools to be de-energized and locked out prior to its entry into confined space



Oxygen deficiency leads to asphyxiation



Oxygen content determination



Mechanical ventilation

Administrative control

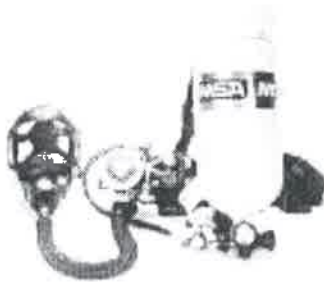
- Entry by work permit only
- Display sign boards
- Provide training for safe confined space entry
- Rescue team on standby
- Establish proper line of communication from inside to outside
- Provide adequate lighting and ladders for safe access
- Assign an attendant to keep watch



Entry permit

PPE

- Full body harness with lifeline
- Respiratory apparatus (SCBA)
- Safety gloves, boots, helmet
- Ear plugs
- Coverall



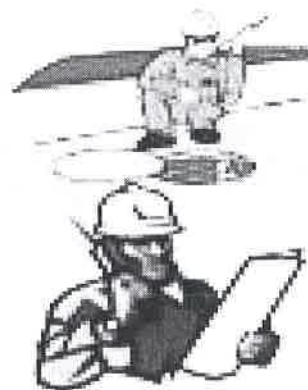
SCBA



Rescue team



Full body harness set



Attendant + Established communication

WELDING

Doc. No. QHSE/TBT/25

Legal Requirement

- OSHA Rules- 1910.252

Hazards

- Inhalation of weld fumes and dust less than 1.0 μm in size
- UV radiation
- Electrical Shock
- Flying sparks, molten metal, hot work surfaces
- Fire

Risks

- Lung diseases such as asthma, cancer
- Metal fume fever
- Welder's flash (damage to cornea of eye)
- Nervous system disorders irritation of respiratory system
- Eye, nose and throat irritation, chest pain

The welders are mainly affect by these hazards.

Control measures

Engineering controls

- Provide proper ventilation
- Provide tool with dust containment unit
- No contact with live parts.
- Proper earthing of equipment
- Check for insulation damage
- No combustible material within radius of 35 ft.
- ELCB Functioning 30 mA



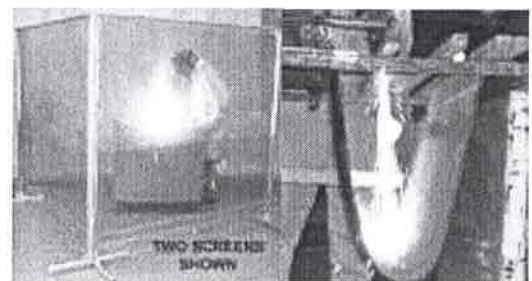
Exposure to welding fumes and radiation



Respiratory problems Welders flash



Welding ventilation



Radiation and fire control

Administrative controls

- Hot work Permit
- Display warning sign boards
- Keep MSDS for welding rods and cylinders used
- Provide training to workers
- Regular inspection and maintenance of equipment's.
- Easy access to firefighting equipment
- Enclose welding area with fire-resistant screens



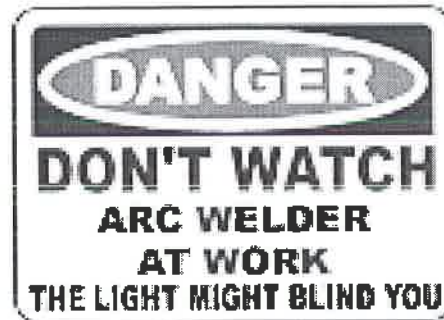
Hot work permit



Sign Board

PPEs

- Welding Face Shield and Helmet with Respirator
- Flame-resistant/Non conducting gloves
- Flame Resistant Welding Jacket
- Wear leather, steel-toed, high-topped
- Safety shoes



Sign board



GAS CYLINDERS

Legal Requirement

Gas Cylinder Rules, 2004

Hazards:

- Explosive
- Fire
- Hit

Risks:

- Body injury /Burn
- Fatality

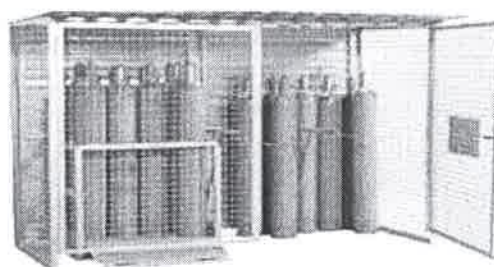
Control measures

Engineering control

1. Fix gas leak detector
2. Provide adequate ventilation as per the gas proportion in air (For e.g., Methane cylinder – Provide enough ventilation at base as gas is heavier than air which will store at the floor.
3. Check if valves and fittings are in good condition. Provide valve caps when not in use.
4. Do not expose gas cylinders to direct sunlight and high temperatures.
5. Do not store cylinders with flammable or explosive materials
6. No person to cause fire and explosion in and around areas of gas cylinders.
7. Cylinders to be stored in cool, dry, well-ventilated place under cover away from potential sources of heat.
8. Storage room should be of fire resistant construction



Improper storage



Proper storage



Wrong handling



Proper handling

9. Empty cylinders shall be segregated separately with proper identification.
10. Do not roll, dropping of cylinders on floors.
11. Prohibit use of open flames, welding, etc. in the proximity of cylinders containing flammable gases except while using for welding or cutting

Administrative controls

- Hot work Permit
- Display warning/Un authorized entry sign boards
- Keep MSDS for all cylinders and store as per the guidelines
- Regular inspection and maintenance of cylinders and leaks.
- Availability of firefighting equipment
- Regular training on leak identification & safety measures

PPE

- Safety gloves
- Safety shoes

**Valve caps****Identification of Empty cylinders****Sign boards**

FIRE HAZARDS

Doc. No. QHSE/TBT/27

Legal Requirement

Building and Other Construction Worker Rules, 1998- Chapter VI, Cl. 35
 Factories Rules, 1950- Chapter IV, Cl. 61


Welder on fire

Hazards

- Overloaded circuit
- Over-heating
- Smoking near combustible material
- Improper storage & handling of flammable chemicals
- Improper use of welding torches


Prohibit smoking to prevent fire

Risks

- Fire resulting in body injury or death

Site personnel or visitor in the proximity of fire source can be affected.

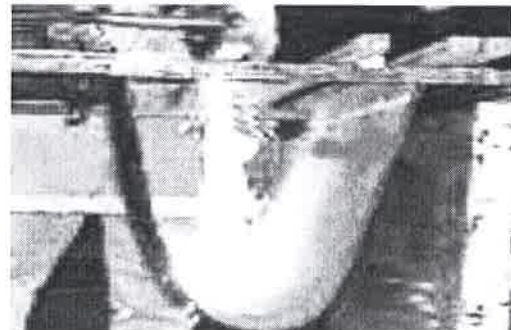

Sprinkler system

Fire alarm

Control measures

Engineering controls

- Provide appropriate firefighting equipment like extinguishers, sand buckets, water line, etc.
- Provide firefighting water line throughout the site.
- Install fire detection systems like smoke detector, fire alarms, etc.
- Provide welding blanket during welding activities


Welding blanket

Administrative controls

- Provide firefighting training to workers/ staffs.
- Display evacuation route at designated places
- Display assembly point and fire exit signage
- Housekeeping
- Prohibit smoking inside site



Fire- fighting training

PPE

Fire resistant

- Clothing
- Helmet
- Boots
- Gloves



Sign boards



Classes of Fire

Class A

Class A fires are fires in ordinary combustibles such as wood, paper, cloth, trash, and plastics.


Class B

Class B fires are fires in flammable liquids such as gasoline, petroleum oil and paint. Class B fires also include flammable gases such as propane and butane. Class B fires do not include fires involving cooking oils and grease.


Class C

Class C fires are fires involving energized electrical equipment such as motors, transformers, and appliances. Remove the power and the Class C fire becomes one of the other classes of fire.


Class D

Class D fires are fires in combustible metals such as potassium, sodium, aluminum, and magnesium.


Class K

Class K fires are fires in cooking oils and greases such as animal fats and vegetable fats.

Classification of Fire Extinguishers
Water and Foam


Water and Foam fire extinguishers extinguish the fire by taking away the heat element of the fire triangle. Foam agents also separate the oxygen element from the other elements. Water extinguishers are for Class A fires only.

Carbon Dioxide


Carbon Dioxide fire extinguishers extinguish fire by taking away the oxygen element of the fire triangle and also be removing the heat with a very cold discharge. Carbon dioxide can be used on Class B & C fires.

Dry Chemical


Dry Chemical fire extinguishers extinguish the fire primarily by interrupting the chemical reaction of the fire triangle. The multipurpose dry chemical is effective on Class A, B, and C fires. Ordinary dry chemical is for Class B & C fires only.


Wet Chemical

Wet Chemical is a new agent that extinguishes the fire by removing the heat of the fire triangle and prevents re-ignition by creating a barrier between the oxygen and fuel elements. Wet chemical of Class K extinguishers used in commercial cooking operations.


**Doc. No. QHSE/TBT/27
Water Mist**

Water Mist extinguishers take away the heat element of the fire triangle. They are an alternative to the clean agent extinguishers where contamination is a concern. Water mist extinguishers are primarily for Class A fires, although they are safe for use on Class C fires as well.


Clean Agent

Halogenated or Clean Agent extinguishers include the halon agents as well as the newer and less ozone depleting halocarbon agents. They extinguish the fire by interrupting the chemical reaction of the fire triangle. Clean agent extinguishers are primarily for Class B & C fires.


Cartridge Operated Dry Chemical

Cartridge Operated Dry Chemical fire extinguishers extinguish the fire primarily by interrupting the chemical reaction of the fire triangle. Like the stored pressure dry chemical extinguishers, the multipurpose dry chemical is effective on Class A, B, and C fires. Ordinary dry chemical is for Class B & C fires only.


Dry Powder

Dry Powder extinguishers are similar to dry chemical except that they extinguish the fire by separating the fuel from the oxygen element or by removing the heat element of the fire triangle. However, dry powder extinguishers are for Class D or combustible metal fires, only.

SAND/ GRIT BLASTING

Doc. No. QHSE/TBT/28

Hazards

- Dust inhalation
- High noise

Risks

- Respiratory illness
- Hearing impairment or loss

Control measures

Engineering controls

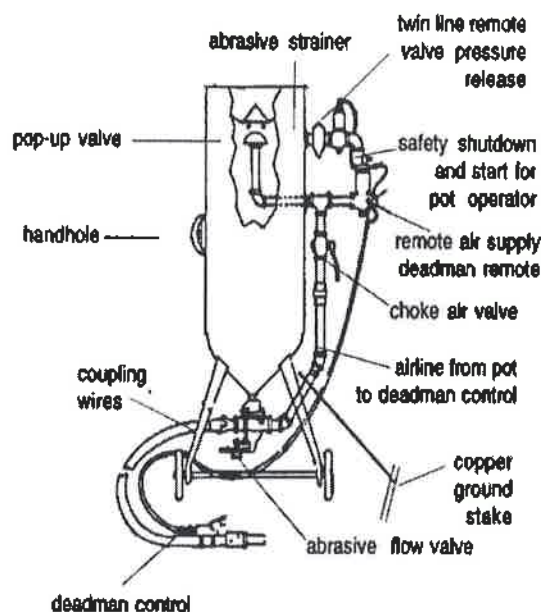
- Blast nozzle, sandblast pot to be grounded
- Sandblast pot to be provided with safety shutdown valve.
- Sandblasting nozzle to be equipped with remote control
- Provide machine guard for air compressor equipment
- Availability of ELCB devices / Body earthing to all equipment's

Administrative controls

- Pictorial display of blasting area
- Restrict entry of unauthorized personnel
- Proper inspection of airlines and hoses before commencement
- Training for blasters
- Enclose blasting area
- Permit to work
- Provide ventilation

PPE

- Safety gloves- full arm
- Coverall
- Safety shoes
- Air supplied hood



Prepared By QHSE Department

RADIATION- GAMMA RAYS

Radiography is conducted for testing and grading of welds on pipelines, pressure vessels, etc.

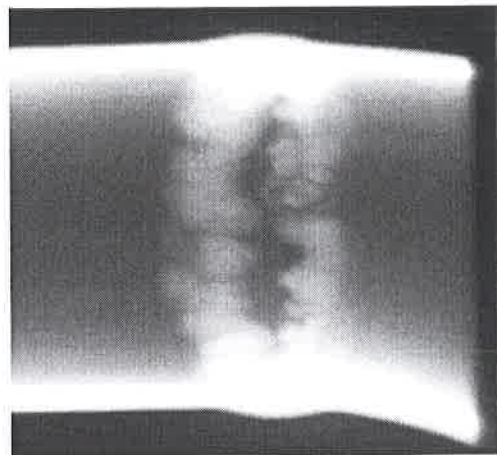
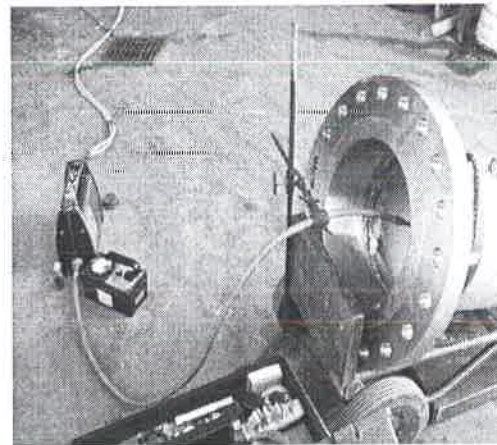
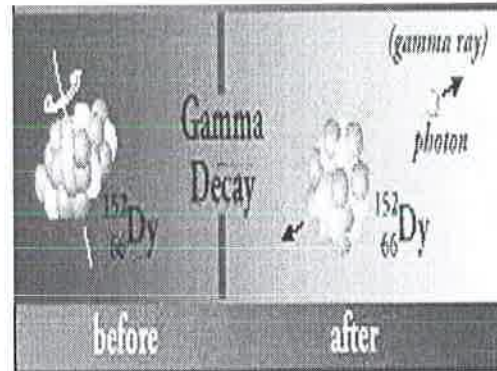
- Gamma rays are the most penetrating of these three types of radiation. Like alpha and beta particles, they are also harmful if inhaled, ingested or absorbed. Because of their high energy, gamma photons travel at the speed of light and can cover hundreds to thousands of meters in air before spending their energy. They can pass through many kinds of materials, including human tissue.
- The ability of ionizing radiation like gamma rays to penetrate materials is used for inspection.
- The radiographers require permit to work and undertake special training
- Restricted entry into testing area

Hazard:

- Radiation exposure to living organisms

Risk:

- Exposure to gamma rays can cause burns, tissue and organ damage in human body
- Cancer



Control measures

Doc. No. QHSE/TBT/29

Engineering control

The longer a person is exposed to radiation and the closer the person is to the source of radiation, the greater the risk. There are **three basic ways to reduce your exposure**:

- **Time:** Decrease the amount of time you spend near the source of radiation.
- **Distance:** Increase your distance from the radiation source
- **Shielding:** Increase the shielding between you and the radiation source.
- Very dense materials, such as lead, are commonly used as shielding to slow or stop gamma photons.



Shielding

Administrative control

- The radiographers require permit to work and undertake special training



Sign board

PPE

- Lead apron
- Respiratory protection
- Safety gloves and Gum boots

Safety equipment

- Radiation Survey meter
- Alarming dosimeter or rate meter
- Gas-charged dosimeter
- Film badge or thermo luminescent dosimeter (TLD)
- The radiographers use shields such as sand, lead (sheets or shot), steel, tungsten and in suitable situations water to reduce exposure

Types of personal dosimeter badges:

- **Passive badges** can be checked after a period of time.
- **Active badges** measure radiation dose in real-time, giving radiology personnel immediate feedback regarding their exposure.

PRESSURE TESTING

Hydrostatic & pneumatic testing are methods of pressure testing

Hydrostatic testing involves filling the pipeline with water (test medium) for a few hours and pressurizing to a pressure higher than operating pressure to give a factor of safety.

In pneumatic testing, gas, generally air or nitrogen, is the test medium.

The test helps in examining leaks and permanent change in shape of pipelines



Hydrostatic testing

Legal Requirement

Factories Rules, 1950- Chapter IV, Cl. 56(7)

Hazards

- Water splash on body
- Hit by equipment
- Electrical shock
- Slip by oil spill
- Noise generation from compressor

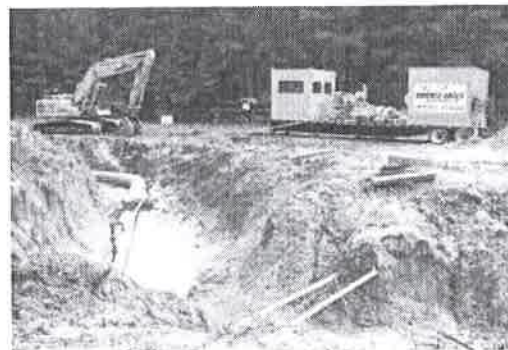


Pneumatic testing

Risks

- Body injury
- Resource depletion
- Land contamination
- Hearing impairment or loss

The test personnel may be affected by these hazards.



Control measures

Doc. No. QHSE/TBT/30

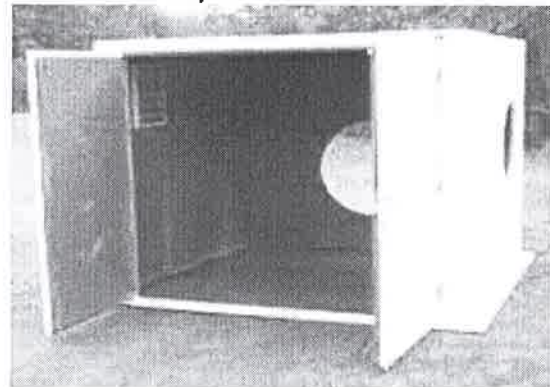
Engineering controls

- Collect and reuse water for testing another structure/ system
- Inspect welds, flanges, threads, valves, etc. and repair/ presence of flammable materials.
- Barricade testing equipment
- Provide secondary containment or drip tray
- Provide enclosure for the compressor


Inspection of welds

Administrative controls

- Prohibit entry of unauthorized personnel
- Permit to Work
- Job rotation
- Conduct pre-safety meeting to create awareness of emergency plans among workers before commencing the test
- Display caution boards
- If not air, gas chosen for pneumatic test shall be non-flammable and non- toxic


Acoustic enclosure for compressor

PPE

- Earmuff/Ear plug
- Safety shoes
- Safety helmet
- Coverall
- Goggles

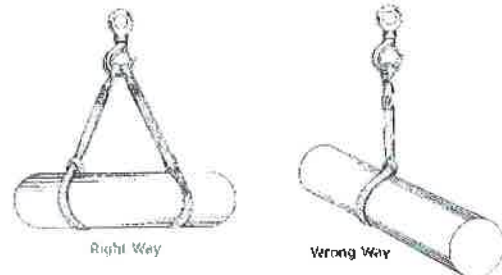

Caution boards

HOIST & CHAIN PULLEY SAFETY

Doc. No. QHSE/TBT/31

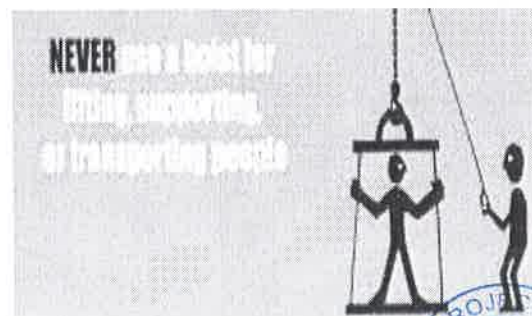
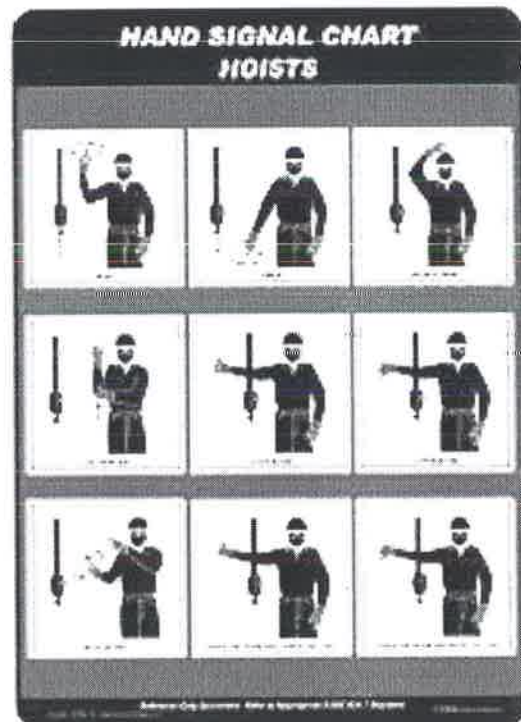
Legal Requirement

Building and Other Construction Worker Rules, 1998- Chapter VII, Cl. 65
Factories Rules, 1950- Chapter IV, Cl. 55



Safe usage

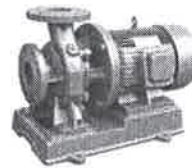
- The load chain must always mesh correctly with load sheave
- Regular lubrication of load chain with machine or gear oil
- Confirm proper functioning of brakes
- Non- vertical pulling of hand chain is not recommended
- Confirm monorail beam or structure supporting chain block is of sufficient strength to support load to be lifted
- Never walk or work under hoisted loads
- Never lift, support or transport people
- Use chain blocks manually only
- One operator to pull hand chain at a time
- Lift loads with proper slings and attachments
- Never lift with point of the hook
- Lifting load with two chain blocks not recommended
- Training on hand signal for hoisting operation
- Extreme temperature reduce durability of hoist, therefore loads to be hoisted or lowered slowly and carefully
- Never leave load hanging on the hoist



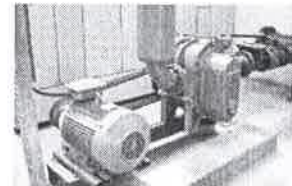
ROTATING EQUIPMENT

Doc. No. QHSE/TBT/32

The rotatory equipment normally used in water treatment operations are pumps, compressors and mechanical agitators.



Pump



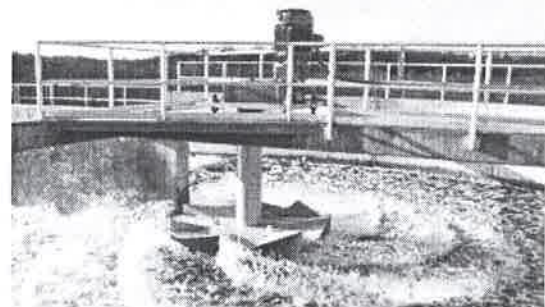
Blower

Legal Requirement

Building and Other Construction Worker Rules, 1998- Chapter VI, Cl. 37

Hazards

- Entanglement with the rotating parts
- High noise exposure
- Electric wiring insulation damage or earth fault

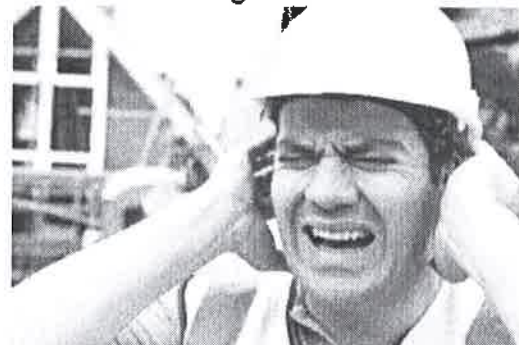


Agitator

Risks

- Body injury
- Hearing impairment or loss

All equipment operators may affect by these hazards.



Noise exposure leads to hearing impairment

Control measures

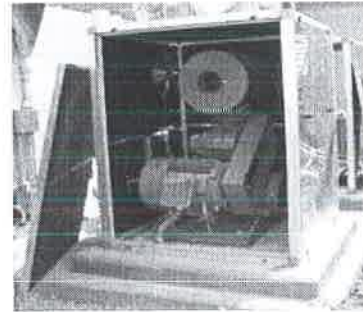
Engineering controls

- Install machine guards such as enclosures to rotating part of the equipment
- Provide noise enclosure for equipment
- Provide insulation
- Provide oil drip tray or secondary containment from pumps and compressor



Hand injury from contact with rotating or sharp parts of equipment

- Electric power provided complies with the rating of equipment
- Install protection devices such as GFCI and MCB
- Provide casing for pump to avoid water splashing
- Install level sensors to prevent chemical spillage from tank



Noise enclosure

Administrative controls

- Display caution/ warning boards
- Job rotation
- Employee awareness
- Employee authorized and licensed electrician
- Proper inspection and maintenance of cable insulation



Protection devices: MCB, GFCI

PPE

- Coverall
- Safety shoes
- Safety gloves
- Safety helmets
- Earmuff/ ear plug



High noise levels
Wear ear protection

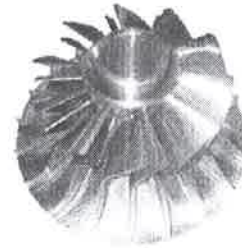
Caution boards

MACHINE GUARDING

Doc. No. QHSE/TBT/33

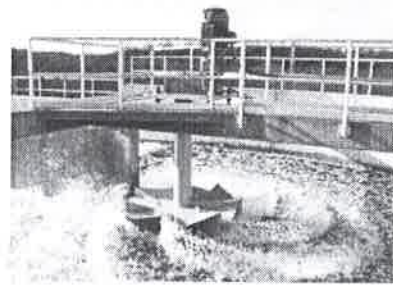
Legal Requirement

OSHA Rules- 1910.212
Building and Other Construction Worker
Rules, 1998- Chapter VI, Cl. 37



Hazards

- Caught in between rotating parts of machinery
- Sharp edges of machines



Risks

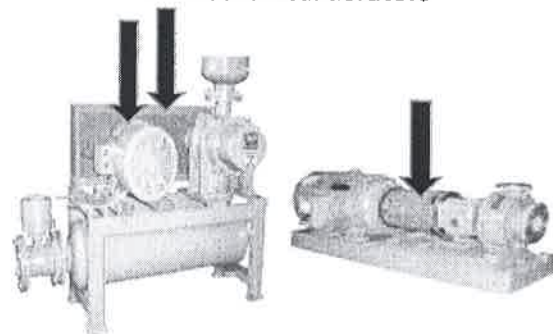
- Body injury
- The machine operators mainly affected by these hazards.

Rotating parts: impellers in pump, blades of mechanical aerators

Control measures

Engineering controls

- Enclosing rotating parts and sharp edges of machinery
- Regular maintenance of electrical equipment's and change spares accordingly



Enclosures

Administrative controls

- Competent personnel for handling with equipment's.
- Display warning/ caution sign boards

PPE

- Safety gloves
- Safety shoes
- Safety goggles



Sign boards

VIBRATION

Doc. No. QHSE/TBT/34

Legal Requirement

Building and Other Construction Worker Rules, 1998- Chapter VI, Cl. 34
 Vibration Occupational Health and Safety Code of Practice 2008, ISO 2631-1:1997

Hazards

- Handling machines such as needle vibrator, power saw, etc.
- Vehicle operation

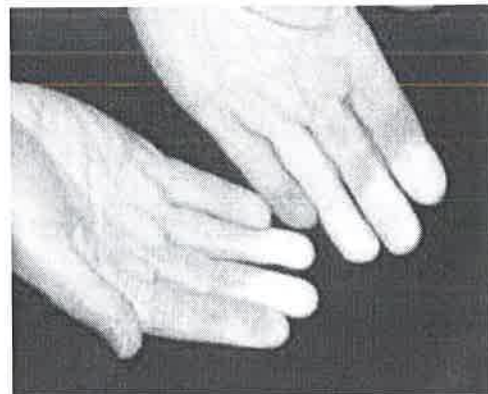
Risks

- **Hand-arm vibration:** Mechanical vibration that, when transmitted to the human hand-arm system, entails risks to the health and safety of workers, in particular vascular, bone or joint, neurological or muscular disorders
- **Whole-body vibration:** Mechanical vibration that, when transmitted to the whole body, entails risks to the health and safety of workers, in particular lower-back morbidity and trauma of the spine.
- **Vibration-induced white finger:**
 A form of Raynaud's disease where the blood vessels and nerves in the hands and fingers are damaged causing blanching, numbness, tingling, pain, loss of grip strength and reduced sensation touch.

The machine operators may face these hazards.



Compaction of concrete using needle vibrator induces

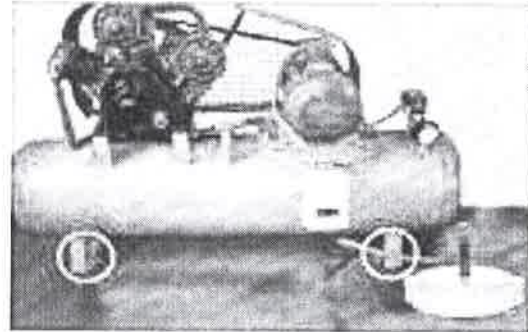


Vibration induced White finger

Control measures

Engineering controls

- Install vibration dampers for compressors
- Tighten loose bolts & parts
- Replace the fault machinery
- Install pumps on concrete slope bed
- Regular Inspection of machineries from competent person



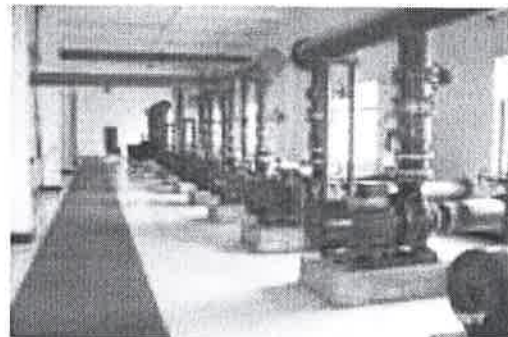
Vibration dampers

Administrative controls

- Routine Maintenance of Equipment
- Job rotation
- Regular training

PPE

- Safety gloves, shoes



Pump installation on concrete bed

Average daily vibration exposure A(8) ⁽¹⁾	Hand-arm vibration	Whole body vibration
Action value	2.5ms ⁻²	0.5ms ⁻² or 9.1ms ^{-1.75} (VDV) ⁽²⁾
Exposure limit	5ms ⁻²	1.15ms ⁻² or 21ms ^{-1.75} (VDV) ⁽²⁾

(1) Standardized to eight-hour energy equivalent frequency weighted acceleration magnitude
 (2) Vibration dose value

PAINTING

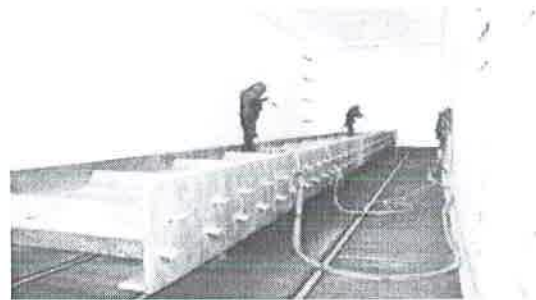
Doc. No. QHSE/TBT/35

Legal Requirement

OSHA Rules 1915.35

Hazards

- Caught in between machine parts
- Fall, trip and slip hazards
- Electrical hazards (spray painting)
- Exposure to noise (spray painting)
- Contact with eye
- Fire
- Asphyxiation



Painting booth

Risks

- Skin and respiratory illness
- Physical injury
- Hearing impairment or loss
- Burn injury



Paint Fume extractors

Control measures

Engineering controls

- Substitute hazardous paints by less hazardous such as water based instead of organic solvent based paint
- Use brush or roller instead of spray
- If spray painting, use high volume low pressure instead of airless spraying
- Provide paint fume extractors

**SPRAY PAINT
BOOTH
PAINT FUMES
MAY BE PRESENT**

Caution sign boards

Administrative controls

- Provide ventilation
- Pictorial display of boards
- Restricted entry to painting area



PPE

- Masks- breathing protection
- Safety gloves, shoes and face shield
- Coverall



MATERIAL SAFETY DATA SHEET (MSDS)

Doc. No. QHSE/TBT/36

MSDS is a technical document that provides detailed and comprehensive information of a chemical. MSDS should contain the following information:

1. **Product & Company identification:**
 - Provides chemical name, family and formula
 - Lists product identifiers, manufacturer and supplier name, address and emergency numbers
2. **Composition/ information on ingredients**
 - Lists ingredients of chemicals along with their CAS number
3. **Hazard identification**
 - Describes the ways of exposure (skin, eye, ingestion, inhalation) to the material and the harmful effect (acute, chronic, irritancy, toxicity) it can cause
 - Also include material appearance, reactivity, health and environmental hazards
4. **First-aid measures**
 - Describes action to be taken in case of accidental exposure
 - First-aid information to be known before working with the chemical
 - Every employee to know the location of first-aid equipment
 - In case of medical treatment, send MSDS along with victim to notify the doctor, the recommended first-aid measures

MATERIAL SAFETY DATA SHEET	
DATE OF PREPARATION: 01/04/15	
I. General Information	
CHEMICAL NAME & SYNONYM CHEMICAL CAS # EMERGENCY SHIPPING NAME SUPPLIER	TRADE NAME FORMULA DOT HAZARD CLASSIFICATION DANGER CLASSIFICATION DANGER CLASSIFICATION DANGER CLASSIFICATION DANGER CLASSIFICATION
II. Ingredients	
PRINCIPAL COMPONENTS MIXTURE TYPE (e.g. SOLID) EFFECTIVE PERCENTAGE CAS #	THRESHOLD LIMIT VALUE (TLV) TLV-TWA TLV-STEL TLV-C TLV-S
III. Physical Data	
BOILING POINT (°C) VAPOR PRESSURE (MM HG) VAPOR DENSITY (AIR=1) SOLUBILITY IN WATER APPEARANCE AND ODOR	SPECIFIC GRAVITY (4/4) PLACED VOLATILE (%) EVAPORATION RATE (WATER = 1) REFRACTIVE INDEX
IV. Fire & Explosion Hazard Data	
FLASH POINT (TEST METHOD) AUTOIGNITION TEMPERATURE CEILING CONCENTRATION SPECIAL FIRE FIGHTING PROCEDURES SPECIAL FIRE & EXPLOSION HAZARDS	LOWER EXPOSURE LIMIT (LEL) UPPER EXPOSURE LIMIT (UEL)
V. Health Hazard Data	
LD50 (RAT) (MILLIGRAMS/KG) LD50 (MICE) (MILLIGRAMS/KG) SYMPTOMS OF EXPOSURE MUTAGENICITY DATA PRIMARY ROUTES OF ENTRY EMERGENCY FIRST AID	CARCINOGEN - IARC PROGRAM
VI. Reactivity Data	
STABILITY INCOMPATIBILITY WITH OTHERS HAZARDOUS POLYMERIZATION HAZARDOUS DECOMPOSITION PRODUCTS	UNSTABLE STABLE MAY OCCUR WILL NOT OCCUR CONDITIONS TO AVOID HAZARDOUS DECOMPOSITION PRODUCTS
VII. Environmental Protection Procedures	
SPILL RESPONSE WASTE DISPOSAL METHOD	
VIII. Special Protection Information	
EYE PROTECTION RESPIRATORY PROTECTION OTHER PRECAUTIONS	
IX. Special Precautions	
HYGIENE PRACTICES IN HANDLING & STORAGE PRECAUTIONS FOR PREVENTION OF CONTAMINATED EQUIPMENT OTHER PRECAUTIONS	

Typical MSDS



Harmful effect of exposure to chemicals



First-aid

5. Fire-fighting measures

- Describes fire hazards associated with the material (NFPA Hazard rating)
- Information useful in appropriate selection of fire extinguisher

6. Accidental release measures

- General instructions to respond to an accidental release or to clean up a spill are described
- Specific information such as recommended absorbent for spill cleanup are included

7. Handling & storage

- Lists precautions for safe handling of chemical
- Storage recommendations are provided

8. Exposure controls/ personal protection

- Permissible Exposure Limit (PEL), Threshold Limit Value (TLV) for the chemical is stated
- Describes exposure controls-
 - Engineering (ventilation- local exhaust, containment hood)
 - PPE controls (Chemical resistant gloves, apron/ lab coat, goggles, chemical resistant shoes, boots)

9. Physical and chemical properties

- Lists physical state of chemical, appearance & odour, boiling point, melting point, vapour pressure, pH, specific gravity, evaporation rate, odour threshold.

4. Deadly
3. Extreme Danger
2. Hazardous
1. Slightly Hazardous
0. Normal Material

4. Below 73°F
3. Below 100°F
2. Above 100°F not exceeding 200°F
1. Above 200°F
0. Will not burn



NFPA Hazard Classification



Accidental release



Handling of chemicals



Containment hood

10. Stability and reactivity

- Describes reaction to heat, light, moisture, shock and incompatible materials- conditions under which chemical is unstable
- Described storage requirements and disposal measures

11. Toxicological information

- LD50 and LC50 values of the chemical is provided in this section

12. Ecological information

- Describes environmental impact of chemical, if released

13. Disposal consideration

- Describes waste disposal requirements

14. Transport information

- Lists precautions to be taken during shipment of chemical

15. Regulatory information

- Useful references to applicable health, safety and environmental laws and regulations are provided for the chemical

16. Other information

- To provide supplementary information for safe use of chemical
- Employees to be trained to respond to chemical emergencies
- Provide sign boards for MSDS location area and other warning for safe handling and storage of chemicals



PPE



Emergency training- spill containment



Sign boards

Chemical Emergency- SPILL

- Alert area occupants and supervisors and evacuate area
- Contact fire or medical services, if needed
- Attend to personnel who may be contaminated. Remove contaminated clothing of individual and flush skin with water for about 15 minutes.
- If volatile, flammable material spilled, control sources of ignition and ventilate the area.
- Refer MSDS and wear appropriate PPE
- Contain the spill using absorbents if minor and protect floor drains to prevent environmental release
- If major spill, call for outside help
- Decontaminate surface where spill occurred using mild detergent and water

Emergency Equipment

- Spill kit



- Eyewash fountain



- Emergency showers



- Fire extinguisher & blankets



- First-aid kit



SULPHURIC ACID

Doc. No. QHSE/TBT/37

Legal Requirement

Manufacture, Storage and Import of Hazardous Chemicals Rules, 2000

Hazards

- Burn injury
- Fire
- Exposure to sulphuric acid

Risks

- Irritation to eyes, skin, nose, respiratory tract

Lab technicians/ workers handling acid may face these hazards.

Control measures

Engineering controls

- Prevent generation of mists by providing local exhaust ventilation.
- Provide secondary containment.
- Transfer in small quantities using pipettes
- Add acid to water and not water to acid

Administrative controls

- Provide training on safe handling of sulphuric acid.
- Keep MSDS easily available.
- Awareness about emergency response
- Display caution boards

PPE

- Respiratory apparatus
- Safety Boots, goggles, gloves, Apron



Inhalation of acid fumes results in respiratory disorders



Add acid to water and not water to acid



Caution boards

HYDROGEN SULPHIDE

Doc. No. QHSE/TBT/38

Exposure level	Health effect
Less than 1 PPM	H ₂ S can be smelled (rotten eggs). No harmful effects.
Less than 5 PPM	This amount can be smelled and is safe for 8 hours exposure without respiratory protection.
Less than 15 PPM	This amount can be smelled and is safe for 10 minutes exposure without respiratory protection.
100 PPM	Eyes, nose, throat, become irritated. No permanent effects. LOSS OF SENSE OF SMELL
500 PPM	Dizziness, headaches, nausea, abdominal pains after 15 minutes, dangerous after 30 minutes exposure, rapidly produces unconsciousness and death if effective resuscitation is not applied.
1000 PPM	Victim is instantly unconscious and breathing stops. Death follows very quickly (1-2 minutes).

Safe storage

- Store cylinders in well- ventilated area
- Store cylinders in upright position
- Separately stored from flammable materials
- Storage temperature not to exceed 52 °C
- “No smoking or open flames” boards to be displayed
- Use “First in first out” inventory system to prevent cylinder storage for long time
- Install leak detection and alarm equipment

Safe handling

- Do not drag, slide or roll cylinder
- Use hand- truck designed for cylinder movement
- Use pressure reducing regulator for safe discharge
- Use check valve to prevent reverse flow
- Never insert object into valve cap opening

Safe use:

- Install automatic monitoring equipment to detect oxygen level and potential explosive air- gas mixture
- Provide gas cabinet enclosure
- Provide local exhaust ventilation
- Wear mandatory PPEs: safety gloves, shoes, glass, chemical- resistant clothing, SCBA.

CAUSTIC SODA

Doc. No. QHSE/TBT/39

Safe storage

- Store in a well-ventilated area separate from incompatible materials.
- Keep amount in storage to minimum
- Store in labelled container
- Vent drums to prevent pressure buildup
- Do not handle swollen drums
- Contain spills by storing in trays made of compatible materials

Safe handling and use

- Avoid generating vapors, mists or dusts
- Use corrosion-resistant equipment or tool
- Never add water to corrosive but add corrosive to cold water
- Never reuse empty container
- Keep container tightly closed when not in use

PPE

- Chemical resistant gloves, boots
- Apron & full face shield

First Aid

- Eyes: Wash with low pressure water for about 30 minutes after thorough cleaning of hands
- Skin: Clean with flowing water for 30 minutes. Remove clothing while washing.
- Ingestion: Do not induce vomiting. Drink large quantities of water or milk and wait for medical personnel
- Inhalation: Move victim to fresh air and summon medical personnel. If not breathing, provide artificial respiration

CAUTION

CAUSTIC SODA
 AVOID SKIN OR EYE CONTACT
 AVOID INHALATION OR INGESTION
 CAN CAUSE SEVERE BURNS WEAR
 PROTECTIVE CLOTHING WHEN WORKING
 WITH CAUSTIC SODA IF SKIN OR EYES
 ARE CONTACTED FLUSH WITH
 WATER FOR 15 MIN.

SODIUM HYDROXIDE

DO NOT TAKE INTERNALLY

WARNING

AVOID CONTACT WITH EYES, MOUTH OR CLOTHING

AVOID BREATHING FUMES

FLAMMABLE - KEEP FIRE AWAY
 USE ONLY IN WELL VENTILATED AREAS.
 USE ONLY WHERE THERE ARE NO OPEN FLAMES
 OR OTHER SOURCES OF IGNITION.

EXTREMELY FLAMMABLE
 KEEP AWAY FROM HEAT, SPARKS AND OPEN FLAME
 KEEP CONTAINER CLOSED

ANTIDOTE:

IMMEDIATELY FLUSH SKIN OR EYES WITH WATER FOR AT LEAST 15 MINUTES. REMOVE PERSON FROM CONTAMINATED AREA. REMOVE ALL CONTAMINATED CLOTHING. STOP WORK IMMEDIATELY. GET MEDICAL ATTENTION. NEVER ATTEMPT TO GIVE ANTIPOISON BY MOUTH. USE AN APPROPRIATE FLUORIDE

<p>HAZARD IDENTIFICATION</p> 	<p>CODE NUMBERS</p> <p>4-SEVERE 3-SERIOUS 2-MODERATE 1-SLIGHT 0-MINIMAL</p>
---	--

<p>EXTINGUISHING METHOD</p> <p>USE "ALCONOL" FOAM, DRY CHEMICAL OR CARBON DIOXIDE. WATER SPRAY MAY BE INEFFECTIVE BUT SHOULD BE USED TO KEEP CONTAINERS COOL.</p>	<p>PERSONAL PROTECTION</p> <p>WEAR EYE PROTECTION AND PERSONAL PROTECTION CONSULT CORRESPONDING MSDS FOR FURTHER HAZARDOUS INFORMATION AND INSTRUCTIONS.</p>
--	---

 ALWAYS Wear
 Chemical Goggles

Chemical Protective Suit

 ALWAYS Wear
 Chemical Resistant
 Gloves

 Transparent Face Shield
 and Hard Hat

Pant Legs OUTSIDE Boots

Chemical Resistant Boots



METHANE

Doc. No. QHSE/TBT/40

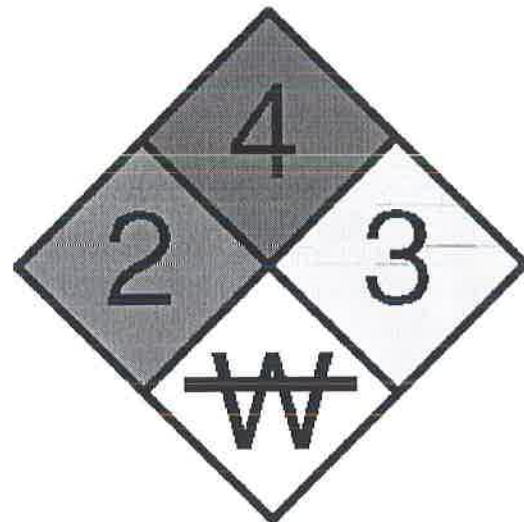
Safe storage

- Area to be cool, well- ventilated, temperature controlled
- No direct sunlight
- No heat and ignition sources in the vicinity
- No combustible and flammable materials nearby



Safe handling

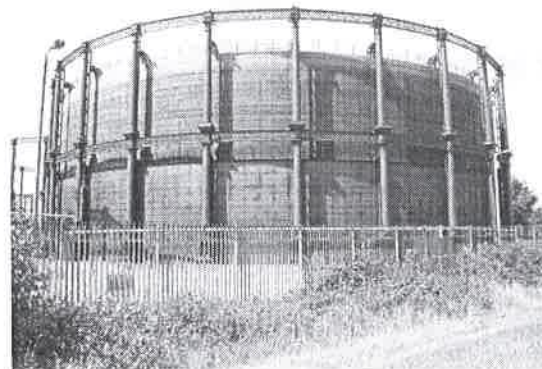
- Check for oxygen level before entering confined spaces containing methane
- Proper ventilation of area containing methane
- Use explosion- proof equipment for transferring methane
- Train employees on hazards while handling methane



Display caution boards

PPE

- Mandatory PPE- goggles, face shield, apron, gloves, boots
- Respiratory apparatus, if required



Gas holder

ELECTRICAL HAZARDS

Doc. No. QHSE/TBT/41

Legal Requirement

OSHA Rules- 1910.303
 Building and Other Construction Workers
 Rules, 1998- Chapter VI, Cl. 47

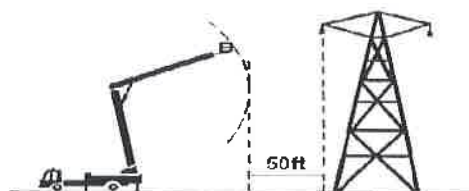


Electric shock

Arcing

Hazards

- Static electricity
- Body contact with electric power source
- Arcing
- Contact with overhead or underground power lines
- Electrical work in wet environment



Risks

- Shocks/ burns/ electrocution
- Fire

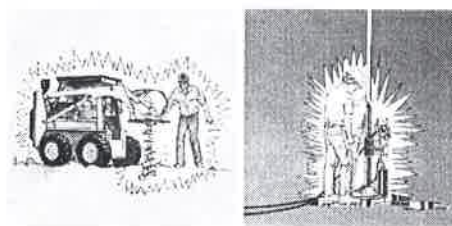


Overhead power lines- clearance

Control measures

Engineering controls

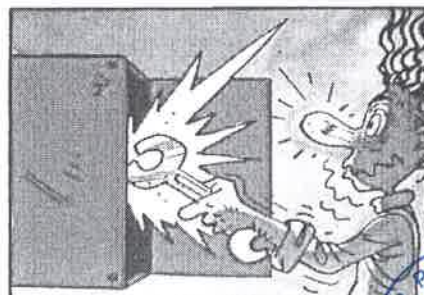
- 1. Static electricity**
 - Bonding of conductive objects using conductor
 - Grounding/ earthing the conductive objects
 - Substituting the conductive object with an alternative
- 2. Body contact with electric power source**
 - Proper insulation of cables
 - Proper earthing of equipment
 - Guard live parts
 - De-energize equipment before maintenance



Underground power lines



Check for wiring insulation damage



De-energize before maintenance

- Use electric-safe tools
- Install protection devices such as GFCI (Ground Fault Circuit Interrupter) and MCB.

3. Arcing

- Design conducting material/equipment layout to meet standard requirement for clearances

- Use of proper rated tools

4. Contact with overhead power lines

- Plan procedure for safe operation of cranes and other equipment at 20ft distance

- Erect scaffolding and ladder with safe clearance

- Use non- conductive tag line

5. Contact with underground power lines

- Before excavation, locate and mark underground power lines

6. Electrical work in wet environment

- Install GFCI (Ground Fault Circuit Interrupter) in circuit

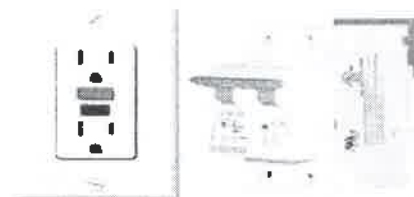
Administrative controls

- Display caution boards
- Good housekeeping to keep electrical work area dry
- Proper maintenance of equipment. Indicate by lockout & tag out.
- Inspect for insulation damage
- In case of overhead lines, shut down supply, if possible, for work and designate a signal person
- Post warning boards along route of underground power lines

PPE

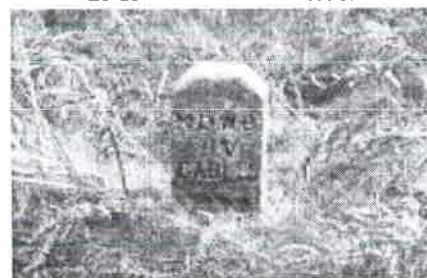
- Non conducting gloves, shoes
- Face shield

Prepared By QHSE Department



GFCI

MCB



Underground cable marking



Lockout & Tag out



Sign boards



PPE

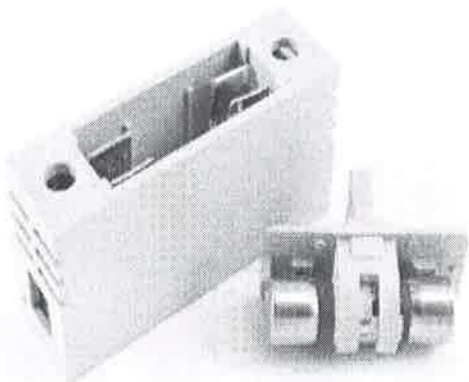
Effect of Electric current in Human body

Current	Reaction
<1 Ma	Not perceptible
1 mA	Faint tingle
5 mA	Slight shock felt, not painful but disturbing
6-25 mA (women) 9-30 mA (men)	Painful shock, loss of muscular control
50-150 mA	Extreme pain, respiratory arrest. Death possible
1000-4300 mA	Rhythmic pumping action of heart ceases. Death likely from nerve damage and muscular contraction
10000 mA	Cardiac arrest and severe burns. Death probable
15000 mA	Lowest overcurrent at which typical fuse or circuit breaker opens a circuit. Death certain



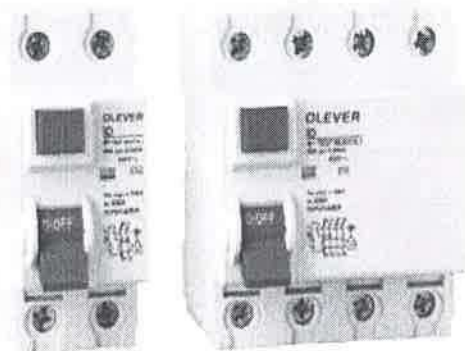
FUSE

- A fuse is a part of the circuit which consists of conductor which melts easily and breaks the connection when current exceeds the predetermined value.
- If fault occurs in the network mainly phase to phase short circuit fault or phase to ground fault, the network current crosses the rated limits.
- This high current may have very high thermal effect which will cause a permanent damage to the valuable equipment connected in the electrical network.
- An electrical fuse is a weakest part of an electrical circuit which breaks when more than predetermined current flows through it.
- Fuse is used in power distribution boxes, electrical panels (MCC, PMCC, MLDB)



EARTH LEAKAGE CIRCUIT BREAKER (ELCB)

- The main purpose of Earth Leakage Circuit Breaker (ELCB) is to prevent injury to humans and animals due to electric shock.
- It detects small stray voltages on the metal enclosures of electrical equipment, and interrupts the circuit if a dangerous voltage is detected.
- The ELCB detects fault currents from live to the earth (ground) wire within the installation it protects
- If sufficient voltage appears across the ELCB's sense coil, it will switch off the power, and remain off until manually reset.
- ELCB used normally for lighting system, in-house wiring at our sites.
- Usually, two types of ELCB are generally used- voltage sensing ELCBs and current sensing ELCBs.



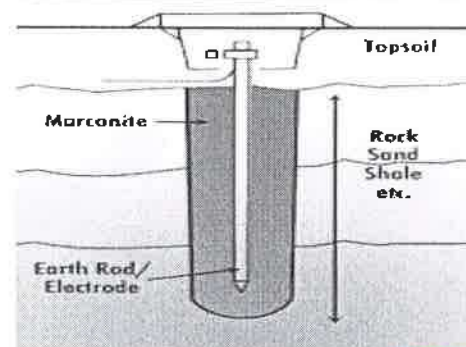
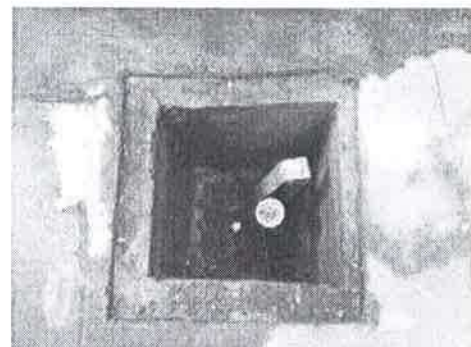
MINIATURE CIRCUIT BREAKER (MCB)

- Miniature Circuit Breaker (MCB) automatically switches off the electrical circuit in over load condition as well as faulty condition thus preventing shock.
- Nowadays, MCB is mostly used instead of backdated fuse unit.
- MCB is much more sensitive to over current than fuse.
- The switch operating knob comes at its off position during tripping, the faulty zone of the electrical circuit can easily be identified. But in case of fuse, fuse wire should be checked by opening fuse grip or cutout from fuse base, for confirming the blow of fuse wire.
- Quick restoration of supply cannot be possible in case of fuse as because fuses have to be re-wired or replaced for restoring the supply. But in the case of MCB, quick restoration is possible by just switching on operation.
- Handling MCB is more electrically safe than fuse.
- One disadvantage of MCB over fuse is that it is more costly.



EARTH PIT

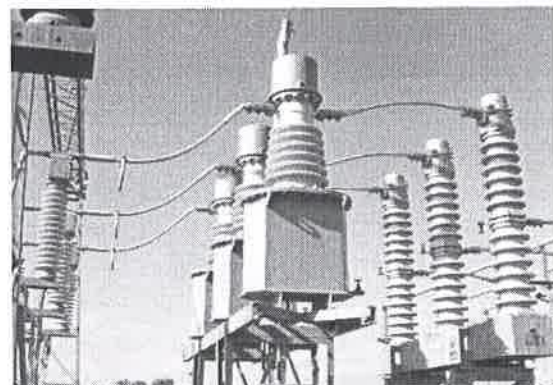
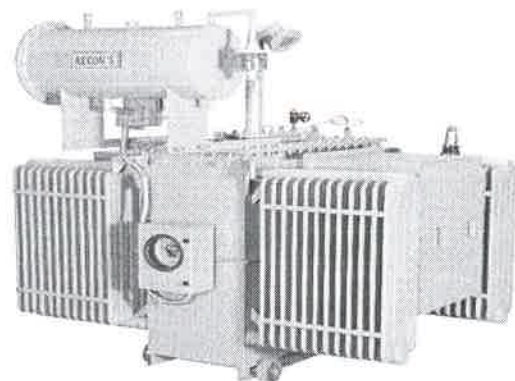
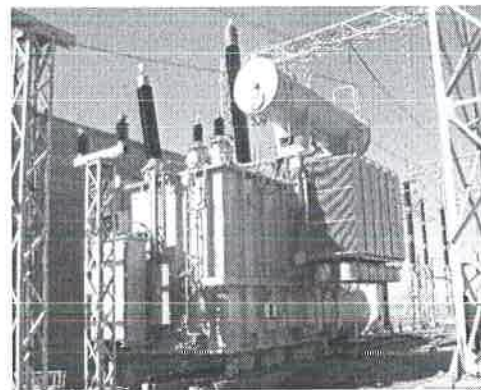
- In electrical system, an Earth pit refers to a pit, dug in earth with some standard filling.
- Primarily Earth pits are used for safety towards short circuits.
- If a machine or equipment is properly grounded into the earth, it has less chances to get damaged. In case of short circuit or any other accident, the current will rush to the lowest resistance path i.e. into the earth. And an OCR (over current relay) will sense the high current and will cut off the supply.
- Pipe and rod earthing is used in our sites.
- The earth wire is fastened to the pipe embedded in wet soil



TRANSFORMERS

- Transformer is a static device which transforms AC electrical power from one voltage to another voltage keeping the frequency same by electromagnetic induction.
- Types of transformers based on application: Electrical Power Transformer, Distribution Transformer & Instrument Transformer
- Power transformers are used to increase (or step-up) voltage before transmitting electrical energy over long distances through wires
- Distribution transformers are used in distribution network and these are of lower rating.
- Current transformer & potential transformer are used for relay and protection purpose in electrical power system
- Power transformers are used to increase (or step-up) voltage before transmitting electrical energy over long distances through wires thus reducing losses
- Instrument transformers are used in controlling and protecting circuits, to operate relays, circuit breakers etc.
- For safe working of transformers, it should have routine maintenance.
- Regular inspection of oil and winding temperature meter reading to be conducted

- It should be provided with lightning arrester, Buchholz relay and explosion vent for protection.
- It should be earthed.



LIGHTING

Legal Requirement

Factories Rules, 1950- Chapter III, Cl. 30, 31

IS 6665: Code of Practice for Industrial Lighting

Hazards

Insufficient lighting at

- Access roads
- Lab, process area, stores, night time construction works leading to tripping, falling, slipping hazard

Over-lighting hazardous due to

- Glaring

Risks

In view of insufficient lighting, risks are:

- Road accidents causing death or body injury
- Body injury to operators, store keeper, construction workers, lab chemist/ technician.

In view of over lighting, risks are:

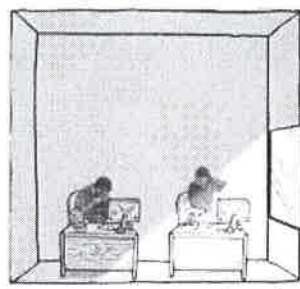
- Damage to vision



Less lighting of roads



Road accident



Light glare

Control Measures

Doc. No. QHSE/TBT/47

Engineering controls

- Provide average illuminance as following:

Areas of lighting	Average illuminance
Internal roads	20 lux
Construction areas	150 lux
Control rooms/ labs	300 lux
Walkways/ Platforms	50 lux
Pump houses & treatment plant housing	200 lux
DG/ battery room/ Electrical switch room/ HV substation	150 lux

(Source: IS 6665- Code of Practice for Industrial Lighting)

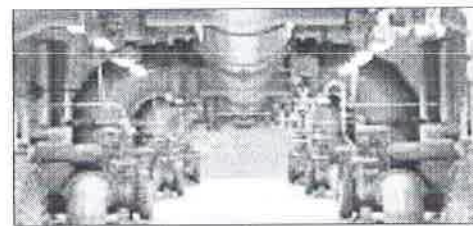
- Angle of lighting such that no glare or shadow is formed
- Install lighting at elevated level not at eye level

Administrative controls

- Pictorial display of reflective caution and warning signs such as speed limits
- Proper maintenance of lighting
- Toolbox talks/ HSE meeting discussion on significance of lighting

PPE

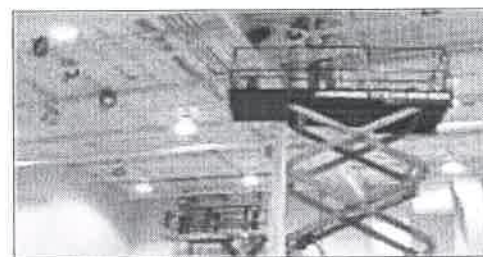
- Mandatory PPE: safety helmet, shoes, gloves
- High visibility clothing
- Clear glass



Adequate lighting



Speed limit caution sign



Maintenance



HEAT STRESS

Legal Requirement

Factories Rules, 1950- Chapter III, Cl. 17A

Hazards

- Exposure of UV rays / Heat exposure from equipment

Risks

- Heat stroke
- Heat exhaustion

Control measures

Engineering controls

- Isolate/ eliminate equipment producing heat
- Provide insulators for heat emitting operations
- Maintain temperatures about 27°C using coolers or fans

Administrative controls

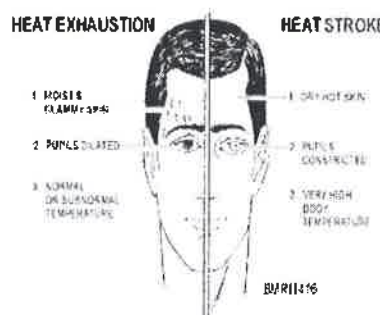
- Provide drinking water to keep worker hydrated
- Provide sheds for workers
- Employee rotation
- Training on first aid and to recognize heat stress

PPE

- Wide brim hard hat
- Sun safe goggles
- Mandatory PPE: gloves, shoes



Working in hot environment



Heat stress



First- aid for heat stress

VENTILATION

Doc. No. QHSE/TBT/49

Legal Requirement

OSHA Rules- 1910.24, 1926.57
Factories Rules, 1950- Chapter III, Cl. 17A

Hazards

- Air/ oxygen deficiency

Risks

- Asphyxiation

All site personnel and visitors to site can be affected by deficiency of air/ oxygen.

Control measures

Engineering Controls

- Design openings in the room not less than 15% of floor area
- Install mechanical means of ventilation such that fresh air per hour is 6 times the capacity of room and is evenly distributed
- Monitoring oxygen content at workplace

Administrative controls

- Maintenance and upkeep of fans and exhaust
- Pictorial display of asphyxiation hazard

PPE

- Respiratory apparatus, full body harness; as required
- Mandatory PPE: helmet, gloves, shoes



Victim of oxygen deficiency at workplace



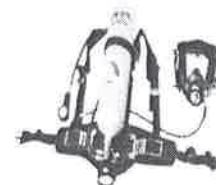
Mechanical means of ventilation



Oxygen content determination



Warning sign



Respiratory apparatus

HUMIDITY

Legal Requirement

Factories Rules, 1950- Chapter III, Cl. 18

Hazards

- Humidity <40% or >70%

Risks

- Uncomfortable working condition
- Fatigue in high humidity conditions and dehydration in low humid conditions
- Rusting damage to equipment in high moisture conditions- material loss

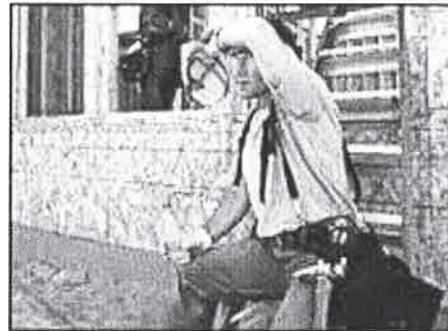
Control measures

Engineering Controls

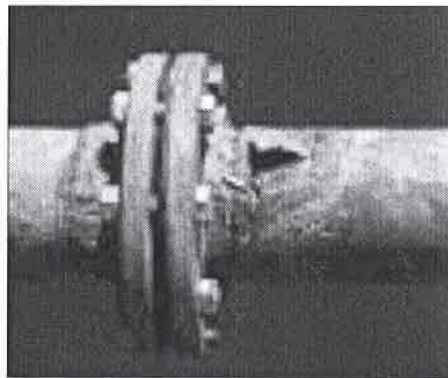
- Install local exhaust, fans or air conditioning if humidity > 70%
- Install artificial humidifier if less than 40%

Administrative controls

- Maintenance and upkeep of fans and exhaust
- Provision of water for workers



Uncomfortable worker



Rusting damage



Artificial humidifier

DRINKING WATER

Legal Requirement

OSHA Rules- 1926.51

Factories Rules, 1950- Chapter III, Cl. 34-39



Drinking water facilities for workers

Hazards

- Providing bacterial drinking water

Risks

- Water borne diseases such as diarrhea, cholera, typhoid, etc.



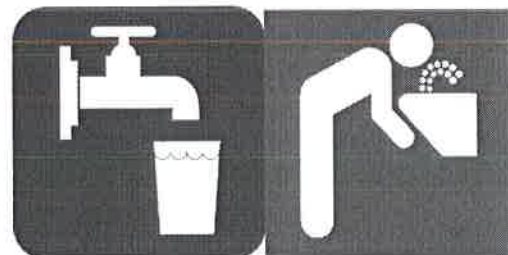
Monitoring of drinking water

All humans inside site consuming unfit water may face these hazards.

Control measures

Engineering controls

- Place drinking water facility 6m away from any source of contamination
- Regular monitoring of water quality



Administrative controls

- Provide drinking water facility at convenient locations for workers
- The Facility points should be marked in language understood by majority of workers



Sign boards

CANTEEN/ EATING AREA/ LUNCHROOM

Legal Requirement

Building and Other Construction Worker Rules, 1998- Chapter XXVIII, Cl. 244
Factories Rules, 1950- Chapter V, Cl. 65, 72



Eating area

Hazards & Risks

- Health problems due to unhygienic conditions in the eating area

All humans inside site consuming unhygienic food may face these hazards.



Waste containers

Control measures

Engineering controls

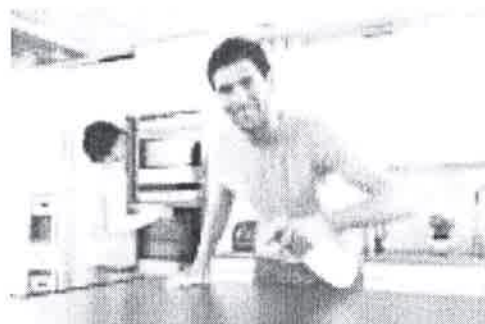
- Ensure hygienic condition in the kitchen and eating area
- Provide waste containers to prevent food littering



Sign boards

Administrative controls

- Eating area to be provided if the no. of employees exceed 250.
- Display sign boards indicating eating area in language understood by majority of workers
- Proper housekeeping



Housekeeping

TOILETS

Doc. No. QHSE/TBT/53

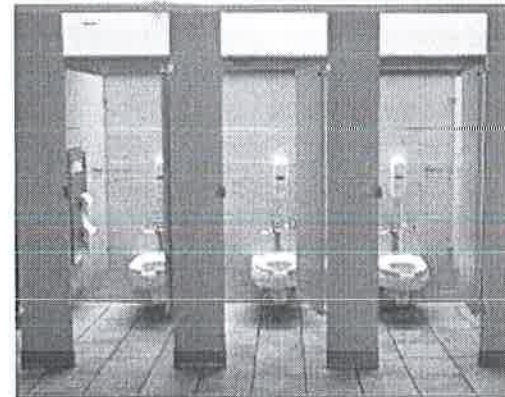
Legal Requirement

Building and Other Construction Worker Rules, 1998- Chapter XXVIII, Cl. 243
Factories Rules, 1950- Chapter V, Cl. 40-49

Control measures

Administrative controls

- Provide covered toilets
- Provide separate toilets for men and women
- Adequate lighting , ventilation and continuous water supply
- Regular cleaning and maintenance
- Display sign boards in the language understood by majority of workers
- Appoint supervisors for regular inspection of cleanliness and stock of toiletries
- Provide dustbins for proper storage of waste such as paper, napkins, etc.



Covered and well-lighted toilets



Regular cleaning of toilet is essential

PPE

The janitors to be provided with

- Mask
- Gloves
- Boots
- Coverall



Sign boards

MEDICAL FACILITY

Doc. No. QHSE/TBT/54

Legal Requirement

Building and Other Construction Worker Rules, 1998- Chapter XXIV
Factories Rules, 1950- Chapter V, Cl. 62-64



Hazards & Risks

- No first aid medical service can result in death

Any injured personnel in site premises can face this hazard.



First Aid Box



Certified Aider

Control measures

Administrative controls

- One first-aid box to be provided for each 150 workers
- First-aid treatment to be given by government certified medical personnel
- If employees more than 500 in number, ambulance, room containing prescribed equipment, medical and nursing staff to be provided.
- Regular medical examination and maintain Health Register
- Create awareness and provide training on medical emergencies
- Display charts of first aid treatment



Ambulance service



First aid chart

FIRST AID KIT

Doc. No. QHSE/TBT/55

Legal requirements

Factories Rules, 1950- Chapter V, Cl. 63

OSHA Rules- 1910. 266 App A

Employer to provide first aid kit for every 150 workers

It is equally important to know the contents of first aid kit and its use.

- **Absorbent Gauze:** Use these to clean a wound or to apply first-aid or antiseptic cream.
- **Adhesive Bandages:** Different sizes and shapes are provided to protect minor scrapes and cuts after they have been cleaned and medicated.
- **Adhesive Tape:** For securing wound dressings or giving additional protection over bandages.
- **Antiseptic Soap or Pads:** For cleaning skin or wounds.
- **Bandage Compresses:** Use these for applying pressure to a large wound or scrape that is bleeding. Place the compress over the wound and apply pressure to reduce bleeding.
- **CPR Mouth Barrier:** (e.g.: Micro shield) for use as a mouth barrier in CPR resuscitation.
- **Disposable Latex Gloves:** The First Responder to an injury should use this protection to prevent contact with an injured person's bodily fluids (blood, saliva, etc.).
- **Elastic Bandages:** For wrapping sprains and to help hold dressings or cold packs in place.
- **Eye Wash:** The wash bottles in a first-aid kit are typically small. Use them to rinse very minor contaminants from the eye.


Absorbent gauze

Adhesive tapes and bandages

CPR mouth barrier

Disposable gloves

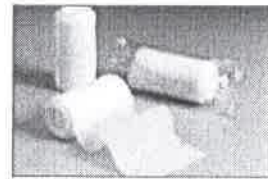
Elastic bandage

Eye wash

- **First-Aid Manual:** A brief guide to emergency first-aid care.
- **First-Aid Ointment or Antiseptic Cream:** Apply this salve to wounds that have been cleaned prior to applying a dressing.
- **Gauze Roll:** Gauze is used to hold flat, non-adhesive bandages in-place prior to taping. It is not a bandage, because most gauze is not a sterile dressing.
- **Instant Cold Pack:** Place the pack on a sprain, fracture, or severe bruise to reduce swelling.
- **Microbial Hand Wipes:** For First Responders' clean-up after providing emergency care.
- **Scissors:** For cutting clothing, tape or bandages and providing a better fit around the wound.
- **Triangular Bandage:** Used to create a sling for supporting an injured hand or arm or as protection over a large dressing.
- **Tweezers:** For removing foreign bodies from minor injuries. Not for use on eye injuries.
- **Wound Cleanser Wipes:** Use these singlet wipes to clean minor scrapes or cuts before applying antiseptic and adhesive bandages.

Use first aid kits for minor injuries and during emergencies before medics arrive to treat serious injuries.

Be sure to let your supervisor know if your kit needs to be restocked.


Antiseptic cream

Gauze roll

Instant cold pack

Scissors

Triangle bandage

Tweezers

Wound cleanser wipes

CPR- CARDIOPULMONARY RESUSCITATION

Doc. No. QHSE/TBT/56

It is an emergency procedure performed in an effort to manually preserve intact brain function until further measures are taken to restore spontaneous blood circulation and breathing in a person who is in cardiac arrest.

Procedure

1. CALL

Check the victim for unresponsiveness. If the person is not responsive and not breathing or not breathing normally. Call 911 and return to the victim. In most locations the emergency dispatcher can assist you with CPR instructions

2. PUMP

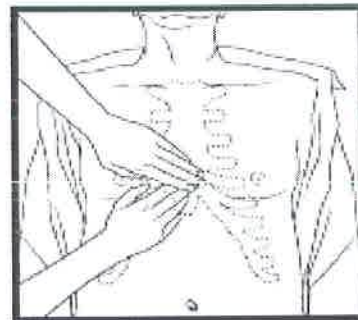
If the victim is still not breathing normally, coughing or moving, begin chest compressions. Push down in the center of the chest 2 inches 30 times. Pump hard and fast at the rate of at least 100/minute, faster than once per second.

3. BLOW

Tilt the head back and lift the chin. Pinch nose and cover the mouth with yours and blow until you see the chest rise. Give 2 breaths. Each breath should take 1 second.

CONTINUE WITH 30 PUMPS AND 2 BREATHS UNTIL HELP ARRIVES

This ratio is the same for one-person & two-person CPR. In two-person CPR the person pumping the chest stops while the other gives mouth-to-mouth breathing.



MUSCULOSKELETAL DISORDERS

Legal Requirement

OSHA Rules

Hazards

- Repeated motions
- Forceful exertions
- Awkward posture
- Mechanical compression
- Lack of rest in works

Risks

- Cumulative Trauma Disorder

All workers doing hard physical labour can be affected.

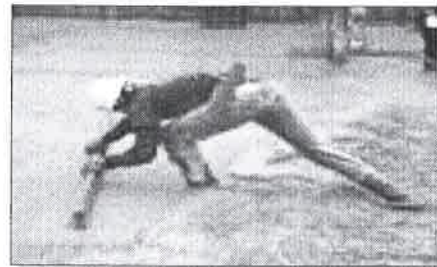
Control measures

Engineering controls

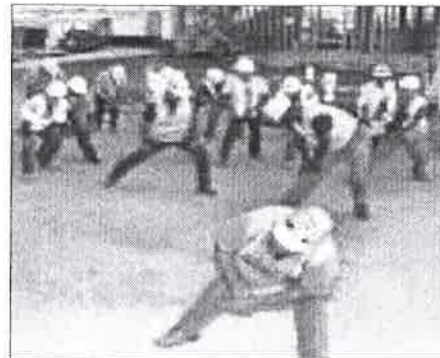
- Design work area with ergonomic consideration (fit the job to person and not the person to job)
- Provide tools with long, smooth, rounded handle

Administrative controls

- Job rotation
- Regular breaks
- Set employee- friendly conditions such as temperature, lighting and humidity
- Incorporate pre-work stretch and flex program



Awkward posture



Pre-work stretch and flex program

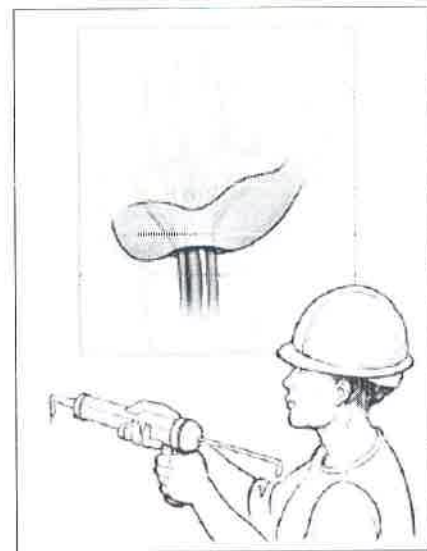
The most well- known CTD related to construction workers are:

Tendonitis:

- Inflammation of the tendons (bundles of fibrous tissue that connect the muscles to the bones) that occurs when a muscle/tendon is repeatedly used or tensed.
- Commonly affected areas are the wrists, elbows, and shoulders.

Carpal tunnel syndrome (CTS):

- Compression of the median nerve as it passes through the carpal tunnel in the wrist.
- Symptoms: numbness, burning, and tingling in the first 3 ½ digits.
- If left untreated: loss of grip strength, clumsiness, increased pain at night, and possibly permanent loss of hand function.
- Tasks like electrical work and inserting caulking in windows require repetitive bending and flexing of the fingers and wrists.



Carpal tunnel syndrome



Rotator cuff tendonitis

Rotator cuff tendonitis:

- Most common shoulder tendon disorder.
- Associated with work that requires the elbow to be in an elevated position for long periods of time, such as when performing overhead tasks.

- Results “frozen shoulder” syndrome, which may include severe pain and the loss of shoulder function.
- Jobs like sheet metal work, plumbing, painting, and drywall installation can all contribute to the development of rotator cuff tendonitis

Doc. No. QHSE/TBT/57

Golfer’s elbow (Medial Epicondylitis):

- Associated with tasks that require repeated or forceful rotation of the forearm and bending of the wrist at the same time.
- Tasks that require the use of poorly designed tools contribute to the frequency of this CTD such as screwing nuts, bolts, nails, etc.



Golfer’s elbow

Thoracic outlet syndrome:

- Involves the compression of nerves from the spine and blood vessels from the heart that go to the muscles in the arms.
- Performing overhead tasks for extended periods of time and bending over can cause this condition.
- Like carpal tunnel syndrome, symptoms of thoracic outlet syndrome include numbness in the fingers along with weakened wrist pulse and the sensation of one’s arm “falling asleep.”

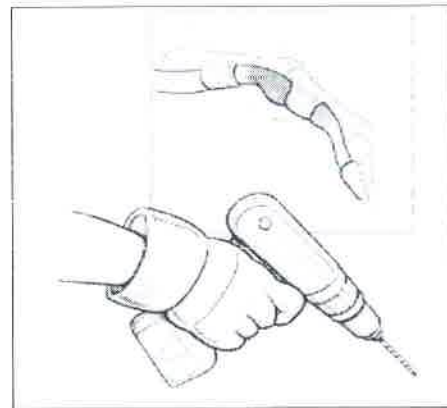


Thoracic outlet syndrome

Raynaud's syndrome/ "vibration white finger" / "hand-arm vibration syndrome" (HAVS)

Doc. No. QHSE/TBT/57

- Condition caused by forceful gripping and/or prolonged use of vibrating tools such as hand-held power drill, power saws, needle guns, chipping hammers, and rotary hammer drills.
- The risk is even higher when vibrating tools are used in cold temperatures.
- Symptoms: numbness and tingling in the fingers, skin that turns pale and cold, and ultimately loss of sensation and muscle control in the fingers and hands.



Raynaud's syndrome

Trigger finger

- Occurs when the tendon sheath of a finger is so swollen that the tendon becomes locked in the sheath.
- Associated with using tools that have handles with hard edges or ridges, and/or repetitive bending of the fingers with continued forceful gripping of equipment.
- Although severe pain is uncommon, attempting to move the finger will cause snapping and jerking movements.



Trigger finger

WATER POLLUTION

Legal Requirement

Water (Prevention and Control of Pollution) Rules, 1975

Hazards

- Disposal of untreated waste water into water bodies

Risks

- Water borne disease in humans
- Decline in marine life

All humans and marine ecosystem coming in contact with polluted water can be affected.

Control measures

Engineering controls

- Treat and dispose of domestic sewage and chemical effluent from plants.

Administrative controls

- Monitoring of discharge as per Schedule VI of Environment (Protection) Rules, 1986.

PPE

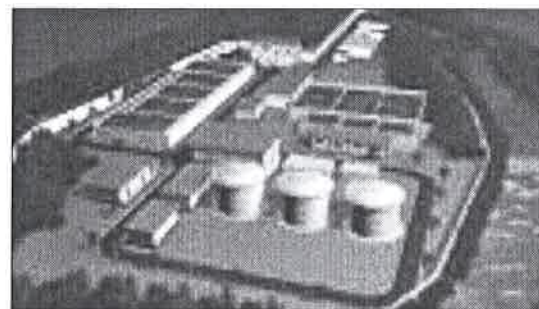
- Hand gloves
- Gum boots
- Coverall



Disposal of untreated waste water



Marine ecosystem destruction



Waste water treatment plant



LAND POLLUTION

Doc. No. QHSE/TBT/59

Legal Requirement

Municipal Solid Waste (Management and Handling) Rules, 2000
 Batteries (Management and Handling) Rules, 2001

Hazards

- Open dumping of wastes
- Eating fruits and vegetables that have been grown in polluted soil.
- Breathing in polluted dust or particles

Risks

- Very bad smell and odour
- Affect human respiratory system
- Cause various type of cancer

All humans coming in contact with polluted water as a result of waste dumping can be affected.

Control measures

Engineering controls

- Proper collection, segregation, storage, treatment, disposal (or landfilling) of waste

Administrative controls

- Provide colour-coded and labelled containers for waste segregation and storage
- Provide sign boards to prevent littering

PPE

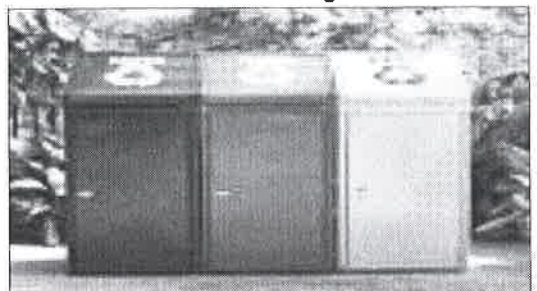
- Hand gloves
- Gum boots
- Coverall



Open dumping



Landfilling



Colour coded waste containers provided for segregated collection and storage of solid waste



Sign boards

AIR POLLUTION

Legal Requirement

Air (Prevention and Control of Pollution) Rules, 1982
National Ambient Air Quality Standards, 2009



Inhalation of toxic gas/emission

Hazards

Inhalation of

- toxic gas emissions from processes,
- CO emissions from vehicle exhaust
- fugitive dust



Flaring of gases

Risks

- Respiratory health problems

All humans, site personnel as well as visitors, coming in contact with polluted air can be affected.



Water sprinkling

Control measures

Engineering controls

- Flare the gases at outlet
- Adopt air pollution control measures
- Water sprinkling to prevent fugitive dust

Administrative controls

- Display warning/ caution boards.
- Restrict vehicle speed

PPE

- Respirators
- Nose Masks



Sign boards



NOISE POLLUTION

Doc. No. QHSE/TBT/61

Legal Requirement

OSHA Rules- 1910.95
Noise Pollution (Regulation and Control)
Rules, 2000

Noise level- Exposure Limit

Noise level	Exposure Limit
90dBA	8.0 hours
92dBA	6.0 hours
95dBA	4.0 hours
100dBA	2.0 hours
102dBA	1.5 hours
105dBA	1.0 hours
110dBA	30 minutes
115dBA	15 minutes

Hazards

- Exposure to noise beyond permissible limit as in Noise Pollution Rules

Risks

- Hearing impairment/ loss
- Hypertension
- Ischaemic heart disease.
- Increased frequency of headaches

All site workers, plant operators or visitors exposed to high noise can be affected.



Acoustic enclosure

Control measures

Engineering controls

- Design workplace such that all noisy equipment are isolated and separated from quiet areas.
- Provide enclosures for noisy equipment

Administrative controls

- Display sign board
- Proper maintenance and lubrication of equipment



Sign boards

PPE

- Ear plugs
- Earmuffs
- Canal caps



Prepared By QHSE Department

FLOODING

Doc. No. QHSE/TBT/62

Legal Requirement

Building and Other Construction Worker Rules, 1998- Chapter IX

Hazards

- Drowning/ falling
- Oxygen deficiency
- Electrocuton
- Hit by materials

Risks

- Injury /Death

Control measures

Engineering controls

- Proper insulation to be made for underground cable routing as per IEE rules.
- No live electrical cable to be laid near water or any other location which has the potential to harm others.
- Routine inspection for leakage in pipelines
- Provide adequate supply of ventilation while working underwater- cleaning of tanks, submerged pumps.
- Tripping facility should be available in all electrical equipment's in case of any leakage in current.

Administrative controls

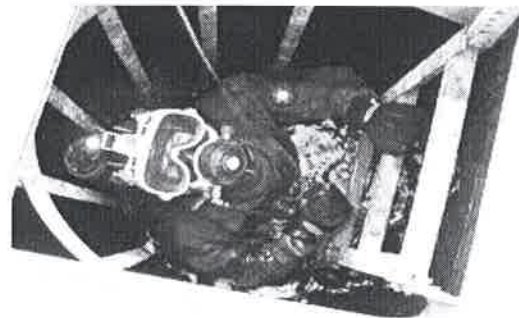
- Provide training for personnel working near water bodies.
- Shut off power supply in the event of flood
- Emergency Escape plan should be made available for all the possible scenarios.

PPE

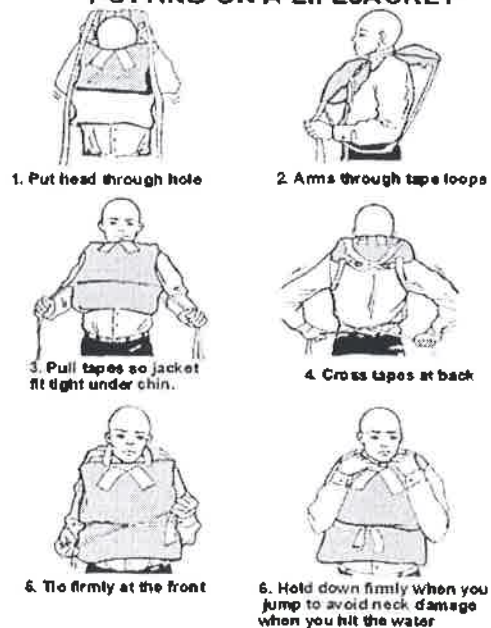
- Life jacket/lifebuoy
- SCBA (Self-contained Breathing apparatus)
- Swimmer goggles



PPE to be worn while entering water retaining structures



PUTTING ON A LIFEJACKET



EARTHQUAKE SAFETY

Before Earthquake

- Teach all members of your family about earthquake safety. This includes: 1) the actions you should take when an earthquake occurs, 2) the safe places in a room such as under a strong desk, along interior walls, and 3) places to avoid such as near windows, large mirrors, hanging objects, heavy furniture and fireplaces.
- Stock up on emergency supplies. These include: battery operated radio (and extra batteries), flashlights (and extra batteries), first aid kit, bottled water, two weeks food and medical supplies, blankets, cooking fuel, tools needed to turn off your gas, water and electric utilities.
- Arrange your home for safety: Store heavy objects on lower shelves and store breakable objects in cabinets with latched doors. Don't hang heavy mirrors or pictures above where people frequently sit or sleep.
- Anchor heavy appliances and furniture such as water heaters, refrigerators and bookcases.
- Store flammable liquids away from potential ignition sources such as water heaters, stoves and furnaces.
- Learn where the main turn-offs are for your water, gas and electricity. Know how to turn them off and the location of any needed tools.

During Earthquake

- If you are indoors, stay there. Quickly move to a safe location in the room such as under a strong desk, a strong table, or along an interior wall. Avoid taking cover near windows, large mirrors, hanging objects, heavy furniture, heavy appliances or fireplaces.
- If you are cooking, turn off the stove and take cover.
- If you are outdoors, move to an open area where falling objects are unlikely to strike you. Move away from buildings, power lines and trees.
- If you are driving, slow down smoothly and stop on the side of the road. Avoid stopping on or under bridges and overpasses, or under power lines, trees and large signs. Stay in your car.

What to Do During an Earthquake

If you are inside when the shaking starts, you should:

 <p>Drop, cover, and hold on. If you are sitting at a desk or table, drop to the floor under it. If you are standing, drop to the floor and hold on to a sturdy object.</p>	 <p>If you are elderly or have a mobility impairment, remain where you are, bracing yourself in place.</p>	 <p>If you are in bed, stay there. Hold on, and protect your head with a pillow. If you are in bed, stay there. Hold on, and protect your head with a pillow. If you are in bed, stay there. Hold on, and protect your head with a pillow.</p>
 <p>Stay away from windows. If you are near a window, move away from it. If you are near a window, move away from it.</p>	 <p>Stay indoors until the shaking stops and you are sure it is safe to exit. If you are outdoors, move to an open area. If you are outdoors, move to an open area.</p>	 <p>Check for and extinguish small fires, and exit via the stairs.</p>

If you are in a coastal area:

 <p>Drop, cover, and hold on during an earthquake and then move immediately to higher ground when the shaking stops.</p>	 <p>Find a clear spot away from buildings, trees, streetlights, and power lines.</p>
--	---

If you are outdoors when the shaking starts, you should:

 <p>Drop to the ground and stay there until the shaking stops. If you are outdoors, drop to the ground and stay there until the shaking stops.</p>
--

If you are in a vehicle, pull over to a clear location, stop, and stay there with your seatbelt on until the shaking stops.

If you are in a mountainous area or near unstable slopes or cliffs, be alert for falling rocks and other debris that could be loosened by the earthquake.

After Earthquake

- Check for injuries, attend to injuries if needed, help ensure the safety of people around you.
- Check for damage. If your building is badly damaged you should leave it until it has been inspected by a safety professional.
- If you smell or hear a gas leak, get everyone outside and open windows and doors. If you can do it safely, turn off the gas at the meter. Report the leak to the Gas Company and fire department. Do not use any electrical appliances because a tiny spark could ignite the gas.
- If the power is out, unplug major appliances to prevent possible damage when the power is turned back on. If you see sparks, frayed wires, or smell hot insulation turn off electricity at the main fuse box or breaker. If you will have to step in water to turn off the electricity you should call a professional to turn it off for you.



COLOR CODING OF WASTE BINS

Legal Requirement

Hazardous Waste Rules, 2008
Municipal Solid Waste Rules, 2000

HSE Management System, OCP/016- Handling of Waste states the following color code or painted waste bins are to be provided in EPC sites and O&M plants:

RED: Hazardous waste (oil, batteries, paint, ETP sludge, resins, used membranes, etc.)

YELLOW: Non- hazardous recyclable waste (plastic, scrap metal, unserviceable equipment, electrical scrap, etc.)

GREEN: Bio-degradable waste (paper, wood, food waste, etc.)

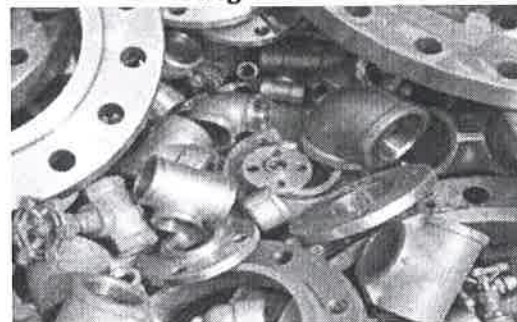
- The waste bins provided should have lids
- Employees should be given training on color coding of bins and segregation of waste
- Waste should be frequently collected by housekeeping / contractor's staff
- Recyclables should be sold to authorized vendors
- Hazardous waste to be disposed as per rules
- Bio-degradable waste to be composted or landfilled at designated place



Hazardous waste



Bio- degradable waste



Recyclable waste

STACKING OF MATERIALS

Doc. No. QHSE/TBT/65

Legal Requirement

Building and Other Construction Worker Rules, 1998- Chapter XVIII

Hazards

- Falling of materials/ personnel
- Tripping hazard
- Slipping hazard

Risks

- Body injury/ death

Control measures

Engineering control

- No overloading of platform beyond its loading capacity
- No stacking beyond a height making the pile unstable
- Beyond 1.5m height of pile, safe means of access to be provided
- No stacking near pits, excavations, etc.

Administrative controls

- Supervisor to be appointed for stacking operation
- Pictorial warning signs to be displayed

PPE

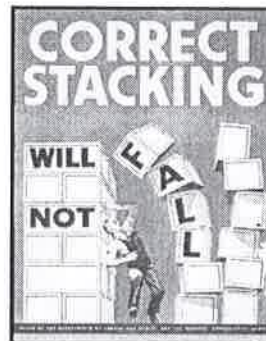
- Safety helmet
- Safety shoes
- Gloves
- Mask, if dust or powdery substance handled



No overloading platform and no stacking beyond 1.5m



Safe access to be provided to prevent fall of personnel



Display posters and sign boards

STORAGE OF CEMENT

Doc. No. QHSE/TBT/66

Good practices for storage of cement are as follows:

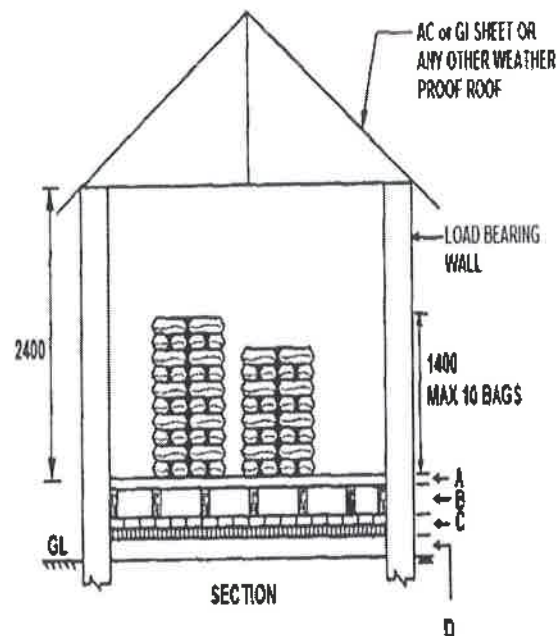
- Check and ensure cement bags are not torn
- Cement shall be stored in shed which is dry, leak proof and as far as possible it shall be moisture proof.
- Minimum no. of windows or ventilators in the shed
- Do not allow workers to use hook or sharp tools to lift bags
- Check for roof leakage, if found, repair immediately
- Always store cement away from the wall
- Do not store cement directly on the floor.
- Use wooden planks/ pallets or polythene sheets to avoid dampness
- During stacking, not more than 8 bags are stacked vertically.
- Always adopt first in first out approach (FIFO system).
- Minimum access of 750 mm shall be left all-around the walls.
- Place board indicating the Batch, Grade, quantity etc. to know age of cement.
- Cements of different types and grades shall be stacked separately with proper identification tags.
- PPE to be provided while handling cement bags and hand trolley or fork lift shall be provided.

Bad Storage



Bags stored directly on floor, close to walls and more than 8 bags are stored vertically

Good Storage



A. WOODEN PLANKS; B. WOODEN BATTENS;
C. 150 DRY BRICKS IN TWO LAYERS OR LEAN CEMENT CONCRETE; D. CONSOLIDATED EARTH

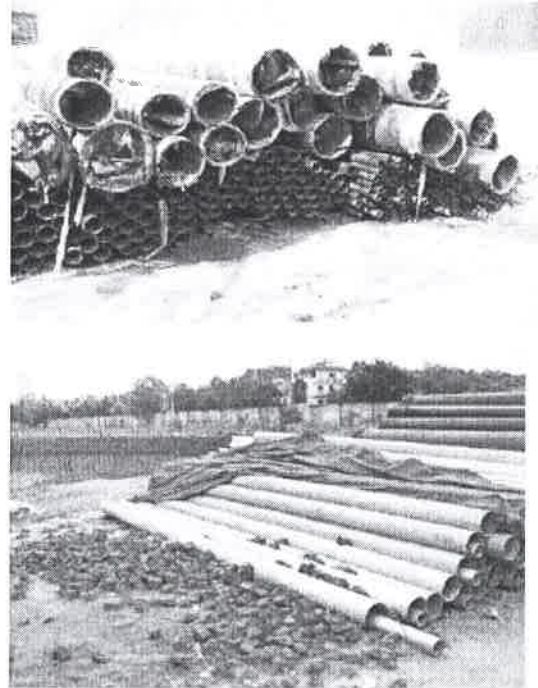
STORAGE OF STEEL PIPES

Doc. No. QHSE/TBT/67

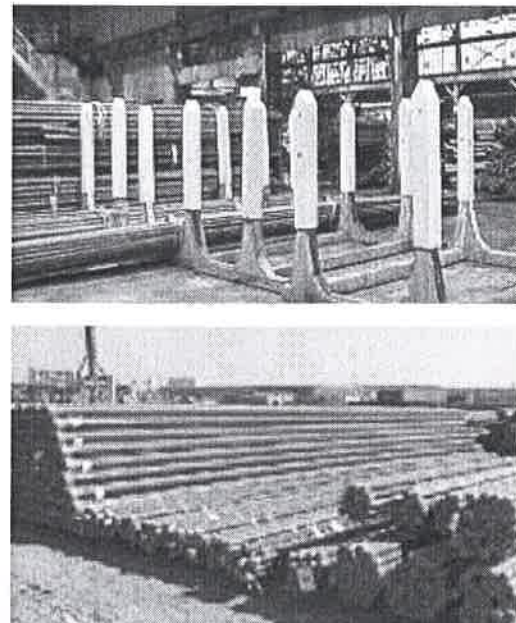
Good practices for storage of steel pipes are as follows:

- The area for storage shall be levelled uniform, brick soled or bitumen topped, fenced and well lit.
- All steel pipes of OD ≤ 25 mm shall be stacked in racks and of OD > 25 mm shall be stacked on wooden sleepers with pipe end protected with end caps.
- The pipes of different sizes and material grades shall be stored separately
- For pipes with beveled weld edges, damage to the same shall be avoided during handling and storage and transportation to work area, with edge protection like, providing plastic end caps.
- Metal tag to be tied on one of the pipes in the lot or the details shall be marked on the pipe itself for easy identification and traceability.
- Arrange a board to display the Pipe details near the storage area
- The pipe surface shall be inspected periodically for deterioration, if any, preservation carried out by spraying rust preventive oil or any other suitable media to prevent from surface and internal corrosion.

Bad storage



Good storage



STORAGE OF RUBBER LINED VESSELS

Doc. No. QHSE/TBT/68

Good practices for storage of rubber-lined vessels are as follows:

- All openings to rubber lined vessels should be closed as much as possible to prevent attack from hazards
- The ends of rubber lined pipe should be blanked off and kept in such a way until ready for use.
- All portable rubber covered items should be covered for protection.
- All nozzles and other openings shall be closed or covered with rubber gasket and blind flange and filled with potable water. The water inside shall be periodically drained out and refilled with fresh water.

ALL-WEATHER STORAGE

- Rubber linings should never be exposed to direct sunlight or direct outdoor weathering, for periods longer than a few days.
- Lining should be protected from sunlight.
- If no other alternatives are possible, linings should be periodically painted with Chlorobutyl, Neoprene or Hypalon based coatings

SUMMER STORAGE

- If possible, store in shaded areas away from of sun.

- Paint outside of tanks with aluminium or white paint, or cover with a tarpaulin.
- Closed tanks should be kept ventilated.

WINTER STORAGE

- Equipment should be protected as much as possible from cold weather conditions by covering with tarpaulins, erecting temporary shelters, etc.
- Tanks containing solutions must be emptied if temperatures drop below the freezing point (of the solution contained therein).
- Equipment should be handled very carefully and protected from getting subjected to external forces (sudden blows, flexing, twisting, etc.).
- Sudden temperature changes also are to be avoided.



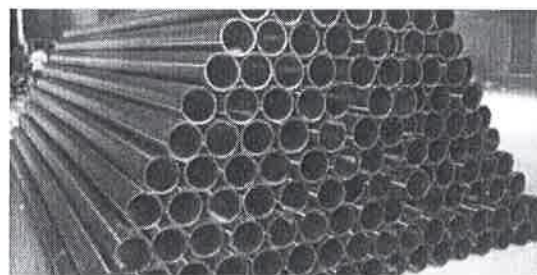
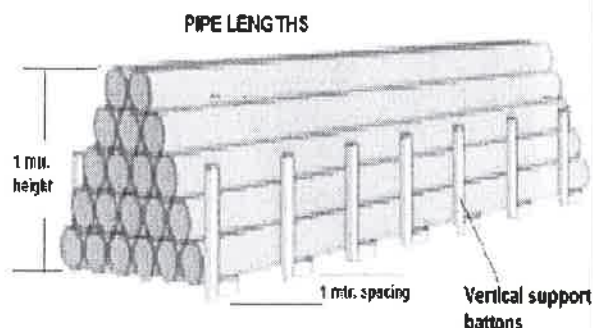
Proper storage of vessels- kept on saddles and lashed

STORAGE OF HDPE PIPES

Doc. No. QHSE/TBT/69

Good practices for storage of HDPE pipes are as follows:

- All pipe store locations should be
 - on suitably firm, level ground,
 - free from damaging material with
 - with adequate access for construction vehicles and/or lifting equipment.
- Badly stacked pallets, bundles may slip or collapse, causing injury to personnel or damage to the pipe.
- Pipe-end caps, intended to prevent ingress of contamination, should be kept in place during storage.
- Pipe lengths stored individually should be stacked in a pyramid not more than one metre high, with the bottom layer fully restrained by wedges. Where possible, the bottom layer of pipes should be laid on timber battens at one-metre centres
- Chains or end hooks should not be used.
- Dragging of pipes not to be done
- Do not position the pipes and fittings near or adjacent to exhaust systems or other heat sources as far as possible



OFFICE SAFETY

Doc. No. QHSE/TBT/70

Hazard and Risks

Accidents due to:

- Slipping, tripping and falling hazard
- Burning, cutting and pinching hazard
- Improper lifting and handling technique
- Improper office layout and arrangement
- Unobservant employees
- Faulty electrical wiring
- Exposure to toxic substances
- Horseplay

- Ensure no blockage at exits
- Report furniture requiring repair
- Create awareness on emergency action in the wake of calamities
- Dispose waste in designated containers



Good practices

- Good housekeeping and adequate lighting
- No electrical cords across walkways
- Clean spills and pick up debris immediately
- Store materials in appropriate and designated space
- Avoid keeping hazardous material inside office such as firearms, etc.
- Provide training prior to operating office machinery
- Do not place machines on edges
- Ensure rotating parts of machines and sharp edges are guarded
- Arrange office so as to facilitate unobstructed movement
- Keep stairs and walkways obstruction free
- Close drawers when not used
- Open one drawer at a time using the handle provided
- Do not block ventilation with shelves
- Install fire detection and extinguishing facilities



Falling, tripping, slipping hazards to be avoided/ prevented by housekeeping

DO NOT BLOCK



FIRE EXIT

Thank You!




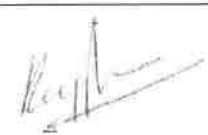

ANNEXURE – 13

	VA TECH WABAG	Doc No : OCP/024 Rev No : 00
	HSE Contractual Condition and Agreement	Date : 05/04/2018

HSE Contractual Condition and Agreement

Doc Number: OCP/024 dated 05.04.2018

Scope
<p>Document applicable to</p> <ul style="list-style-type: none"> The Project Management Team for sending bid enquiry to contractor The EPC contractors for implementing the stated requirements during project execution. Wabag and Contractor to sign MOU on HSE understanding prior to awarding of the contract

Date	Rev no	Description of changes	Prepared by	Reviewed by	Approved by
04/04/2018	00	Initial issue	Sweeti Jha/Dipti Sharath Tech Coordinator	Benny John Head QHSE	Pankaj Sachdeva CEO India Cluster
Signature →					

VA TECH WABAG LIMITED

Global Headquarters

address: WABAG HOUSE, No. 17, 200 Feet Thoraipakkam - Pallavaram Main Road, Sunnambu Kolathur, Chennai - 600 117, Tamil Nadu, India

mail: Benny_John@wabag.in

office: +91 (44) 3923 2323

direct: +91 (44) 3623 2246 **fax:** +91 (44) 3923 2324



	VA TECH WABAG	Doc No : OCP/024 Rev No : 00
	HSE Contractual Condition and Agreement	Date : 05/04/2018

Table of Contents

Sr. No	Particulars	Page Number
1	General 1.1 Introduction 1.2 Purpose 1.3 Objective 1.4 Definition	3 3 3 3-4
2	Abbreviation	4
3	Health, Safety and Environment Compliance 3.1 MOU 3.2 EHS Policy 3.3 Statutory requirements	4 4 4-5
4	Contents of HSE Organization 4.1 Contractors Project Specific HSE Plan 4.2 Contractors HSE Organization 4.3 Standard Operational Procedures to be submitted by the contractor 4.4 Safety Measures 4.5 Emergency Response Plan 4.6 Occupational Health and Hygiene 4.7 Incident Reporting 4.8 Contractors Safety Committee and Near Miss Committee	5 5 6-7 7-8 8 8-9 9 9
5	Environment Protection	9
6	Monitoring of EHS performance and close out report	10
7	Suspension and stoppage of work	10
8	Reward and Recognition	10-11
9	Penalties	11-14

ATTACHMENTS

Attachment 1	Memorandum of understanding	15-16
Attachment 2	Wabag EHS Policy	17
Attachment 3	PPE Matrix	19



	VA TECH WABAG	Doc No : OCP/024 Rev No : 00
	HSE Contractual Condition and Agreement	Date : 05/04/2018

General

1.1. Introduction

WABAG is an Indian Multinational which provides Water Technology solution with a presence in more than 23 countries. Being one of the world's leading suppliers of water and wastewater treatment plant, Wabag offers sustainable solutions that can serve as the economic basis for a region and provide enhanced quality of life for the local population. The health, safety and welfare of its stakeholders form the basis of the value system. Wabag is certified to ISO 9001, ISO 14001 and OSHAS 18001 and has developed as elaborated process and procedures to ensure its stake holders safety and Health.

1.2. Purpose

The purpose of this agreement is to ensure that

- 1.2.1. The contractors and their sub-contractors are familiar with Wabag HSE process and procedures
- 1.2.2. The statutory and regulatory requirements as per the National and International requirements are well understood and followed at site.
- 1.2.3. The contractors executes the work as per the Wabag and Client requirements

1.3. Objective

The objectives that are to be achieved while project execution are as follows:

- 1.3.1. Zero incident
- 1.3.2. Zero LTI
- 1.3.3. Compliance to all applicable statutory and legal requirements
- 1.3.4. 100% compliance to job specific personal protective equipment
- 1.3.5. Value human life of all the stake holders engaged in the project
- 1.3.6. Ensure positive physical and mental health of all the workmen at site
- 1.3.7. Best construction practices are followed to ensure safety with productivity
- 1.3.8. Minimize environmental damage caused due to the construction activities
- 1.3.9. Improvising the productivity by implementing best HSE Standards

1.4. Definitions

- 1.4.1. The use of "**shall**" indicates a mandatory requirement.
- 1.4.2. The use of "**should**" indicates a strongly recommended
- 1.4.3. The use of "**may**" indicates is to be considered
- 1.4.4. **Contractor:** The person/firm whose tender has been accepted by Wabag and is responsible for project execution till the handover of the project to Wabag.
- 1.4.5. **Residential Construction Manager (RCM):** The purpose of RCM is to control the project's time, cost and quality. RCM is compatible with all project delivery system including design-bid-build, design-build, CM At-Risk and Public Private Partnerships.



	VA TECH WABAG	Doc No : OCP/024 Rev No : 00
	HSE Contractual Condition and Agreement	Date : 05/04/2018

- 1.4.6. Project manager: The project manager is responsible for the overall planning and execution of a particular project for Wabag.
- 1.4.7. Safety engineer: A safety engineer is a contractor's employee whose primary responsibility should be designing the procedures and implementing systems to keep project site safe.
- 1.4.8. Safety In charge/ Safety Officer: A person responsible for ensuring safety regulations are adhered to, and for assessing the unsafe conditions or hazards at the project site.
- 1.4.9. QHSE: Quality, Health , Safety and Environment
- 1.4.10. CSE: Confined Space Entry
 - 1.4.11. PPE: Personal Protective Equipment
 - 1.4.12. LTI: Lost Time Injury

2. Abbreviation

- 2.1. PM- Project Manger
- 2.2. RCM – Resident Construction Manager
- 2.3. QHSE – Quality Health Safety and Environment
- 2.4. PPE – Personal Protective Equipment
- 2.5. BOCW- Building and Other Construction Workers Act
- 2.6. LTI - : Lost time Injury
- 2.7. MOU – Memorandum of understanding
- 2.8. ISO – International Organization for Standardization
- 2.9. OHSAS – Occupational Health and Safety Assessment Series
- 2.10. HSE –Health Safety and Environment
- 2.11. HIRA – Hazard Identification and Risk assessment

3. Health Safety and Environment Compliance

3.1. Memorandum of Understanding

A Memorandum of Understanding placed at Attachment No: 1 shall be executed before the award of the contract by the contractor with regard to the provisions on Health, Safety and Environment to be followed and implemented during the Project execution.

3.2. EHS Policy

The construction works shall be undertaken in accordance with EHS policy of Wabag as provided in Attachment No: 2

3.3. Statutory requirements



	VA TECH WABAG	Doc No : OCP/024 Rev No : 00
	HSE Contractual Condition and Agreement	Date : 05/04/2018

3.3.1. The contractor including sub-contractor shall be solely responsible for all the compliances with applicable legal and other requirement of area of jurisdiction in respect of services under this contract.

3.3.2. The contractor shall comply with the relevant statutory requirement of various acts as per applicable local/State/national law including BOCW Act, Labour Law, Environment act , Water act, Electricity act, Pollution control board..

4. Contents of HSE Organization

4.1 Contractors Project Specific HSE Plan

The contractor shall prepare and submit a detailed Project HSE plan covering the following aspects which shall be as per ISO 14001/OSHAS 18001/Wabag QHSE plan and project specifications and requirement. In case of labor contract or small contracts of value less than 10 crores, Wabag HSE Project Plan shall be followed. The contractor's HSE Plan should be in line with the below guidelines. The Contractor HSE plan must include:

- 4.1.1. **Contractor safety policy statement**
- 4.1.2. **Purpose**
- 4.1.3. **Targets and Goals/ Objectives**
- 4.1.4. **Resource management**

4.2 Contractors HSE Organization

The contractor shall appoint one Safety Head with a minimum of 12- 15 years of EPC experience having relevant HSE qualification like BE in Fire Safety, Industrial Diploma in HSE, NEBOSH, irrespective of the number of workmen. However if the number of workmen exceeds 100, an addition safety officer shall be engaged thereof having 8-10 years of experience having same qualification as detailed above.

- The senior most Contractor safety person should be designated as EHS Head and his/her status in organization shall be similar to other departmental heads.
- The work experience and qualification credential of HSE officers shall be submitted to Wabag for approval prior to execution of the work. In case if any EHS personnel is replaced , the contractor shall intimate Wabag HSE officer and necessary approval shall be taken for replacement

4.2.1 Project Organization chart

Project organization chart stating Contractor HSE Engineers reporting shall be prepared and submitted for Wabag review and approval.



	VA TECH WABAG	Doc No : OCP/024 Rev No : 00
	HSE Contractual Condition and Agreement	Date : 05/04/2018

4.2.2 Roles and responsibilities

Contractor should designate specific roles and responsibilities for the implementation of the HSE plan as per the project organization chart.

4.3 Standard Operational Procedures to be submitted by the contractor

The contractor shall submit the standard work procedures as per the project requirement along with the Project HSE Plan.

4.3.1 Operational Procedures:

The contractor must provide the safe working procedures for all activities that they will perform at site. All activities may not be applicable to the contractor. Depending on the activity to be performed the contractor must choose the activities relevant to the job being performed. This is above and beyond the following activities that are deemed critical as per Wabag requirements.

1. Material transportation and logistics (loading and receiving end)
2. Material handling (storage, transportation, surface preparation, lifting, erection and alignment)
3. Pilling and capping
4. Excavation and Trenching
5. Confined space work
6. Concrete works and reinforcement
7. Formwork
8. Welding and gas-cutting
9. Fabrication of steel structures
10. Grit blasting
11. Erection and installation of electrical equipment
12. Plastering
13. Painting
14. Storage of cement and handling
15. Work at height
16. Handling of chemicals and spill control
17. Scaffolding
18. Hydrostatic and pneumatic testing
19. LOTO
20. Incident investigation

4.3.2 Project HSE Documentation

- a. The following documents shall be available with the contractor for verification and audit
 1. HSE plan
 2. Standard operating procedures
 3. Hazard and Risk Assessment for all activities
 4. Work permits



	VA TECH WABAG	Doc No : OCP/024 Rev No : 00
	HSE Contractual Condition and Agreement	Date : 05/04/2018

5. Housekeeping schedule for each area.
6. Emergency response procedures
7. Daily safety report
8. Monthly safety report
9. Internal audit reports
10. Legal compliance reports
11. Environmental monitoring reports
12. Certification by competent authority for critical equipment's and machineries
13. Incident/ Near miss reports
14. Violation reports
15. Minutes of meeting of safety and near miss committee meetings
16. Induction training records
17. First aid records
18. Training records
19. Medical checkup records
20. PPE issue register

4.4 Safety Measures

4.4.1 General safety requirements

- 4.4.1.1 All personnel shall undergo safety induction training. The contractor workers shall have induction stickers on their helmets which will specify:



- 4.4.1.2 **The PPE Mandatory requirements are attached in Annex - 3**
- 4.4.1.3 The contractor personal shall not enter the site premises without wearing a hard hat and safety shoes.
- 4.4.1.4 All site personnel, for their own safety and for the safety of others, are required to fully comply with their employer's statement of safe working method and participate in tool box, safety programs, mass meeting, orientation programs and trainings.
- 4.3.1.4 Contractor personnel shall not enter the work premises under the influence of alcohol, drugs or other intoxicating substances.
- 4.3.1.5 The work site shall be non-smoking zone
- 4.3.1.6 Gate entry system is to be devised so that all visitors shall report to security and will be allowed entry. HSE officer of contractor/ Wabag shall be informed by the security if induction is required.



	VA TECH WABAG	Doc No : OCP/024 Rev No : 00
	HSE Contractual Condition and Agreement	Date : 05/04/2018

- 4.3.1.7 Its Mandatory that all the visitors shall wear appropriate PPE during their entry into construction area.
- 4.3.1.8 Carrying arms and ammunition into the site is strictly prohibited.
- 4.3.1.9 No personnel shall indulge in fighting, horseplay or practical jokes within the site or its perimeter.
- 4.3.1.10 Offensive or inappropriate language and provocative gestures are not allowed
- 4.3.1.11 Gambling is prohibited in the site premises

4.5 Emergency response plan

The emergency response plan has to be designed for all possible contingencies and must be communicated to all employees. It should include the following:

1. The procedures to be adopted for all applicable emergencies
2. The roles and responsibilities of the personnel in case of an emergency
3. Details of persons to be contacted during an emergency. This information is also to be displayed at site.
4. Details of local hospitals, response support agencies like ambulance and fire-fighting. This information is also to be displayed at site.
5. Essential emergency equipment should be available at site, and it must be checked periodically to ensure its efficiency.
6. Emergency mock drill is to be conducted once in three months.
7. Assembly point, evacuation route and plan shall also be included, displayed and communicated

4.5 Occupational Health and Hygiene

- The contractor shall be responsible for the providing health, hygiene and welfare facilities to his personnel. The contractor shall provide the following basic facilities:
 - Medical examinations for Height, Trench and confined space workers
 - Welfare of labor camps by ensuring hygienic living quarters.
 - Provide the highest quality of sanitary facilities to the labor camp
 - Conducting regular medical checkup for the contractor workers
- It is essential that good housekeeping be maintained throughout the period of any work, both at work site and around any temporary building/store.
- The working area shall be cleaned on a regular basis to ensure good housekeeping.
- Escape and other access ways must be kept clear, safety equipment kept accessible and surplus/scrap material must be removed daily.

4.6 Incident reporting



	VA TECH WABAG	Doc No : OCP/024 Rev No : 00
	HSE Contractual Condition and Agreement	Date : 05/04/2018

The contractor shall have an incident reporting system in line with HSE procedures/ Plan / Manual. The contractor shall immediately notify of all incidents resulting in:

- First aid cases
- Injury to third parties
- Damage to plant or machinery
- An outbreak of fire or explosion
- Loss of containment of inflammable material/chemicals
- Fatalities and lost time Injuries to its personnel
- Other medical or health issues

Any unsafe acts and conditions are to be communicated daily to the Wabag HSE officer.

4.7 Contractors Safety Committee and Near Miss Committee

Contractor shall form a Safety Committee and near miss committee. And meeting shall be held every month. The meeting will be attended by Wabag HSE Engineer and RCM

- Responsibility of safety committee:
 - Discuss client complaints and feedback
 - Review of previous MOM and its compliance
 - NCR and observations review
 - First aid cases/Reportable injuries
 - Planning future jobs ahead and specific requirements
 - Sub-contractor performance
 - Need for training, resources, PPE.
 - Observation of HSE committee during safety walks and resolution.
- Responsibility of near miss committee:
 - The near miss committee shall comprise of supervisors, skilled and unskilled labours and engineers from all work areas.
 - The committee is to encourage reporting of near miss by all workers, by communicating the importance of near miss.
 - The near miss reported is to be communicated to all site employees along with the corrective actions.
- Contractor shall send the Near miss report to Wabag on a daily basis.
- Copies of minutes of contractor's safety committee meetings shall be sent to Wabag EHS Head RCM and Project Manager every month
- Near Miss Observation committee and meeting MOMs are to be sent to the Wabag EHS Head RCM and Project Manager every month
- Contractor representatives shall attend the Wabag Safety Committee meeting and Near miss committee meeting regularly

5.0 Environment protection

The contractor shall take necessary actions for protecting air, water, soil and vegetation from the adverse effects of the construction activities and must minimize any nuisance



	VA TECH WABAG	Doc No : OCP/024 Rev No : 00
	HSE Contractual Condition and Agreement	Date : 05/04/2018

to the public, which may arise from such operations. Contractor shall follow the environmental guidelines as issued from by Client and Wabag.

6.0 Monitoring of Contractors HSE performance and close out report

- 6.1 Contractor shall share the monitoring reports every month.
- 6.2 On project completion, the contractor shall submit the HSE close out report and subsequent final dossier along with the project statistics to the Wabag HSE head for approval. The final payment will not be released without the approval of Wabag Head HSE. The satisfactory HSE performance certificate shall be obtained from Head QHSE.

7.0 Suspension/Stoppage of work

- 7.1 Wabag shall have the right to suspend/stop the work at its sole discretion, if in its opinion the work is being carried out in an unsafe manner that may pose a risk to the worker, people working nearby, equipment, or environment. Or if it violates a mandatory requirement of Wabag or the Client
- 7.2 The contractor shall not proceed with the work until he has complied with the Wabag HSE requirements or the instructions of Wabag RCM/HSE Head
- 7.3 The Contractor shall not be entitled for any damages/compensation for stoppage of work, due to reasons mentioned in 7.1 and the period of such stoppage of work shall not be taken as an extension of time for completion of the work and will not be the ground for waiver of levy of liquidated damages.

8.0 Rewards and Recognitions

Wabag appreciates the commitment of its stakeholders towards maintaining a safe working environment and recognizes the same accordingly. Below mentioned is the selection criteria for rewards.

Sl No	Indicators	Criteria for selection	Reward frequency	Target Personnel's
1	Reporting of Unsafe conditions , near miss, Incidents	Workman who adhere to the safety norms at site and promptly reports any unsafe acts, conditions and near misses to his supervisor and co-workmen. He encourages his co-workmen to follow the safe practices of work.	Once in a week	Workmen
2	Speaking up during a safety committee meeting and sharing innovative ways of improving safety	Idea acceptance by Project Manager and QHSE Corporate office. The employee showing concerns and proposing ways for improvement in project site	Monthly – Pan India only one will be selected	Contractor Supervisor/ Engineers



	VA TECH WABAG	Doc No : OCP/024 Rev No : 00
	HSE Contractual Condition and Agreement	Date : 05/04/2018

3	Stopping an Unsafe Activity (own work or others) and assisting co-work to avoid risk situation	Activity was a potential threat to the work environment including life and property.	Monthly	Workmen/Contractor or Engineers
4	Best contractors award	The audit will be conducted by Wabag HO on specific parameters and the highest rating will be the qualifying criteria	Once in a year. Pan India.	Contractor
5	Safety officer of the year	Excellent contribution to the department of HSE in terms of Reporting / Sharing information / Transparency/ compliances / documentation / implementation of initiatives/house keeping	Once in a year	Contractor Safety Engineer

9.0 Penalties

The intent of this system is not to penalize any stakeholders, but to have a better control and discipline as well as to ensure a safe working environment. Safety is of prime importance to Wabag and its clients, and the same is enforced through this process.

The work place violation like , non-compliance to procedures / guidelines / safe work practices/ unsafe acts/ behaviors shall be dealt according to penalty system as follows:

S. No	Violation of EHS Norms Unsafe act/condition	1st Violation	2nd Violation	3rd Violation	Remarks
1	PPE Non compliance Any of the Engineers/ Supervisors/ workmen without safety hard hat or safety shoes.	Violation notice to contractor and contractor is advised to issue the PPE immediately. Workers without PPE are not permitted to work at site.	Contractors Managing director is informed. Safety officers recommends to procure PPE and debit from contractor account	PPE available and not wearing will result in one day suspension from work	Recommendation for PPE purchase is to be taken from the Project Manager and the amount will be debited to contractors account
2	No Work permit Working without work permit/clearance	Violation Memo to the contractor and suspension of work. Work to resume only after necessary permits are in place.	If the violation repeated recommendation to suspend the respective Engineer. Approval from RCM and PM/PH	Further action to be recommended by COO and CEO	----



	VA TECH WABAG	Doc No : OCP/024 Rev No : 00
	HSE Contractual Condition and Agreement	Date : 05/04/2018

3	Site Electricity : a) ELCB not installed b) Inserting of bare wires into the socket	Work stoppage. One hour training on electrical safety. Immediate corrective action.	----	----	Work stoppage report to PM/PH/COO/CEO
4	Noncompliance of Working at height: <ul style="list-style-type: none"> • No full body harness • No safety net • No life line or anchorage point • Bamboo scaffold / ladders • Broken/ weak ladders • Re-bar welded ladders • No guardrail, toe board, barriers • No working platform • Working at unprotected edges 	<ol style="list-style-type: none"> 1 Two hours training on work at height to contactor and employees 2 Training on impact of fall 3 Video session on fall from height 4 Behavioral training <p><u>Poor condition of scaffolds/ladders/platforms:</u></p> <ol style="list-style-type: none"> 1. Violation memo 2. Ensure immediate action plan for replacement 	Escalation to the Project Manager and Project Head. Written communication to contractor's Managing Director to take corrective and proactive actions	Recommending suspension of contractors supervisor for his inability to execute safety requirements and posing threat to human life	If the violation is repeated further escalation to COO and CEO for necessary action
5	Gas cutting: <ul style="list-style-type: none"> • Flash back arrester, non-return valve and regulator not in working condition • Using domestic LPG cylinders • Fire extinguisher not placed in the vicinity during operation 	Issue violation memo to the responsible contractor. Brief the workers and contractor on the use of flash back arrestors, Cylinders and control measures.	Issue of violation memo. Work is stopped, and the work can be started only after taking corrective action	Nil	Work stoppage report is to be sent to the Project Head and COO.





VA TECH WABAG

Doc No : OCP/024
Rev No : 00

HSE Contractual Condition and Agreement

Date : 05/04/2018

6	Welding : <ul style="list-style-type: none"> Improper grounding and return path. Damaged welding cable 	Issue violation memo to the responsible contractor. Brief the workers on welding and control measures.	Welders shall undergo 2 hour full training on welding safety and control measures.	The matter to be escalated to the RCM/PM	In case of no resolution the items will be purchase or rectified using external source.
7	Occupational Health Fail to conduct medical examination to workers who are working at Height, Trenches and confined space	Intimate the contractor of further course of action if the medical checkup is not conducted within in the stipulated time	----	----	The medical examination will be conducted by Wabag Safety office and the amount will be taken from the contractor in the form of a debit note. Approval from PM/Project Head
8	Display of Signage's Non display of safety signage's emergency telephone number at work locations	Violation memo to be issued to the contractor along with an implementation date for the signage.	If not implemented, issue a second warning and communicate about Wabag procurement and cost deduction.	Wabag will initiate procurement of signage's and will deduct from the contractors bill	Approval will be taken from the Project Head /COO
9	Safety supervisors Failure to appoint safety supervisors as specified in the contract.	Intimate the contractor of further course of action if the manpower is not deployed within in the stipulated time	----	----	Wabag will appoint the safety engineers on a man month basis through consultants and deduct the charges as applicable Approval from COO/CEO
10	Housekeeping : Material/ tools/ construction material etc. not in designated area and clean	Briefing to be given regarding the hazards that are resulted from improper	Violation to be issued by RCM. Briefing to be given regarding the hazards that are	Warning letter to the contractor by the Project Head / PM	In case of further violation the PM/Project Head will decide the course of action



	VA TECH WABAG	Doc No : OCP/024 Rev No : 00
	HSE Contractual Condition and Agreement	Date : 05/04/2018

	working environment is not maintained	housekeeping practices by HSE / Lead Engineers Follow up to be done to ensure compliance	resulted from improper housekeeping practices.	regarding the compliance to housekeeping requirements.	
11	Failure to report incident including near miss reporting system	Provide awareness training regarding: Importance of incident reporting and Near miss reporting.	Violation memo to be issued. Conduct a near miss awareness training session and meeting. Conduct a near miss committee meeting and raise the issue.	Violation memo to be issued. Conduct a near miss awareness training session and meeting. Conduct a near miss committee meeting and raise the issue.	Repeated violation - Review of contractor performance and report to COO/CEO for further action
12	Any major/serious EHS violation other than above mentioned violation	----	----	----	The safety committee and the Wabag Management will take appropriate decision

Note: Violation reporting

1. The evidence has to be in the form of a photograph.
2. The communication has to be in the form of formal written mails, along with acknowledgement that the contractor has understood and accepted the violation.
3. The evidence has to be submitted along with the violation memo.
4. The violation report has to be approved by the RCM and signed by the contractor.
5. In case of any disputes the matter is to be escalated to the Project Manager & the Head, QHSE for resolution.
6. The penalty is to be debited from the contractor in the form of a debit note.


----- END -----



	VA TECH WABAG	Doc No : OCP/024 Rev No : 00
	HSE Contractual Condition and Agreement	Date : 05/04/2018

Attachment No. 1

Memorandum of understanding between Wabag and the Contractor for safe execution of contract work

	HSE MANAGEMENT SYSTEMS	Date: Project:
	Memorandum of understanding between Wabag and the Contractor for safe execution of contract work	

This memorandum of understanding is made and executed by and between Wabag M/s _____ an office at _____ or their authorized representative (s), hereinafter referred to as "WABAG" (Which expression shall wherever the context so requires or admits be deemed to mean and include its successors in business and assigns) of the one party

AND

M/s _____ Having its registered office at _____ hereinafter referred to as the "CONTRACTOR" (Which expression shall wherever the context so requires or admits be deemed to mean and include its successors in business and assigns) of the other party

WITNESSETH THAT

WHEREAS the WABAG gives highest importance to the occupational safety, health and environment during execution of work, seeks cooperation from the CONTRACTOR in this endeavor.

Thus, this memorandum of understanding is for promoting the safety health and environment aspects required to be followed at workplace/site and will be applicable to any site job to be done by the CONTRACTOR

AND

WHEREAS the CONTRACTOR has read all the terms and condition of the and whereas the CONTRACTOR has studied the following documents

- a. Tender documents, including Notice inviting tender, general and conditions, special conditions.
- b. Conditions of contract of safety, Health and Environment.



	VA TECH WABAG	Doc No : OCP/024 Rev No : 00
	HSE Contractual Condition and Agreement	Date : 05/04/2018

c. Corresponding applicable acts and Rules.

The amendments to any of the above rules and any other rules & regulations or procedures circulars notices & advices laid down by the WABAG from time to time.

Now it is hereby AGREED AND DECLARED by and between the WABAG and the CONTRACTOR as follows:

Clause - I the contractor shall abide by the terms and conditions stipulated in Condition of Contract on Health, Safety & Environment.

Clause - II The CONTRACTOR shall undertake full responsibility for safe execution of job at work place/site and safety of this personnel and adjoining road users during work.

Clause - III Without giving any prior notice, the WABAG shall from time to time be entitled to add/or amend any or all terms and conditions with a view to improving safety and occupational health of personnel and safety of work, With immediate effect and the same shall be binding on the CONTRACTOR. The contractor agrees to implement all such amendments, which shall be laid down by the WABAG.

Clause - IV Besides following the guidelines, safety rules and regulations, safety codes given in various safety procedures/documents mentioned above, the CONTRACTOR shall also prepare detailed method statement which includes job safety analysis where there are complication and hazardous/high risks working involved and get it approved from Wabag before execution of work.

Clause -V Any negligence or violation in implementing any of the provision of the conditions of contract on Health, Safety& Environment shall be viewed seriously and the contractor is liable to compensate the Wabag for the loss of reputation. The cost of damage shall be fixed on case-to-case basis

In Witness there of the Parties here to by representatives duly authorized have executed this memorandum of Understanding on _____ day of _____ 20_____

Signed on

Signed on

For and on behalf of Wabag

For and on behalf of Contractor

Sign:

Sign:

Date:

Date:



	VA TECH WABAG	Doc No : OCP/024 Rev No : 00
	HSE Contractual Condition and Agreement	Date : 05/04/2018

Attachment No. 2


OCCUPATIONAL HEALTH, SAFETY AND ENVIRONMENTAL POLICY



VA TECH WABAG LTD. as a market leader in the Indian water technology offers portfolio in the areas of municipal, industrial water and wastewater treatment, besides offering a full fledged state-of-the-art engineering services in line with global standards both in terms of quality and delivery.

VA TECH WABAG LTD will undertake every reasonable effort to eliminate the hazards that cause incidents and injuries and aim to control or reduce wastage of natural resources, energy, materials and chemicals.

We shall strive to continually improve our Occupational Health, Safety and Environmental performance in our activities, products and services by implementing and maintaining the HSE Management Systems and by,

- ❖ Ensuring compliance with applicable legal and other requirements.
- ❖ Avoidance of incidents through prevention and Safety awareness.
- ❖ Promotion of activities that could minimise environmental pollution.
- ❖ Optimising the utilisation of natural resources like energy, construction materials and reducing the waste generation.
- ❖ Promotion of measures aimed at enhancing the physical and emotional health of the people who work with or for our company.
- ❖ Creating awareness amongst our employees and stake holders by proactive communication, training and felicitation.
- ❖ Increasing green cover in and around the operational sites.

Date : 23.08.2010


RAJIV MITTAL,





VA TECH WABAG

Doc No : OCP/024
Rev No : 00

HSE Contractual Condition and Agreement

Date : 05/04/2018

Attachment no: 3 PPE MATRIX


Work Description/PPEs	Safety Helmet	Safety Shoes/Cutproofs	Safety Goggles	Reflective Vest	Apron	Ear Plug	Dust / Respiratory Mask	full body harness - 2 wayward	Full Arcwelder	Lease Bag	Welding face shield	Grinding goggles	Cotton Gloves	Rubber/Leather gloves
General work	✓	✓		✓		✓	✓							
Welding/Gas cutting	✓	✓	✓		✓		✓				✓			✓
Grinding and chipping	✓	✓	✓	✓	✓	✓	✓					✓		✓
Confined space	✓	✓	✓	✓				✓					✓	
Working at height	✓	✓	✓	✓			✓	✓	✓	✓			✓	
Erection (Structures / Equipment etc)	✓	✓	✓	✓			✓						✓	
Excavation /Trenching	✓	✓	✓	✓			✓	✓	✓					
Foundation /Concreting	✓	✓	✓	✓		✓	✓							✓
Paint Manual/Spray	✓	✓	✓	✓	✓		✓							✓
Road Works	✓	✓	✓	✓										✓
Electrical work:	✓	✓	✓	✓										✓
Site office employee		✓												



	VA TECH WABAG	Doc No : OCP/024 Rev No : 00
	HSE Contractual Condition and Agreement	Date : 05/04/2018



ANNEXURE – 14

 <small>W A B A G</small> <small>Garibhadra Zol. No. 10 for a better life.</small>	<h2>Internal Audits</h2>	ISO 9001:2015 (CI 9.2) ISO 14001:2015 (CI 9.2) ISO 45001:2018 (CI 9.2)
	P-920 Revision number : 11	Date: 14-02-2019

1.0 Purpose/Scope

- 1.1 The purpose of this procedure is to describe the process for internal audits of the integrated management system at Wabag.
- 1.2 The procedure applies to the performance evaluation required to meet the objectives of the QMS, the EMS, and the OHS as an Integrated Management System (IMS).
- 1.3 The procedure applies to internal audits that are conducted to ensure that the IMS conforms to the requirements, is effectively implemented and maintained, and continues to be suitable, adequate and effective.

2.0 Responsibilities and Authorities

- 2.1 The QHSE Head has the prime responsibility and approval authority for this procedure and is responsible to ensure that internal audits are conducted at planned intervals.
- 2.2 In support the audit reports and concerns are reviewed by CEO at regular intervals / frequency as determined by the CEO.

3.0 References and Definitions

- 3.1 This document relates to clause 9.2 of the ISO 9001:2015, the ISO 14001:2015 and the ISO 45001:2018 standards dealing with internal audit.
- 3.2 Audit Team: May be one or more auditors, including the lead auditor.

4.0 Instructions

- 4.1 Internal audit process (CMP-04) is established, implement and maintain an internal audit program to ensure conformity of Business management system processes with respect to
 - 4.1.1 Requirements of ISO 9001:2015, ISO 14001:2015 and ISO 45001:2018
 - 4.1.2 Other requirements of the organization
 - 4.1.3 Effectively implemented and maintained
- 4.2 Audits are conducted once in six months by trained auditors/external consultants. Objectivity and impartiality of the audit process is ensured.
- 4.3 internal audits may be conducted more frequently based on performance and results observed during previous audits and as per the instruction of CEO
- 4.4 Audit programs are planned, and communicated as per the established process



 <small>Sustainable solutions for a better life.</small>	Internal Audits	ISO 9001:2015 (Cl 9.2) ISO 14001:2015 (Cl 9.2) ISO 45001:2018 (Cl 9.2)
	P-920 Revision number : 11	Date: 14-02-2019

(CMP-04) and the audits are conducted accordingly. Non –conformity reports are generated if any and appropriated corrective actions are taken within the time frame.

4.5 The audits reports are retained and the results of audits are reviewed in management review. The effectiveness of the action taken are verified during the subsequent audits.

5.0 Forms and Documented Information


5.1 Forms

- 5.1.1 F-920-001 Internal Audit Plan
- 5.1.2 F-920-002 Internal Audit Report
- 5.1.3 F-920-003 Internal Audit Notification
- 5.1.4 F-1020-002 Corrective action request

5.2 Documented information

- 5.2.1 CMP-04 Internal Quality Audit
- 5.2.2 CMP-06 Corrective action

6.0 Revision History

Rev	Date	Section	Paragraph	Summary of change	Authorized by
11	14-02-2019	All		1. Migration to ISO 45001 from BS OHSAS 18001 2. All the procedures revised as per ISO clause 3. Change in numbering system	
10	15-01-2018			QMS: Certification ISO 9001 2008 to 2015 ISO 9k/14k/18k integration	



ANNEXURE – 15



HSE Assessment and Index Report

ISO 45001:2018
(CI 9.1)

F-910-00 A Revision number :02

Date:

Assessment Ref no		Assessment date	
Project Details Ref Number Project Name Location		Project description	
Name and designation of Assessor		Name and designation of the assessee	
Assessment objectives and Purpose	<ol style="list-style-type: none">1. Verification of the safety process and procedure implementation2. Identifying the gaps and areas for improvement3. Standardizing the HSE process across the projects4. Identifying the best practices and sharing with other projects5. Identifying most compliant project sites		

Management Summary : *(To be filled by assessor)*


Opportunities for Improvement : *(To be filled by assessor)*

For detailed information refer to subsequent pages

Overall safety Index Score for present assessment		Overall safety Index Score of previous assessment		Average Safety Index in a year	
--	--	--	--	---------------------------------------	--

Prepared by : Name : Designation:	Approved by: Name : Designation:
--	---



 <small>sustainable solutions for a better life.</small>	HSE Assessment and Index Report	ISO 45001:2018 (CI 9.1)
	F-910-00 A Revision number :02	Date:

Date :	Date:
Diffusion : CEO /COO/Project Head /Project Manager/RCM /Project team leads	

Detailed Report

General Observation

Good Practices

Scope for improvement

Assessment Details

<u>Total no of workers at Project site</u>		<u>Total no of Wabag Employees</u>	
<u>No of Wabag Safety officer</u>		<u>No of Contractor Safety officer</u>	

Note: Score shall be **2 for Yes, 1 for Partial** and **0 for No**

	Assessment Questionnaire	Yes/Partial / No	Score 2/1/0	Comments/ Concerns
Workmen Induction training and PPE Compliance	Induction training content available and approved by Corporate QHSE			
	All the workers at site receive induction training on first day of work			
	Workers have received induction training along with induction stickers for helmets			
	All workers display identity card and designation/ trade			
	All Workers are wearing helmet			
	Workers are wearing safety shoes			
	Workers who are involved in night work are wearing reflector jackets.			
	Safety Gloves/Mask /Shields are worn by respective workers as per the work requirement			
	Fall arrestor system are used for all height work			
		Score		
	Safety officer wearing green Helmet and white coverall with reflectors			





HSE Assessment and Index Report


ISO 45001:2018
(Cl 9.1)

F-910-00 A Revision number :02

Date:


Wabag Employees /JV compliance to PPE	Project Manager/RCM/Wabag employees and execution staff wear Helmet and Safety shoes at work.			
	Safety induction sticker is pasted on Helmet			
	WABAG Employees display identity card at all times			
	Score			
Sub-contractors Safety management	Man power count board is placed			
	All workers receive job specific Induction training from the contractor			
	Sufficient number of safety supervisors and safety stewards available at site			
	Project Specific plans are available and followed during construction			
	Subcontractors personal details are recorded			
	Standard operating procedures are implemented			
	Are the workers/supervisors communicated about various HSE			
Score				
Tool box Talks	Whether the tool box talk is conducted before start of work			
	Whether all the workers are covered under the tool box talk			
	Whether the tool box is given as per the Tool box Manual			
	Whether the tool box contents are displayed			
	Whether the mass tool box talk is conducted			
	Whether Wabag HSE Engineer/ Lead Engineer/supervisor conduct the tool box talk			
Score				
Safety improvement meeting	Whether safety committee meeting are conducted every month and minutes of meeting (MOM) is available.			
	Whether the actionable points discussed in Safety meeting are implemented			
	Whether the Near miss committee meeting is conducted every week.			
	Whether the points in MOM are implemented			
	Whether the near miss observation is communicated during tool box talk or any other form			
	Whether mass tool box talk is conducted every month by RCM/PM			
	Where RCM/Project Manager conduct Safety Walk every week			
	Whether action taken report is on safety walk through is available			



 WABAG <small>excellence in safety for a better life</small>	HSE Assessment and Index Report	ISO 45001:2018 (Cl 9.1)
	F-910-00 A Revision number :02	Date:

	Whether all the members of the Wabag execution team attend the meetings.			
	Is there any mechanism to capture near miss?			
	How effective is the mechanism in capturing near miss			
	Are the MOMs and Action Plans communicated to the Corp QHSE			
	Whether any action taken were evident on recorded near miss. Is it rightly communicated through various forms to arrest its reoccurrence			
	Score			
Work Permit system	Whether the work permit system in place as per OCP- 021			
	Whether work permits raised before work is initiated and closed			
	Availability of work permit system at work place			
	Do safety officer perform inspection of work permitted area and reports available			
	Score			
Signage's	Safety Man poster is displayed at the entry			
	Whether work related signage are displayed at strategic locations relevant to the job			
	Quality of signboards in terms of visibility and clarity			
	Emergency assembly signage			
	Dos and Don'ts signage			
	Score			
Housekeeping , Labor camp and Material Handling	Is the house keeping team identified team identified and responsibility assigned?			
	Is there any schedule for housekeeping?			
	Whether Scrap Bins are provided, used and regularly emptied? Scrap bins / waste bins must be provided approx. every 200 meters apart.			
	Whether housekeeping awareness campaigns are conducted regularly.			
	Whether the construction materials are stacked systematically			
	Whether the Storage Practices and Procedures manual is followed			
	Labour camp is maintained with necessary utilities and infrastructure (roofing / electrical connections etc.)			
	The surrounding of labor camp is clean and hygiene			
	Clean drinking water is available			



 W A B A G <small>WABAG is a leading provider of a better life.</small>	HSE Assessment and Index Report	ISO 45001:2018 (CI 9.1)
	F-910-00 A Revision number :02	Date:

	Score			
Equipment certification and calibration	Does all lifting tools and tackles have a valid certification by the competent authority test and inspection record/register?			
	Safe Working Load, date of testing is visibly marked / painted on lifting tools, tackles or equipment?			
	Are the equipment's physically inspected by Wabag Safety officer and whether records are maintained?			
	Score			
Communication of HSE initiatives/LTI etc	Whether LTI Alerts are communicated to the site execution team and workers			
	Are reports as per the HSE Site Management Procedures being maintained and communicated to Corp QHSE			
	Communication between site office / execution team/contractors/ HO			
	Score			
HSE Statistics No of major incidents /LTI	No of Man Hours without LTI (cumulative and current year). Whether it is displayed		0	LTI free man-hours to be displaced in worker count board near the site entrance
	Display of no of Near miss daily and cumulative		0	Near misses reported in a quarter to be displayed on the same board
	Display on no of First aid case		0	Number of first aid cases to be documented and displayed at Worker count board
	Display on reportable incidents		0	Reportable incidents to be displayed on board
	Display of Violations recorded		1	Violations recorded are maintained in register
	Display of violation Memo issued.		1	Memos issued are recorded in register
	HSE and Quality policy are displayed			
	ISO Certificates are displayed			
	Score			
Compliance to Statutory and Regulatory requirements	Whether BOCW certificate is available and within the validated period and all the workers are covered			
	Whether Labor License certificate is available and within the validated period and all the workers are covered			
	Whether ESI and PF are credited			
	Is the compliance register maintained, communicated and updated			
	Environment compliance			
	Score			
HSE Documentation	Whether the following documents are maintained:			
	1. HSE Plan			





HSE Assessment and Index Report

ISO 45001:2018

(Cl 9.1)

F-910-00 A Revision number :02

Date:

2. HIRA			
3. JSA			
4. Induction record			
5. Visitor feedback register			
6. Client complaint register/records			
7. Incident/Near miss reports			
8. Work permits			
9. IMS Manual			
10. NCR Closure report			
11. Violation forms			
12. External/ Internal training reports			
13. MOMs of HSE meetings			
Score			

S. no	Area of Assessment	Max score	Assessment score	% Compliance
1	Workmen PPE Induction training and medical Compliance			
2	Wabag Employees /JV compliance to PPE			
3	Sub-contractors Safety management			
4	Tool Box Talk			
5	Safety improvement meeting			
6	Work Permit			
7	Signage			
8	Housekeeping and Material Handling			
9	Equipment certification and calibration			
10	Communication of HSE initiatives/LTI etc.			
11	HSE Statistics			
12	Compliance to Statutory and Regulatory requirements			

Overall assessment Index

Target Score	
Assessment score	
Percentage compliance	
Project HSE Index	



ANNEXURE - 16

LABOUR INFLUX AND WORKER CAMP MANAGEMENT PLAN

Kolkata Metropolitan Development Authority

Doc No: Wabag/LIWCMP/KMDA/EPC/001



Contents

1	Introduction.....	3
2	Scope of Plan	3
3	Objective of Plan	3
4	Legal and other requirements	3
	i. Indian Regulations.....	4
	ii. IFC Standards.....	5
5	Organization	5
	i. Human resources	5
6	Code of conduct	6
7	Roles and Responsibilities	7
8	Risk and Impact Mitigation	9
9	Consultation and Participation of workers	10
10	Welfare Facilities : Labour Camp	11
11	Disease prevention.....	13
12	Emergency Preparedness and response.....	13
13	Monitoring.....	14
13.1	Performance Indicator:.....	Error! Bookmark not defined.
	i. HSE Index	14
	ii. Internal Audits.....	14
	i. Labour camp inspection	15
14	Reporting	15
15	Training and awareness	15

Annexures:

Annexure 1: Risk Assessment and control measures

Annexure 2: OSHE Policy

Annexure 3: Consultation, participation and grievance redressal of workers

Annexure 4: Worker Feedback Form - Complaint and redressal

Annexure 5: Worker feedback form - QHSE Review

Annexure 6: HSE Index

Annexure 7: Labour camp inspection checklist



1 Introduction

The Labour Influx and Workers Camp management Plan has been developed in accordance to the Wabag Policies, Contractual requirements, Legal and regulatory framework, IFC Performance Standard (PS-2) and EHS Guidelines. The purpose of the plan is to ensure that a safe and healthy living space is ensured for the workers involved in the construction works.

The plan defines the requirements for construction of workers' accommodation, including the general living facilities, rooms/dormitories facilities, sanitary facilities, cooking facilities, pest control, medical facilities etc.

2 Scope of Plan

The plan is applicable to the entire workforce at all skills levels, and deals with all the aspects relating to the sub-contractor workers including the statutory and regulatory requirements, labour and accommodation conditions, management of worker relationships, their occupational health and safety. The plan includes the risks associated with the workforce and activities and also the control measures to mitigate them.

3 Objective of Plan

The objectives of this Plan are to:

- Promote equitable labour practices for the fair treatment, non-discrimination and equal opportunity of workers.
- Establish, manage and promote a healthy management-worker relationship.
- Protect workers' rights as per the statutory requirements.
- Promote healthy, safe, secure and comfortable accommodation that does not impact negatively on the communities in the surrounding area.
- Protect vulnerable groups such as children and avoid the use of forced labour.

4 Legal and other requirements

Various laws, policies, systems, standards and international good practice codes are applicable to the implementation of this Plan. The legal department identifies the applicable statutory and regulatory requirements which will be implemented at the project sites. The Project Manager will be responsible for the implementation and compliance of the legal requirements. The compliances are monitored by HR Legal and HSE Engineer. The compliances are reviewed by the management through QRM and Monthly HSE audit report. Immediate corrective action are taken for any non-compliance noted in this regard. Legal register will be maintained at site. The hiring, contracting, daily wages, rights and protection, dismissal, severance agreement will be as mandated by the Indian Legal regulations as listed below.



i. Indian Regulations

1. Building and Other Construction Workers (Regulation of Employment and Conditions of Service) Act, 1996

Applicable to all workers working at the construction site, it is an act to regulate the employment and conditions of service, and to provide for their safety, health and welfare measures.

2. Employees state insurance Act, 1948

The ESI Act mandates every employer to provide for its worker's insurance. The said Act covers both workers employed directly under an employer and through a contractor. The insurance procured by an employer/contractor under the mandate of the ESI Act covers for contingencies such as maternity leave, sickness, temporary or permanent physical disablement, or death owing to the hazards of employment which may lead to loss of wages and earning capacity of an employee.

3. Workmen's Compensation Act, 1923

The act requires that compensation be paid to workers if injured in the course of employment.

4. Minimum wages Act, 1948

The Act mandates that the employer is required to pay the minimum wage rates as may be fixed by the relevant government

5. Payment of Wages Act, 1936

The Act ensures that the employees receive wages on time and without any unauthorized deductions.

6. Maternity Benefit Act, 1961

The Act provides for leave and some other benefits to women employees in case of confinement or miscarriage, etc.

7. Payment of Gratuity Act, 1972

8. Employees' Provident Fund Act, 1952

9. Child labour (Prohibition and Abolition Act), 1986

The Act prohibits the employment of a child (a person who has not completed his fourteenth year of age), in building or construction industry.

10. Equal Remuneration Act, 1979

11. Inter-State Migrant Workmen's (Regulation of Employment and Conditions of Service) Act, 1979

The inter-state migrant workers, in an establishment to which this Act becomes applicable, are required to be provided certain facilities such as housing, medical aid, travelling expenses from home to the establishment and back.

12. Payment of Bonus Act, 1965



The Act provides for payments of annual bonus subject to a minimum of 83.3% of wages and maximum of 20% of wages

13. Trade Unions Act, 1926

The Act lays down the procedure for registration of trade unions of workers and employers. The trade unions registered under the Act have been given certain immunities from civil and criminal liabilities

14. Contract Labour (Regulation and Abolition) Act, 1970

The Act provides for certain welfare measures to be provided by the contractor to contract labour

ii. IFC Standards

Wabag has committed to meeting the International Finance Corporation Environmental and Social Performance Standards (IFC Performance Standards). Hence all the requirements as per the Performance standard- 2 Labour and working conditions, will be satisfied by Wabag and its contractors.

IFC PS 2 recognizes that the pursuit of economic growth through employment creation and income generation should be accompanied by the protection of the fundamental rights of workers. The HSE Management system will also incorporate this axiom to ensure that a safe and healthy working environment is provided to all those involved in the project.

5 Organization

i. Human resources

The resources for the project are identified as per the job structure and the criticality of the activities which needs to be performed. The workmen are identified based on their experience and expertise and skill to perform the job in compliance to the safety requirements. Necessary infrastructure will be provided for their safe working.

Safety Engineer having exposure to the relevant activities and having the required competence will be deployed. They will be reporting to a Safety Manager who will be responsible for implementing the ESHMP.

The sub-contractor shall ensure that his staff and labour are all fully trained in and aware of good and safe working practices.



The sub-contractor shall maintain a register of the workmen indicating the following:

FORM XIII : REGISTER OF WORKMEN EMPLOYED BY CONTRACTOR						
<i>(Rule 75)</i>						
Name and address of contractor _____			Name and address of establishment in/under which contract is carried on _____			
Nature and location of work _____			Name and address of Principal Employer _____			
<i>Sl No</i>	<i>Name and surname of workman</i>	<i>Age and Sex</i>	<i>Father's/ Husband's name</i>	<i>Nature of Employment/ Designation</i>	<i>Permanent Home Address of workman (Village and Tehsil / Taluk and District)</i>	
1	2	3	4	5	6	
<i>Local Address</i>	<i>Date of commencement of employment</i>	<i>Signature or thumb-impression of workman</i>	<i>or</i>	<i>Date of termination of employment</i>	<i>Reasons for termination</i>	<i>Remarks</i>
7	8	9	10	11	12	

The categorization of workmen shall be as follows

- Skilled and Semi-skilled: Carpenters, Bar binders, Fitters, Scaffolders, Painters, Welders, Grinders, Electrician, Riggers
- Unskilled workers: Helpers

Prohibition of Child labour

VA Tech Wabag shall

- Not employ any child to perform any work that is economically exploitative, or is likely to be hazardous to, or to interfere with, the child's education, or to be harmful to the child's health or physical, mental, spiritual, moral, or social development.

Forced Labour

Wabag will not employ forced labour, which consists of any work or service not voluntarily performed that is exacted from an individual under threat of force or penalty. This covers any kind of involuntary or compulsory labour, such as indentured labour, bonded labour, or similar labour-contracting arrangements. The client will not employ trafficked persons.

6 Code of conduct

1. Behave equitably, honestly and transparently.
2. Comply with all legal regulations and Wabag policies and rules.



3. Not maliciously or recklessly injure or attempt to injure the reputation of another party.
4. Alcoholic liquor or drugs shall not be imported, sold, given, bartered or otherwise disposed. There must be no importation, selling, gifting of alcoholic liquor or banned substances by the staff.
5. Carrying arms and ammunition into the site is strictly prohibited. No person shall give, barter or otherwise dispose of, to any person, any arms or ammunition of any kind, or allow any sub-contractor staff to do so.
6. No personnel shall indulge in fighting, horseplay or practical jokes within the site or its perimeter.
7. Offensive or inappropriate language and provocative gestures are not allowed
8. Gambling is prohibited in the site premises
9. There shall be no gender based discrimination for any opportunities in any project related works. It is to be ensured that both men and women have fair opportunities to participate in and benefit from any project related works.
10. Strict action will be taken in cases of sexual and physical abuse, and necessary action as per the legal regulations.
11. Women will be protected against harassment and abuse and all cases will be dealt in line with the statutory norms in place for the protection of women.
12. No person shall be required or instructed to work in surroundings or under conditions that are unsafe or dangerous to his or her health. Each employee must take responsibility to become aware of the hazards associated with their workplace and tasks they are to perform.
13. Each person is responsible to complying with applicable safety requirements, wearing prescribed safety equipment, and preventing avoidable accidents.
14. All workers must understand the risks of works undertaken and the precautions required before the start of the activity.
15. Any person responsible for the destruction or misuse of company property will be reprimanded for their actions.
16. Treat each other with cultural and religious sensitivity and rest their well-being.
17. Strict action will be taken for all cases of theft
18. All workers must carry their induction cards at all times while at the work site.

7 Roles and Responsibilities

Project Head

- Implementing the VA Tech Wabag HSE policy across the projects.
- Understand the legal requirements pertaining to labour management and implement of the same.
- Ensuring the implementation of the Labour influx and worker management Plan.
- Ensuring the labour management Risk Assessments are implemented across the site and revised when required.
- Ensure accident and near-miss reporting procedures are understood by the workforce and complied with.



- Establish a clear communication with the project manager, construction manager and HSE manager to strictly implement the labour management procedures.
- Ensure that the labour issues are reported and corrective actions are taken by the site team regularly.

Project Manager

The project manager is accountable and responsible for implementation, management and compliance of health & safety for the project. He will ensure:

- Overall implementation of the project safety management system
- Assign tasks to senior managers and safety personnel to achieve specified activities and tasks of the project objectives.
- Ensuring legal and statutory labour OSH standards are implemented at the project site.
- Ensuring the workforce is adequately trained and competent to implement the HSE Plan.
- Ensuring each sub-contractor has developed and implemented a detailed safety management system with labour management in line with project requirements.
- Facilitate monitoring programs for assessing the effectiveness of the labour management programs and taking actions for improvement.
- Participate in site walkthrough, safety committee meetings and mass tool box talks. Use these as a medium of directly communicating with workers and receiving their feedback.

Resident Construction Manager

Resident construction manager will lead the safety and health initiatives at project site. He will be:

- Accountable for implementing the labour management procedures across all construction activities at site.
- Ensure sub-contractor complies with the mandatory labour welfare requirements and take action if non-compliance is observed.
- Responsible for the implementation of welfare activities including awareness and training of the workforce.
- Facilitate the labours with the basic amenities and facilities like clean drinking water, sanitation, hygienic living conditions, protection from pests, etc.
- Provide & maintain safe system of work for all personnel working at project site.
- Make available resources to enable execution of OHS activities.
- Ensure participation and involvement of employees in the awareness and training program.
- Ensuring appropriate health and safety standard are developed & implemented.
- Participating in monitoring programs, like labour camp inspection etc.
- Submit a detailed report to the client/consultant
- Constitute and chair the site safety committee monthly, and organize meetings and programs and monitoring compliance with safe work methods.
- Stimulating high level of safety awareness at all times & identifying safety-training needs.
- Reviewing audit and inspection reports and implementation of preventive and corrective action plan.



- Perform regular Safety walkthroughs along with the HSE officer to inspect the site for its compliance to the HSE requirements.
- Lead mass tool box talks to the workers weekly, to discuss critical OHS issues and increase awareness. Also take feedback from the workforce.
- Organize and conduct regular health camps.

HSE Manager

The HSE Officer has the following roles and responsibilities:

- Implementation of the project specific Labour influx and workers camp management plan.
- Preparation, implementation, review and update of the risk management procedure for labour management in coordination with project execution team.
- Monitor the compliance to the regulatory and statutory requirements.
- Inspection of work area, work method, Men, Machine, materials, tools and tackles.
- Creating awareness on occupational health and hygiene through tool box talks, on the spot training, awareness programs.
- Inspection of labour camps to verify the hygienic condition and take suitable corrective action
- Communicate legal rights and requirements to the workforce.
- Record all feedback, grievances and complaints, recommend and ensure corrective action is implemented and preventive action are taken.
- Maintaining the necessary records.
- Conduct investigation of all Near Miss cases/ LTI/ Fatal/ Dangerous occurrences and recommend appropriate corrective measures and inform client within 24 hours. The project office and the corporate office shall be informed immediately.
- Conduct weekly safety walk through with client/Resident Construction Manager/Discipline lead/Project Manager and implement the findings.
- Safety signage are displayed at various work locations so that the workers get the right information about the best practices to be followed at site.
- Communicating incident and near misses from all sites to the site engineers and the workmen through LTI alerts.
- Conduct safety induction training to all the workmen/new workmen and maintain records.
- Conduct job specific trainings and trainings on work instruction to all the workmen.
- Organize campaigns, competitions, and other special emphasis programs to promote awareness on OHS in the work place.
- Organize awareness training to inculcate
- Develop an emergency response and preparedness plan and ensure that it is displayed and communicated to all the people in the site.
- Conduct periodic emergency response preparedness mock drills to ensure that the emergency evacuation plan is effective. The same is to be documented.

8 Risk and Impact Mitigation

As with any project of this scale and nature, there are certain risks that cannot be entirely eliminated, i.e. residual risks after implementing mitigation measures. With respect to impact



mitigation, the risks have been addressed in this plan along with control measures to bring the risk to acceptable levels for ensuring a safe and healthy working environment. This plan seeks to address the following:

1. Labour and working conditions
2. Accommodation conditions
3. Occupational health and Safety
4. Community management

The major risks identified are:

- Exposure of workforce to potential harm, injury, ill-health and to enjoyment of human rights, etc.
- Exposure of the workforce to poor accommodation standards.
- Exposure of workforce to inadequate OHS standards.
- Conflict and tension associated with interaction between the workforce and local communities.

The risks and control measures have been detailed *in Annexure-1: Risk assessment & control measures*

The Hazard identification and risk assessment has been carried out for all construction activities separately. These are attached along with the Health Safety and Environment Plan.

9 Consultation and Participation of workers

The project team ensures the participation of the workers through various methods, and ensures they are made aware of the HSE Operational Processes and Procedures being implemented at site level. A platform is created for workers to communicate and resolve any issues related to Health and Safety.

Safety committee meetings are conducted on a monthly basis which will help to encourage workers participation in the identification of risks and mitigation of hazards.

Employees/workers shall be encouraged to raise their concerns / feedback, if any without fear of repercussions, through any of the following modes maintained in the project:

- Report to respective Supervisors
- Voice their opinion in HSE meetings.
- Discuss the issues with the Safety Engineer during the TBT/Awareness Sessions

Worker Feedback System: Concerns / feedback / suggestions obtained as above shall be recorded in the Feedback Register maintained by HSE engineer. The system will also include areas to record information on measures to address issues, timeframes, personnel responsible and any subsequent feedback that is required.

The grievance procedure has been attached along with the Plan.



Annexure III: Consultation, participation, grievance redressal of workers: Procedure

Annexure IV: F-540-002 Worker Feedback form: QHSE Review

Annexure V: F-840-003 Worker Feedback form: Complaints and Improvement

10 Welfare Facilities: Labour Camp

VA Tech Wabag shall be responsible for the providing health, hygiene and welfare facilities to the personnel.

- Medical examinations for Height, Trench and confined space workers
- Welfare of labour camps by ensuring hygienic living quarters.
- Provide the highest quality of sanitary facilities to the labour camp
- Conducting regular medical checkup for the contractor workers

Information obtained from exposure monitoring and surveillance campaigns can be used to tailor health awareness and training programs for the workforce.

Labour camp facilities

If a labour camp is provided, all the necessary services and compliance to local regulations will be maintained.

Accommodation

- The proximity of the camp should be located away from the congested, market and densely residential areas.
- The inspection of camp will be done to ensure proper hygiene and housekeeping.
- Proper sanitary facilities will be provided.
- Safe drinking water will be made available.
- The camp should be appropriate to protect the workers against heat, cold, damp, noise, fire, and disease-carrying animals, and, in particular, insects
- Pest control will be carried out at a pre decided frequency. Timely spraying of insecticide will be done to prevent spread of communicable diseases in the site.
- Rooms and dormitory facilities will be designed and built so that workers can rest properly and maintain good standards of hygiene.
- Rooms/dormitories will be kept clean and in good conditions, exposure to noise and odour must be minimized.
- Ensure access to adequate medical facilities and services is provided to workers; an adequate emergency response system must be put into place.
- The accommodation services will be provided in a manner consistent with the principles of non-discrimination and equal opportunity.
- Workers' accommodation arrangements should not restrict workers' freedom of movement or of association. Workers' gender, religious, cultural and social backgrounds must be respected.



- Regular housekeeping is to be conducted and records are to be maintained
- Security personnel must be posted to ensure safety and security
- Storage of waste is to be done separately and away from the living quarters, as per the waste management guidelines and procedures.
- The community are to be made aware of the camps and local community. Movement of migrant labourer within the villages should be restricted and Local residence/village should be restricted from the labour Camp.
- Waste and Waste water generated from labour camp should not dump within the villages
- Nearby Pond/Surface water should not be polluted
- For dismantling of the mobile camp after completion of construction work, the contractor should ensure that all residual materials are collected to avoid any unnecessary lasting impacts of the accommodations on the communities (garbage, equipment etc.).
- Grievance mechanism should be made aware and accessible to the local people in case of any complaints and issues. The mechanism should also be made available to the workers to register their grievances.

Potable water, Toilets, Latrines, Washing Facilities, and Wastewater Disposal

- Throughout the period of construction VA Tech Wabag will provide, maintain, and cleanse suitable and sufficient toilets, latrines and washing facilities for use by its employees and workmen
- After completion of the works, the temporary toilets, latrines, washing facilities, septic tanks, and soak pits shall be removed, all ground disinfected and the surface restored to its original condition.
- Welfare facilities such as access to drinking water within easy reach, sheds for rest / lunch breaks, toilets in sufficient numbers in well-lit at easily accessible locations shall be made available at all times for male and female employees and workers. The drinking water will be as per the local drinking water standard.
- Workers will not be permitted to eat food at workplaces other than the designated shed / cabins to prevent attracting vermin and ingestion of contaminated food.
- The facilities will be kept clean and well maintained.
- Hand washing facilities will be provided
- The presence of stagnant water will be avoided as it is a factor of proliferation of potential disease vectors such as mosquitoes, flies and others. This has also been discussed in the subsequent section of training and awareness programs.

Kitchen

- The kitchen area will not be made of bamboo to prevent fires. The oil and other hazardous materials will be stored safely.



- Kitchens will be designed, built and equipped so to maintain an adequate personal hygiene and to permit food hygiene practices, including protection against contamination.

Pest control

- VA Tech shall take the necessary precautions to protect Wabag's & Employer's Personnel employed on the Site from insect and pest nuisance, and to reduce their danger to health and shall comply with all the regulations of the local health authorities, including use of appropriate insecticide.
- Timely spraying of insecticide will be done to prevent spread of communicable diseases in the site.
- Pest control services will be called regularly to ensure that the site is free of rodents and poisonous reptiles.

Rest break

In extreme temperatures the work group will structure the work to enable regular rest breaks. Temporary rest-sheds shall also be arranged. Measures will be taken to prevent heat stress related illness.

11 Disease prevention

The influx of workers may cause impacts to public health, especially an increase in prevalence of diseases. Influx of migrant labours during construction can cause mixing of the migrant workforce with the local people. This mixing of the groups may cause some adverse impacts to public health in the neighboring villages with the potential for spread of infectious diseases such as AIDS.

One of the major concern at the labour camp for construction workers is the possible spread of diseases due to poor hygiene and lack of adequate sanitation facilities. These problems will be taken care of through these plans by adopting the aforementioned camp management processes. Trainings and awareness programs will also be conducted for ensuring that:

1. The workers are aware of the causes and symptoms of the diseases
2. The workers are aware of the prevention techniques
3. Prevent the spread of communicable diseases, to prevent epidemics
4. Ensuring that a healthy work environment is maintained at site
5. Workers are educated about the health and hygiene practices

12 Emergency Preparedness and response

On site updated First aid kit, trained first aiders, emergency response vehicle will be provided.



The camp should be located at a location which is not exposed to wind, fire, flood and other natural hazards. If the area is prone to natural disasters then emergency response trainings and mock drills will include these to educate the workers on the actions to be taken in case of emergencies.

It is also important that workers' accommodation is unaffected by the environmental or operational impacts of the worksite (for example noise, emissions or dust) but is sufficiently close that workers do not have to spend undue amounts of time travelling from their accommodation to the worksite.

Fire extinguishers will be provided in sufficient quantity and the supervisors will be trained to fight fire in case of an emergency.

Emergency contact information and assembly point signage must be posted at the labour camp

13 Monitoring - Performance Indicator

i. HSE Index

HSE Index is a performance measurement tool designed for aligning project sites with the VA Tech Wabag Safety standards. It is a checklist which covers the different aspects of the Safety Management System and it will be carried out as per the schedule described in the Site Activity Plan. HSE Index score of above 90 indicates a good compliance to the requirements of the HSE Management System.

Refer Annexure VI: HSE Index checklist

ii. Internal Audits

- **The audit will be conducted to measure the effectiveness of implementation of the Labour Influx and worker camp management which will focus on the following:**
 - Undesirable camp conditions;
 - Grievance records of employees;
 - Workers' accommodation conditions
 - Evidence of worker consultation and participation
- Audit is conducted by the team as per schedule, using appropriate audit checklist, audit report is prepared by the audit team and submitted to the QHSE head for review.
- The report is then circulated to the respected site/department for the follow up action and compliance.
- Audit would be carried out by external audit team and report submitted by the team will be circulated to all stakeholders for review and follow up action.



i. Labour camp inspection

Regular labour camp inspection will be carried out to ensure that the welfare facilities are available to all workers and is functioning well. A checklist is available which lists out the requirements which will be inspected by the HSE In-charge.

Annexure VII: Labour camp inspection checklist

14 Reporting

Reporting system will be based on the communication requirements for implementing and assessing the labour management plan. The following records will be maintained and communicated periodically:

1. Worker details: HSE Induction
2. Trainings given
3. Welfare facilities inspection
4. Grievances & Improvement suggestions lodged
5. Incidents and health issues reported
6. Disciplinary actions/ Violations raised

15 Training and awareness

Trainings and awareness programs will be conducted on based on the risks evaluated. Regular training will help create a positive living and working environment, by educating the labor of the health risks. Through awareness sessions and trainings the following information can be provided which will help in preventing diseases which occur as a result of poor hygiene and housekeeping.

The following topics will be covered are:

1. Health & Hygiene

- Sanitation
- Kitchen hygiene
- Housekeeping
- Safe storage of materials
- Personal hygiene
- Waste management and disposal

2. Cultural awareness

- Interacting with the local community
- Persisting local social issues
- Safety and security concerns, if any



- Religious tolerance and building brotherhood

3. Communicable diseases

- Causes. Symptoms, Preventive measures, Treatment of
 - Water borne diseases - Cholera, Diarrhea, Dysentery, Typhoid
 - Air borne diseased - Chickenpox, Tuberculosis, Flu
 - Insects/pests - Malaria/Dengue/Snake bite
 - Sexually Transmitted diseases - HIV/AIDS, Viral Hepatitis
- The training will include discussions on removing taboo associated with the diseases and the treatment involved.
- How to recognize the symptoms and what actions are to be taken
- What are the preventive measures that are to be adopted in the form of housekeeping and cleanliness to protect oneself from these diseases
- Steps for preventing an epidemic

4. Code of conduct - Social management

The following will be communicated as a part of code of conduct:

- Health impacts of alcohol and drug abuse. Prohibiting the workers from indulging in sale, possession and use of narcotic drugs.
- Prohibiting fighting & gambling
- The labor camp property is to be treated with care and damage to it is a serious violation
- Harassment will not be tolerated and all cases will be strictly dealt with.
- Protection of women and children against abuse and harassment
- Reporting and redressal of cases of harassment
- Sexual abuse protection, training and redressal
- Wabag policies and rules
- Labor camp rules

5. Disciplinary and grievance procedure

The grievance procedure will address the communication and redressal of workers concern, pertaining to the work site and the labour camp. The grievance procedure has been attached along with the Plan.

Annexure VI: Consultation, participation, grievance redressal of workers

6. Interaction with community

- Local religious and cultural beliefs and practices
- Communal conflicts



- Protection during man-made emergencies

7. Gender discrimination & harassment prevention and redressal

- Protection of women from physical, mental and sexual abuse and harassment
- Understand the gender roles, and providing knowledge regarding equality
- Rights and regulations for the protection of women
- National laws for prosecuting sexual harassment & gender based violence
- Gender stereotyping
- Engaging men and boys in the empowerment
- Equal opportunities to education and pay
- Importance of educating women
- Prohibition of Child marriage

After the commencement of works, a training plan will be developed to ensure that all the subjects are covered and timely trainings are conducted.

The trainings in the respective areas will be provided by professionals with competencies in the areas as required.

The training plan format has been attached along with the HSE Plan. All trainings will be included in the HSE training program.



ANNEXURE I RISK ASSESSMENT

S.No	Risks	Control Measures	Responsibility	Monitoring
Occupational health and hygiene				
1	<p>Recruitment of individuals who, by virtue of age, would be exposed to hazardous situations and be subject to impaired social development.</p> <p>Increased health and safety risk to workforce, potential non-compliance with national labour laws, and reputational risk to Project.</p>	<p>Human Resources and contracting policies and/or procedures that cover recruitment and selection processes that specifically address issues associated with child labour.</p>	<p>Project manager / Resident Construction Manager</p>	<p>Quarterly</p>
2	<p>Worker accommodation building specifications (camps). Accommodation is considered sub-standard which leads to discontent amongst the residents and concerns about perceived health risks. Workers have low morale and perceive the contractor to not care about their welfare, which in turn affects motivation and productivity.</p>	<p>The labor camps have to have basic minimum requirements such as:</p> <ol style="list-style-type: none"> 1. Adequate and clean drinking water 2. Sufficient toilet facilities are to be provided along with washing facilities 3. Separate male and female toilet and bathing facilities should be provided. 4. Areas should be well lit and able to be switched on or off at all hours 5. First aid facilities should be provided and accessible at all times 6. Access should be provided to enable entry by emergency services eg. ambulance or fire brigade 7. Potential health outbreaks should be monitored and measures taken to prevent spread 	<p>Project manager/ Resident Construction Manager</p>	<p>As per Labour camp monitoring schedule</p>





W A B A G

Creating a better life.

Labour Influx and Workers Camp Management Plan

Doc no: KMDA/LIWCMP/01

Date:
Rev.: 0

Page 19 / 27

	<p>Residents do not live in harmony and the potential for conflict rises. Residents do not know how to complain or make a grievance.</p>	<p>8. Employers should be encouraged to vaccinate the workforce from communicable diseases</p> <p>9. Clear and multilingual signage should be provided around hazardous storage areas like diesel, kerosene etc.</p> <p>An induction program to be attended by all residents that covers at least the following:</p> <ul style="list-style-type: none"> • Camp rules and regulations • Code of conduct • Camp grievance mechanism • Camp disciplinary procedure • Complaints system for food, dining, housekeeping and maintenance • Community relations cultural awareness • Health, safety and security 	<p>Project Resident Construction Manager/ HSE In-charge</p>	<p>Fortnightly</p>
<p>3</p>	<p>The general appearance of the camp deteriorates making camp life unpleasant. The overall camp experience is compromised which in turn leaves workers demoralized and unproductive.</p>	<p>Complaint and grievance to be recorded through Workers feedback system.</p> <p>Ensure that camp grounds and common areas are routinely cleaned and organized with appropriate signage in place.</p> <p>Waste management plans should include the timely removal and disposal of wastes generated in the labour camps.</p> <p>Wastewater and sewage will be discharged in compliance with local and World Bank standards</p>	<p>Resident Construction Manager / HSE In-charge</p>	<p>Fortnightly</p>

4



		without causing any significant impacts on camp residents, the biophysical environment or surrounding communities.		
	Inconsistent and aggressive behavior of security personnel towards workers can result in tensions and conflict in the workplace and a perception of human rights abuses. Insufficient training and control of security personnel can lead to the inappropriate use of force, while protecting Project workers and assets, or inappropriate behavior towards local populations, resulting in human rights claims.	Ensure that camp security personnel meet at least the following requirements: <ul style="list-style-type: none"> • Have not been implicated in past abuses • Are trained in appropriate conduct towards workers and community members including: <ul style="list-style-type: none"> o Exercising constraint and caution and understand how force may be used o Respecting human rights o Behaving consistently o Knowing and abiding by applicable laws o Fostering good community relations through their interaction and behavior towards the workforce 	Resident Construction Manager / HSE In-charge	Monthly
5				
	Dangers due to pests, poisonous insects and reptiles. The pests can result in malaria, dengue, chikungunya, typhus and leptospirosis, which can be contagious and infect the other workers as well.	Regular pest control activities are to be carried out to prevent infestation and infection.	Resident Construction Manager / HSE In-charge	As per pest control schedule
6				
	Harassment or discriminatory behavior on the basis of caste, religion, gender, age, region etc	<ol style="list-style-type: none"> 1. Adopt detailed clear, non-discriminatory, internal accommodation rules and procedures. 2. The workers are to be made aware of their rights, duties, responsibilities and the camp rules. 3. Regular inspections are to be carried out to ensure adherence to the protocols 	Project Manager / Resident Construction Manager/ HSE In-charge	As per training schedule
7				



		<p>4. Ensure that grievance and conflict resolution mechanisms are understood by all workers.</p> <p>5. Cultural awareness programs during induction for both workers and supervisors, and a code of conduct training to cover the following: Respect for different cultures</p> <ul style="list-style-type: none"> • Acknowledgement of cultural differences in respect to diet, religious ceremonies and so forth • Non-discrimination and equal opportunity • Harassment, types and consequences, including harassment of women • Community “do’s and don’ts” 		
--	--	---	--	--



ANNEXURE-II OHSE POLICY



**OCCUPATIONAL HEALTH, SAFETY
 AND ENVIRONMENTAL POLICY**



VA TECH WABAG LTD. as a market leader in the Indian water technology offers portfolio in the areas of municipal, industrial water and wastewater treatment, besides offering a full fledged state-of-the-art engineering services in line with global standards both in terms of quality and delivery.

VA TECH WABAG LTD will undertake every reasonable effort to eliminate the hazards that cause incidents and injuries and aim to control or reduce wastage of natural resources, energy, materials and chemicals.

We shall strive to continually improve our Occupational Health, Safety and Environmental performance in our activities, products and services by implementing and maintaining the HSE Management Systems and by,

- ❖ Ensuring compliance with applicable legal and other requirements.
- ❖ Avoidance of incidents through prevention and Safety awareness.
- ❖ Promotion of activities that could minimise environmental pollution.
- ❖ Optimising the utilisation of natural resources like energy, construction materials and reducing the waste generation.
- ❖ Promotion of measures aimed at enhancing the physical and emotional health of the people who work with or for our company.
- ❖ Creating awareness amongst our employees and stake holders by proactive communication, training and felicitation.
- ❖ Increasing green cover in and around the operational sites.

Date : 23.08.2010

Rajiv Mittal
RAJIV MITTAL



ANNEXURE III CONSULTATION, PARTICIPATION & GRIEVANCE REDRESSAL OF WORKERS

(Attached along with the Plan)



ANNEXURE IV WORKER FEEDBACK FORM- COMPLAINT & IMPROVEMENT

(Attached along with the Plan)



ANNEXURE V WORKER FEEDBACK FORM - QHSE REVIEW

(Attached along with the Plan)



ANNEXURE VI HSE INDEX
(Attached along with the Plan)



ANNEXURE VIII- LABOUR CAMP INSPECTION CHECKLIST

(Attached along with the Plan)



