Volume-XVII

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MMRDA

004519

MUMBAI METROPOLITAN REGION DEVELOPMENT AUTHORITY

STRABAG

JV of STRABAG Infrastructure & Safety Solutions GmbH and STRABAG AG

Mumbai Trans Harbour Link Project, Package-4

Design, Supply, Installation, Testing and Commissioning of Intelligent Transport System (ITS), Toll Management System, Electrical works, Highway and Bridge streetlighting system, Construction of Toll Plazas and Administrative Buildings including Command Control Centre

Bid Documents

IFB No.: MMRDA/ENG1/0002561

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Technical Proposal

Safety Plan / Environment Management Plan / Health Plan

Outline OHSE Plan

MUMBAI TRANS HARBOUR LINK PROJECT (MTHL)

IFB No.: MMRDA/ENG1/0002561:

Document No.	Document Name		Document Revision
0001	OUTLINE OCCUPATIONAL HEALTH, SAFETY & ENVIRONMENT PLAN		R00
	Prepared By	**Checked By**	**Approved By**
Name	Sandeep	Mubashshir	Anuj
Designation	Manager	DGM	GM
Date	29.11.2021	29.11.2021	29.11.2021

STRABAG	OUTLINE OCCUPATIONAL HEALTH, SAFETY & ENVIRONMENT PLAN	एम एम आर डी ए MMRDA

EMPLOYER	**MUMBAI METROPOLITAN REGION DEVELOPMENT AUTHORITY**
ENGINEER	**GENERAL CONSULTANT (GC)** Consortium of AECOM, PADECO, DAR and T.Y.LIN
VERIFIER	**General Consultant**
CONTRACTOR,	STRABAG,
IFB #	**MMRDA/ENG1/0002561** Design, Supply, Installation, Testing and Commissioning of Intelligent Transport System (ITS), Toll Management System, Electrical works, Highway and Bridge streetlighting system, Construction of Toll Plazas and Administrative Buildings including Command Control Centre

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STRABAG	OUTLINE OCCUPATIONAL HEALTH, SAFETY & ENVIRONMENT PLAN	एम एम आर डी ए MMRDA

1. OBJECTIVE

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

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

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

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

2. ABOUT THE PROJECT

2.1. PROJECT

Package -4: Design, Supply, Installation, Testing and Commissioning of Intelligent Transport System (ITS), Toll Management System, Electrical works, Highway and Bridge streetlighting system, Construction of Toll Plazas and Administrative Buildings including Command Control Centre.

2.2. SCOPE OF THE PROJECT

The scope of work under the Contract covers the following:
Design, Supply, Installation, Testing, Integration and, Commissioning of :

1. Intelligent Transportation System (ITS)
2. Toll Management System (TMS)
3. Traffic Management Stem and associated Fiber Optic System (ATMS)
4. Security Surveillance at all Substations, Toll Plazas, Administrative Buildings
5. Electrical Powering System with BMS Automation System
6. Power on Fire Fighting, Dehumidification and Navigational Aids
7. Highway Illumination System and Providing Specified Aesthetic Lighting and Controls
8. Design and Construction of Administrative Buildings including CCC with state of Art Interiors, Furnitures and Mechanical, Electrical, Plumbing and Fire Fighting Services
9. Design and Construction of Toll Plazas with associated MEPF Services
10. Development of Food Plaza incl. MEPF works

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2.3. DETAILS OF THE CLIENT

The Engineer-in-Chief, MTHL-PIU,
Mumbai Metropolitan Region Development Authority (MMRDA),
2nd Floor, New Office Building, Plot No. R-05, R-06 & R-12, 'E' Block,
Bandra-Kurla Complex, Bandra (E), Mumbai Maharashtra, INDIA
400051

2.4. CONTRACT PACKAGE

MMRDA/ENG1/0002561

2.5. PERIOD OF THE PROJECT

460 Days from the "Commencement Date" (XX-XXX-XXXX)

3. DEFINITIONS

SHE	Safety, Health and Environment
Employer	Mumbai Metropolitan Region Development Authority (MMRDA)
BOCWA	Building and Other Construction Workers (Regulation of Employment and Conditions of Service) Act, 1996
BOCWR	Building and Other Construction Workers (Regulation of Employment and Conditions of Service) Central Rules, 1998
CIIBC	Chief Inspector of Inspection of Building and Other Construction

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4. POLICIES

4.1. HEALTH, SAFETY & ENVIRONMENTAL POLICY

4.1.1. Policy Objectives

- STRABAG should aim at zero fatal accidents.
- STRABAG should aim at zero dangerous occurrences.
- STRABAG should aim at an Accident Frequency Rate (AFR) of less than 0.5 per 1,00,000 hours worked on the ground

4.1.2. Implementation of Policy Objectives

The following general approach has been adopted by STRABAG with a view to achieving the policy objectives set out above

a. Secure a commitment to safe and healthy working practices by all parties involved in the construction process, including consultants, Contractors, sub- contractors, workers' unions, and utility providers.
b. Develop contract provisions that require Contractors to prepare, implement and monitor safety plans, and ensure that sub-contractors are also obliged to comply with the same. (Copies of the provisions relating to Health and Safety are contained in the Conditions of Contract).
c. Arrange accident prevention, safety management training for all site staff supervising Contracts.
d. Establish Site Safety Management Committees to monitor the implementation of safety plans and keep a record of the Meetings of the Committees.
e. Build up a database of accidents and dangerous occurrences, for the purpose of monitoring trends, analysing data, and formulating measures for accident prevention.
f. Publish this Manual to assist in the administration of construction safety matters of the Employer's contracts.
g. Oversee the safety performance of the Contractors and sub-contractors to ensure that their duties and responsibilities on health and safety under the Contract, this Manual, and other relevant Employer and Government requirements are fully discharged.
h. To publish and issue any further instruction / appendices needed for any specific requirement of the Contract.

Authorised Signatory

Date: XX/XX/XXXX
Place: Mumbai

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4.2. DRUG / ALCOHOL POLICY

DRUGS / ALCOHOL POLICY

Management of the company undertakes to promote and preserve the health and environmental safety of all employees, and accordingly, has drawn up a "DRUGS/ ALCOHOL" policy that everybody will be expected to adhere to.

This policy will form part of the disciplinary code, and failure by any person to adhere to it will result in severe disciplinary action being taken, which could result in dismissal. The laws and procedures on Drugs and Alcohol legislation have been set up and are available in the relevant Government Gazette.

PRINCIPLES

In order to create a pleasant, healthy and environmentally safe climate in which to work and to reduce any unnecessary exposure to the effects of smoking in the workplace, the company has decided to declare all buildings on this property as Alcohol / Drugs free ZONE.

This means that no person is allowed to consume alcohol and health injurious drugs within the building or come to work intoxicated.

PROCEDURES

All employees are expected to abide to the company's policy in order to ensure a safe, healthy and environmentally friendly workplace and to facilitate communication and industrial harmony to the mutual benefit of all concerned.

All employees shall adhere to the following procedures.

- No use of Alcohol/ Drugs in the company buildings
- Do not work under the influence of Alcohol or Injurious Drugs.
- No selling / advertising of alcohol on the company premises.

Authorised Signatory

Date: XX/XX/XXXX
Place: Mumbai

4.3. HIV POLICY

HIV POLICY

STRABAG TO ENSURE A CONSISTENT AND EQUITABLE APPROACH TO THE PREVENTION OF HIV/AIDS AMONG EMPLOYEES, AND TO THE MANAGEMENT OF THE CONSEQUENCES OF HIV/AIDS.

WE ARE COMMITTED TO AVOID ANY ACTIVITY BY THE WORKERS THAT MAY LEAD TO HIV/AIDS DISEASE AND SHALL REMAIN OPEN TO ANY MEDICAL EXAMINATION IF DEEMED FIT BY THE MANAGEMENT.

WE WILL CREATE AWARENESS THROUGH PROFESSIONAL AGENCIES BY CONDUCTING SUCH PROGRAMS SPECIALLY DESIGNED FOR MIGRATORY WORKERS ON DRUG ABUSE AND USE OF CONDOMS.

Authorised Signatory

Date: XX/XX/XXXX
Place: Mumbai

4.4. Memorandum of Understanding (MOU)

MoU Shall be signed & submitted after award of contract

5. SHE ORGANISATION CHART

Once the SHE personnel is appointed, STRABAG will submit the details of qualifications and experience to the Employer for the purpose for comments and approval well before the start of the work.

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5.1. ROLES & RESPONSIBILITES

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

5.1.1. PROJECT MANAGER

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

The Project Manager is responsible for:

- Establishing, implementing as well as monitoring and reporting on SHE procedures at work site.
- Compliance with statutory and regulatory requirements.
- Review overall safety requirements in site with Safety Officer and other Managers prior to finalization of contracts and issuance of work order.
- Issue specific directives to sites concerning safety & health of employees and contract workmen.
- Carry out periodically site inspections along with the Sectional Heads and the Site Safety Officer.
- Periodically review Safety performance / Accident Statistics and installed safety measures to prevent recurrence of incidents at sites under his control.
- Incorporating the safety requirements in method statements before submitted to the Client /main contractor.
- Ensure selection of experienced and competent personnel for the project work and establishing a health and safety training plan for all project personnel.

5.1.2. SAFETY (ACCIDENT PREVENTION OFFICE)

Manage the SHE functions for following tasks, duties and responsibilities personally or through others.

- Plan and implement safety policies and procedures and budgets in compliance with applicable statutes and local laws & standards
- To be familiar with current SHE legislation relevant to the project and liaise with the Regulatory Authorities
- Establish (in consultation with other stakeholders) measurable goals for achievement of safety results that exceed industry and peer group standards
- To ensure that safety procedures are implemented in accordance with the requirement of project safety plan and agreed contract condition.
- Plan and implement programs to train managers, supervisors, operatives and other workers in safe operating procedures, ergonomics, fire prevention, safe handling of hazardous, and other materials etc.
- Conduct and coordinate safety inspections in all project locations and construction sites
- Lead the investigation of incidents, injury accidents and cooperate in the preparation of material for hearings and insurance investigations.
- Coordinate emergency response procedures with others on security practices
- Maintain updated Material Safety Data Sheet and train employees in their use
- Coordinate injury reports, return to work plans and risk management programs.
- Communicate with physicians, employees and Insurance in post injury follow up
- To organize "Safety Committee" meeting chaired by the Project Manager once every month. Prepare and circulate MOM.
- To prepare monthly report on the Project's overall Safety Performance.
- Prepare documents for submittals to the Client
- Co-ordinate with MMRDA officials on safety, health & welfare matters.

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5.1.3. ENVIRNMENTAL SPECIALIST

- To implement site environmental plan.
- To promote and raise awareness amongst all regarding the impact of emerging environmental issues.
- To train staff at all levels in environmental issues and fulfilling their responsibilities.
- To issue non-compliance note to all those who do not follow the site Environmental plan.
- To manage routine activities and organize to give guidance for conducting specific activities.
- Prepare monthly reports giving compliance status on the overall Project Environmental issues.
- To arrange and conduct Environmental Audit on Monthly basis to ensure that the Environmental Plan is followed properly.
- To coordinate all aspects of pollution control, waste management, waste recycling, environmental health, conservation and renewable energy.
- To attend all meetings of MMRDA regarding Environmental Issues.
- To ensure compliance with environmental legislation and contractual norms

5.1.4. SHE SAFETY STEWARD

- To arrange safety induction of staff and workers and to organize refresher sessions whenever required and maintain record.
- To monitor entire work site on a continuous basis, pointing, suggesting / making on-the-spot corrections of unsafe acts of the workmen, and taking suitable steps to eliminate all observed unsafe conditions.
- To record all incidents / accidents at site, including minor accidents and ensure corrective actions are implemented to prevent similar accidents in future.
- To report accident / incidents involving major injury / loss in the prescribed format.
- To assist in investigating accidents / incidents in finding root cause and to ensure necessary actions to prevent recurrence are taken.
- Inspection of scaffolds to ensure correct erection prior to use,
- Inspection of ladders, safety harness and power tools at a prescribed frequency and maintaining a record of such inspection.
- To conduct toolbox talks on regular basis with respect to site base activities including testing and commissioning of equipment.
- To conduct safety training for personnel working at site.
- Co-ordinate in conducting risk assessment for critical jobs/ activities, based on the method statement to identify the possible hazards and the precautions to be taken before hand.

5.1.5. CONSTRUCTION MEDICAL OFFICER & FIRST AIDER

- Medical examination of workers and staff etc. deployed to work at sites.
- Attend all emergency cases of Injury and attend to OPD cases relate to site work.
- Must assist in accidents/incidents investigations by providing accurate account of treatment rendered to injure.
- Address the workers in health and hygiene related awareness programs at site.
- Coordinate the entire occupational health activities and facilities throughout the project sites.
- Review all contracts for health staffing, services, equipment and facilities to ensure that the contracts meet the required Standards and/or generally recognized best practices.
- Assure food hygiene standards are developed and implemented at all sites.
- Identify the health risks at all locations and recommend appropriate mitigating controls.
- Issue company-wide health alerts and supports the company's plan during threats of epidemic by ensuring preventive, promotive and curative health services are available.
- Ensure that primary health care is available to employees and monitor its performance.
- Monitor and measure the health fitness of the employees and recommend targeted wellness programs to improve their medical fitness and quality of life.
- Identify and put into practice health trainings at all local sites.
- Maintain effective networks with the Indian medical community, local government and NGOs.

- First aider/male nurse render treatment of minor injuries which do not need treatment by an Occupational Health Officer.
- First aider/male nurse shall attend emergency cases of injury and nursing care and general OPD handling for the purpose of preserving life and minimizing the consequence of injury and illness until such help is obtained from OHO.
- First aider/male nurse to assist the medical officer during the medical examination and maintain updated records.
- First aider/male nurse must arrange examination room and equipment and maintain them neat and clean.
- First aider/male nurse shall perform basic tests on the premises and dispose contaminated supplies properly and sterilize medical equipment.

5.1.6. ENGINEERS, SUPERVISORS & SKILLED WORKERS

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

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

5.1.7. INDIVIDUAL EMPLOYEE

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

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

5.1.8. RESPONSIBILITY OF SUB-CONTRACTORS SUPERVISOR

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

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

5.1.9. SUB CONTRACTOR RESPONSIBILITY TOWARDS HEALTH & SAFETY

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

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

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6. GENERAL RULES

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

- Stock of Gas Cylinders will be well within the permissible limit. Will be stored in a shed, its validity for hydraulic pressure testing and Hydro Stretch Testing will be checked at the time of accepting delivery at site.
- Compressed air shall not be used to clean clothing or a body part etc.
- Report all unsafe acts / conditions observed to your supervisors.
- Scaffolds shall be tagged "Under Construction" while being erected or "Ready for use" when it is completely erected, inspected, and okayed for use. It is mandatory to display the scaffolding checklist signed by Safety officer before use of scaffolding.
- Obtain hot work permit before starting any cutting & welding work.

7. PROJECT SHE COMMITTEE

7.1. SHE Committee

There shall be a SHE Committee at site chaired by the Project Manager. The representative of the management of SHE committee shall include

1.	**Chairman**	Project Manager
2.	**Secretary**	SHE Manager (In-charge)
3.	**Member**	SHE Personnel
4.		Labour & Welfare Officer
5.		Electrical In-charge
6.		Traffic Manager
7.		Store-in-Charge
8.		Resident Engineer, Deputy Project Manager, Construction Manager
9.		Sub – contractor's representative
10.		Co-contractor's representative
11.		Workers' representative

Notification of the same in the form of agenda shall be forwarded / communicated to MMRDA Officials and Committee Members and Employees.

7.1.1. Committee Meetings

Objective of the SHE committee meeting is to assemble persons with assigned responsibilities for safety so that they can formally address issues and take appropriate actions in relation to the achievement of the site safety management objectives.

The meeting shall be organized once in a month on a fixed day of each month. The SHE committee shall responsible for taking steps to ensure that the project activities are safe and employees and workers are observing safety Rules and Regulation.

The Project Manager shall be responsible for informing all employees of the finding of SHE Committee. The SHE manager shall be focal point of this event.

Purpose of SHE Committee Meetings is to review the implementation of the safety plan by ensuring the following,

- ✓ To create a safe work environment and to ensure all work activities are done in a safe manner.
- ✓ To find solutions of the safety related issues remaining unresolved.
- ✓ To identify the problem areas and to work out suggestions for the same.
- ✓ To review the SHE performance of the site, discuss incident / accident investigation report, lessons learnt and to plan ways to prevent recurrence of the same.
- ✓ To make an action plan for special SHE requirements for the activities planned in the next month.
- ✓ To review SHE training.
- ✓ To stimulate interest of employer and workmen in safety by organizing safety week, safety competition, talks and film shows on safety and taking similar other measures as and when required.

- ✓ To review the last safety committee meeting minutes and take action for non-compliance if any.
- ✓ The meeting shall be Chaired by the Project Manager or nominated Chief SHE Manager. The senior most manager may preside over the meeting in absence of Project Manager/ Alternate Official.
- ✓ SHE Manager shall be the Secretary of the meeting. He shall prepare agenda of the meeting in consultation with the Project Manager.
- ✓ The Secretary shall record the points discussed during the meeting and prepare report within 2 working days as per the format provided by GC/MMRDA and send the minutes of the meeting to the members concerned personnel for the compliance of action agreed.
- ✓ Safety Officers shall also follow up the implementation of the actions agreed. The minutes shall be displayed on the notice board for information to all.

7.1.2. The Committee Agenda

The Secretary shall circulate the agenda of the meeting at least seven working days in advance of the schedule date of the meeting to all members. The agenda for meeting should include

- ✓ Safety Pledge
- ✓ Review of the previous months report and confirmation of minutes.
- ✓ Previous month SHE statistics
- ✓ Review of project SHE objectives and targets
- ✓ Any non-conformance
- ✓ Any significant incident / accident to assess relevant learning points for prevention of same type of accident in future.
- ✓ Actions against findings from SHE inspections
- ✓ Presentation of pre-selected SHE topics to be given by committee members
- ✓ Any particular concerns on SHE matters that employee may want to highlight.
- ✓ Comments from GC/MMRDA Representative
- ✓ Chairman's review of site SHE performance / conditions
- ✓ Any outstanding issue with the permission of Chair.

The Secretary shall circulate agenda of the meeting at least seven working days in advance of the schedule date of meeting to all members.

7.1.3. Duties of Committee Members

- ✓ Assist and co-operate with the management in achieving the aims and objectives outlined in its safety and health policy.
- ✓ Deal with matters concerning safety, health and environment and arrive at practicable solutions to problems encountered.
- ✓ Create safety awareness amongst employees.
- ✓ Discuss reports on safety, environmental and occupational health surveys, safety audits, etc. and implement the recommendations contained therein.
- ✓ Carry out safety and health surveys.
- ✓ Look into complaints made on the likelihood of an imminent danger to the safety and health of the employees, causes of accidents etc. and suggest corrective measures for implementation.

8. HEALTH & SAFETY TARGETS AND GOALS

Project Manager prepares the Improvement Management Programs in a SMART way and it is ensured that the same are:

Zero Harm	Objective	Target
Safety	Internal safety audit from HO.	Yearly
	HSE training of employee	Yearly
	HSE awareness week	Yearly
	Attend safety conference	Yearly
	Providing and engaging training opportunity	Half Yearly

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	Safety Programs for awareness	Half yearly
	Recognise safe Behaviour Practices of labour	Quarterly
	Recognise training on safe working methods	Monthly
	First Aid training	Monthly
	Safety walk and SHE committee meeting	Monthly
	PPE checking	Weekly
	Tools and Equipment checking	Monthly
	Construction cable checking	Weekly
	Toolbox talk	Daily
	Safety Harness checking	Weekly
	Tagging and colour coding of Equipment's & Tools	Quarterly
Health	Medical Check before engaging	Yearly
	Stopping Mosquito Breeding	Rainy season
Environmental	Safety awareness of Environment	Quarterly

Smart Goal as mentioned below:

- ✓ HSE Policy Implementation at Project and Zero Goal implement at project means NO LTI and No accident at Site or project
- ✓ HSE Committee Meeting for review & implement & Management Commitment
- ✓ HSE management system, EHS risks are controlled in a systematic proactive manner
- ✓ Prevent or mitigate both human and economic losses arising from accidents, adverse occupational exposures, and environmental events
- ✓ Improve HSE performance continually
- ✓ Conduct periodic assessments to verify and validate EHS performance.
- ✓ Establish methods to use energy more efficiently, reduce waste, and prevent accidents.
- ✓ Comply with laws, regulations, and organizational requirements applicable to their operations.
- ✓ Identifies different levels of risk in all the particular areas of an organization.
- ✓ Documentation updating & etc.
- ✓ Make sure everyone is committed to safety
- ✓ Set clear standards for workplace safety performance.
- ✓ Take the lead & review all near misses, Dangerous occurrence & Etc.
- ✓ Get employees involved to the safety
- ✓ Promote understanding through Training
- ✓ Train for competence and safety
- ✓ Encourage feedback & look for teachable moments.
- ✓ Move swiftly to correct safety problems.
- ✓ View accident prevention as an ongoing challenge. & Etc.

9. LEGAL & OTHER REQUIREMENTS

STRABAG will ensure that it has knowledge of all the laws or regulatory requirements which may apply to its activities and shall abide by them. The applicable legislation and Indian statutory requirements are listed below but not limited to

1. Indian Electricity Act, 2003 and Rules 1956
2. National Building Code, 2005
3. Factories Act, 1948 and State Factories Rules
4. Motor Vehicles Act, as amended in 1994, The Central Motor Vehicles Rules, 1989
5. The Petroleum Act 1934 and Rules 1976.
6. The Gas Cylinder Rules, 2003
7. Indian Explosives Act 1884, along with Explosive's substance Act 1908 and Explosive Rules 1983.
8. BS-6164

9. Fire Preventions Act-2006
10. NFPA-130
11. The (Indian) Boiler Act,1932
12. The Public Liability Insurance Act 1991 and Rules 1991
13. The Minimum Wages Act, 1948 and Rule 1950
14. The Contract Labour Act, 1970 and Rules 1971
15. The Child Labor (Prohibitions & Regulations) Act,1986 & Rules 1950
16. Workman Compensation Act 1923 along with allied rules
17. The Environment Protection Act,1986 & Rules, 1986
    i. The Air (Prevention and Control of Pollution) Act, 1981
    ii. The Water (Prevention and Control of Pollution) Act, 1974
    iii. The Noise Pollution (Regulation & Control) Rules,2000
    iv. Notification on Control of Noise from Diesel Generator (DC) sets, 2002
    v. Recycled Plastic Usage Rules,1998
    vi. The Manufacture Storage and Import of Hazardous Chemical Rules, 1991
    vii. The Hazardous Waste (Management & Handling) Rules, 1989
    viii. The Hazardous Waste Management Rules, 1989 (as amended in 1999)
    ix. The Batteries (Management & Handling) Rules
    x. Fly ash utilization notification, Sept1999 as amended in August 2003
    xi. Central Pollution Control Board

In addition to legal requirements STRABAG and its subcontractor shall abide by National, State and Local Byelaws and MMRDA contract requirement and subscribe to codes of practices or performance measures imposed by credible bodies. The applicable key requirements under various legislations and key compliance responsibility with respect to work are as under:

Sl. No.	Legislations	Applicable Key Requirements	Compliance Responsibility
a)	Indian Electricity Act 2003 and Rules 1956	List of Authorized electrician, License for electrical contractor, Usage of work permit and PPE during electric work	Electrical Engineer
b)	National Building Code, 2005	Structural design	Design Engineer
c)	Building and other Construction Workers (Regulation of Employment and condition of service) Act and Central Rules1998, State Govt. Rules 2002 and 'BOCW' Welfare Board Rules	Safety, Welfare and Occupational Health Requirements	Contractor's Management
d)	Factories Act, 1948 and State Factories Rules		
e)	Motor Vehicle Act as amended in 1994, The Central Motor Vehicle Rules,1989	Detail of valid documents w.r.t Registration Insurance, PUC and Driver's license regarding vehicles at project site.	Store In charge
f)	Petroleum Act, 1934 and Rules 1976	- The storage of petroleum shall be as per rules. The storage of petroleum shall be as per rules. - No license is required as stored petroleum shall be less than the minimum required for such license.	Store In charge

g)	Gas Cylinder Rules	- The storage, usage, handling of gas cylinders shall be as per rules. - No license is required as quantity of stored cylinder if the quantity/ no of cylinders are less than the minimum required for such license.	Storage In charge
h)	Indian Explosives Act 1884, along with Explosives substance Act 1908 and Explosive Rules 1983	Not Applicable	-
i)	The (Indian) Boiler Act,192	Not Applicable	
j)	The Public Liability Insurance Act, 1991 and Rules, 1991	As Applicable	HR / Welfare Officer
k)	Minimum Wages Act,1948 and Rules,1950	Muster Roll, Register of wages, Register for deduction for damages or loss, Register of fines,	HR/ Welfare Officer
l)	Contract Labour Act,1970 and Rules,1971	Muster Roll, Register of wages, Register for deduction for damages or loss, Register of fines,	HR/ Welfare Officer
m)	Child Labour (Prohibitions & Regulation) Act,1986 & Rules,1986	No person less than 18 years of age to be employed	HR/ Welfare Officer
n)	Workman Compensation Act1923 along with allied Rules	As Applicable	HR/ Welfare Officer
o)	Environment Protection Act,1986 and Rules,1986		
i)	Air (Prevention & Control of Pollution) Act, 1974 and State Rules	Air Monitoring	Environment Officer
ii)	Water (Prevention & Control of Pollution) Act, 1974 and State Rules	Water Monitoring	Environment Officer
iii)	The Noise Pollution (Regulation & Control) Rules,2000	Noise Monitoring	Environment Officer
iv)	Notification on Control of Noise from DG Set, 2002.	Acoustic Enclosure	Environment Officer
v)	Recycle Plastic Usage Rules, 1998	Not Applicable	-
vi)	Manufacture Storage & Import of Hazardous Chemical Rules, 1989	Not Applicable	-
vii)	The Hazardous Waste (Management & Handling) Rules,1989	Not Applicable	-
viii)	Hazardous Waste Management Rules 1989 (as amended in 1999)	Not Applicable	-
ix)	Batteries Management & Handling) Rules, 2000	Record of Lead, Acid batteries purchased and disposed	Store In-charge
x)	Fly ash utilization notification, Sept1999 as amended in August 2003	Not Applicable	
p)	Workman Compensation Act, 1923 along with allied Rules	As Applicable	HR / Welfare Officer
q)	BS-6164	As Applicable	Environment Officer
r)	Maharashtra Fire Preventions Act, 2006	As Applicable	Environment Officer

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s)	NFPA-130	As Applicable	Fire/ Environment Officer

10. SHE TRAINING:

10.1. ID CARD

All personnel shall be issued a photo identity card duly signed by the authorized representative of the company or project manager to subcontractor or labour before engaged for any work. **(Attached as ANNEXURE-I)**
Apart from the basic details, following details shall be mentioned at the back side of the card:

(i) SHE Induction date
(ii) Medical Examination date
(iii) Worker registration No. (under relevant act)
(iv) PF/UAN No.
(v) Emergency Contact No.
(vi) Any other detail as Employer seems required to be mentioned. **(Attached as per ANNEXURE-I)**

10.2. FIRST DAY TRAINING

All personnel working at the site shall receive SHE induction training at the first day of their joining explaining the nature of the work, the hazards that may be encountered during the site work and the particular hazards attached to their own function within the operation. The training shall cover the contents as given in the General Instruction.

1. **Hazard Identification Procedure**

Hazards on site:

- Falls
- Earthing work
- Electricity
- Machinery
- Handling materials
- Transport
- Site housekeeping
- Fire

2. **Personal Protective Equipment**

- What is available?
- How to obtain it?
- Correct use and care

3. **Health**

- Site welfare facilities
- Potential health hazards
- First Aid/CPR

4. **Duties of the contractor**

- Brief outline of the responsibilities of the Contractor by law
- Details of Contractor's accident prevention policy
- SHE manual
- Building and other Constructions Welfare Law

5. **Employee's Duties**

- Brief outline of responsibilities of employee under law
- Explanation of how new employees fit into the Contractor's plan for accident prevention.

10.3. TRAINING REQUIREMENT

10.3.1. SAFETY TRAINING

16 hours Training Matrix

STRABAG shall ensure that all personnel (Workers/Staff/Employees/Sub-Contractors and their personnel) working at the site receive an induction SHE training of at least 2 days (16 hrs) explaining the nature of the work, reporting & communication routes the hazards that may be encountered during the site work and the particular hazards attached to their own function within the operation. The training shall cover as a minimum the contents as directed within this Chapter.

STRABAG

OUTLINE OCCUPATIONAL HEALTH, SAFETY & ENVIRONMENT PLAN

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TYPE OF TRAINING

	Project Manager	Quality Manager	Resident Engineer	Mechanical & other Workers	Electricians	Security Staff	Office Staff	SHE Managers	SHE Supervisors
Management									
SHE Induction	☑	☑	☑	☑	☑	☑	☑	☑	☑
SHE Leadership	☑	☑	☑	☐	☐	☐	☐	☐	☐
SHE Plan	☑	☑	☑	☑	☐	☐	☐	☑	☑
SHE Improvement Plan	☑	☑	☑	☐	☐	☐	☐	☑	☑
Management of Change	☑	☑	☑	☑	☐	☐	☐	☑	☑
Applicable Statutes & Regulations	☑	☑	☑	☑	☐	☐	☐	☑	☑
SHE Audit & Inspection	☑	☐	☑	☐	☐	☑	☐	☑	☑
SHE Emergency Response & Preparedness	☑	☑	☑	☑	☑	☑	☑	☑	☑
Incident / Accident Investigation & Reporting	☑	☑	☑	☑	☐	☑	☐	☑	☑
SHE Communication	☑	☑	☑	☑	☐	☐	☐	☑	☑
SHE Promotion & Incentives	☑	☐	☐	☐	☐	☐	☐	☑	☑
Traffic Management	☑	☑	☐	☐	☐	☑	☐	☑	☑
Hazard Identification & Risk Analysis	☑	☑	☑	☐	☐	☑	☐	☑	☑
Permit to Work System	☑	☑	☐	☑	☐	☑	☐	☑	☑
Confined Space Entry	☑	☑	☑	☐	☐	☐	☐	☑	☑
Scaffolding	☑	☑	☐	☑	☐	☑	☐	☑	☑
Waste Management	☑	☑	☑	☑	☑	☑	☑	☑	☑
Environment Monitoring	☑	☐	☐	☐	☐	☐	☐	☑	☑
Labour Welfare Measures	☑	☑	☑	☐	☐	☐	☐	☑	☑
Behavioural Based Safety Management (BBSM)	☑	☑	☑	☐	☐	☐	☐	☑	☑
Job Safety Analysis (JSA)	☑	☑	☑	☐	☐	☐	☐	☑	☑
Supervisor									
Safety Training Observation Programme (STOP)		☑	☐	☐	☐	☐	☐	☑	☑
First Aid & CPR	☑	☑	☑	☑	☑	☑	☑	☑	☑
Incident / Accident Investigation & Reporting	☐	☐	☐	☐	☐	☑	☐	☑	☑
Fire Fighting	☐	☐	☐	☑	☑	☑	☑	☑	☑
Confined Space Testing & Certification	☐	☐	☐	☐	☐	☐	☐	☑	☑
Scaffold Erection & Inspection	☐	☐	☐	☐	☐	☐	☐	☑	☑
Rigging	☐	☐	☐	☑	☑	☐	☐	☑	☑
Wire Rope Inspection	☐	☐	☐	☐	☐	☐	☐	☑	☑
Crane Inspection	☐	☐	☐	☐	☐	☐	☐	☑	☑
Electrical / Mechanical Isolation	☐	☐	☐	☐	☐	☐	☐	☑	☑
Permit to Work System	☐	☐	☐	☑	☑	☑	☐	☑	☑
Confined Space Working	☐	☐	☐	☑	☑	☑	☐	☑	☑
Working at Height	☐	☐	☐	☑	☑	☑	☐	☑	☑
Heavy Lifting Operation	☐	☐	☐	☑	☑	☑	☑	☑	☑
Electrical Safety	☐	☐	☐	☑	☑	☑	☑	☐	☐
Radiography (x-Ray)	☐	☐	☐	☐	☐	☐	☐	☑	☑
HAZMAT Handling & Control	☐	☐	☐	☑	☑	☐	☐	☑	☑
Hot Work - Welding Cutting & Brazing	☐	☐	☐	☐	☐	☐	☐	☑	☑
Power Actuated hand Tool	☐	☐	☐	☑	☐	☐	☐	☑	☑
Electrical / Mechanical Isolation	☐	☐	☐	☑	☑	☐	☐	☑	☑
Roofing Work	☐	☐	☐	☑	☑	☐	☐	☑	☑
Scaffold Erection/ Dismantling	☐	☐	☐	☑	☑	☐	☐	☑	☑
Painting In Confined Area	☐	☐	☐	☑	☑	☐	☐	☑	☑

STRABAG Infrastructure & Safety Solutions GmbH

MMRDA

10.4. Training Implementation Plan

The training is an important factor in managing safety and necessary to ensure health and safety of all persons working at site.
We believe that such training programs develop understanding, skills and confidence of individuals. The HR Department and Safety Section impart training to increase awareness of employees & workers on safe working. Retraining of employees and workers is also carried out from time to time depending on need. Such needs may arise due to installation of new equipment, improvement in technology and to curb over- confidence in certain individuals.

10.4.1. System of Assessing the Training Requirements

The training needs shall be identified as under:

a. The identification of training requirements for the workers / employees shall be done by the concerned Engineer and Supervisors on the basis of the performance of workers under their control and also by judging their attitude towards safety.
b. Assessment and recording of training needs with respect to specific work.
c. Re-training on regular basis.
d. Rise in reporting of near misses and accidents and in reporting of non-conformity work affecting product quality in particular work area.

All Managers, Engineers, Supervisors and Workers shall be trained in various aspects of safety with respect to work activities at project sites appended as Training Matrix.

10.4.2. Training Procedure

Purpose:

To define procedure for identifying, imparting and recording of training to employees and workers.

Scope:

This procedure applies to safety training imparted to employees & workman of STRABAG at MMRDA work sites.

Nature of Training Programs:

- Safety Induction Training
- Toolbox Talk
- Work Related Safety Training
- Specific Safety Training
- Refresher Training
- 16 Hours mandatory training to Project Team

Identification of Training Needs:

- The identification of training needs for the workers / employees shall be done by the concerned Engineer and Supervisors based on their performance, and by judging their attitude towards safety.
- Assessment and recording of training needs with respect to specific work.
- Rise in reporting of near misses and accidents and in reporting of non-conformity work affecting product quality work area.

Methodology:

- The training on aspects of Safety, Health & Hygiene and environment is normally conducted at site by the Safety Department.
- Toolbox Talks shall be conducted by Concerned Supervisor / Safety Officer
- Training on project related subject matters shall be conducted / arranged by the concerned Project Manager and specialists may also be called for training on specific subject.
- Personal Hygiene and First Aid Training shall be arranged.
- The time and venue of the Training shall be decided in consultation with the Project Manager/HOD.
- The concerned workmen shall be informed through respective supervisors and by display of notice.

Records:

The records of the training shall be maintained by the SHE Department.

Detail of the respective training course program as under shall be produced on demand by MMRDA.

- Course Title
- Course Duration
- Course Content
- Target Audience
- Actual Audience (Attendance Sheet)

10.4.3. Safety Induction

The staff, technicians and all other workers including that of sub-contractors' will go through an Safety Induction program. This is done by SHE Department before the person is deployed at site. The record to this effect maintained by SHE Department.

i. It will be the responsibility of the respective engineers to inform safety officer about joining of new employees and contractors.
ii. Induction training shall also be extended to sub-contractors as well and records to this effect will be maintained at site.
iii. A "Zero tolerance" culture will be imbibed during the induction to all employees and workers.
iv. Employees / workers having height phobia will be identified during the induction and their work area will be restricted suitably.
v. All visitors will be required to meet the Safety Officer at the site office before being taken at site.
vi. If any of the visitors is taken to site, i.e. construction area, it has to be approved by the Project Manager/ Construction Manager.
vii. The visitor will be required to give an undertaking before taken inside the site. Copy of the format will be available at the site office.
viii. It is the responsibility of the concerned engineer to ensure that all visitors are wearing safety helmets and safety shoes.
ix. New entrants, Every Visitors, Contractors and their Workers should be communicated the relevant points amongst following,

- **Project Information**

✓ Organization
✓ Premises Detail
✓ General Safety Awareness
✓ General discipline, Work culture & Work ethics.

- **Company's & Client's Policies**

✓ To carry Badge/ ID cards inside site at all times
✓ Smoking is restricted at Project sites
✓ To carrying firearms and consumption of Alcohol at the project site is prohibition
✓ To carry out work after obtaining valid Work Permits
✓ To perform all works as per Method Statements
✓ To report all accidents / incidents including near misses
✓ To comply all statutory requirements under the law and client's regulations

- **Safety**

✓ Site General Safety Rules
✓ Specific Site
✓ Use of Personal Protective Equipments (PPEs)
✓ Communication protocol in case of an accident.

- **Health & Hygiene**

✓ Welfare facilities at site
✓ Potential Health Hazards and First Aid & Medical Facilities

- **Emergency Procedure**

✓ Types of Emergencies & Responses
✓ Important Telephone Nos. in the event of any emergency

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

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

The minimum Employer's requirement of training needs for various categories of employees.

The contents of SHE training to Managers/Supervisors as given in general instruction shall be conducted. A training Matrix shall be followed through a monthly Training Calendar. Training module / Training Matrix shall be approved by Project Manager.

Toolbox talk shall be conducted for all workmen engaged in High-Risk Activity **every day**.

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

The refresher-training programme to all employees shall be conducted at least **once in six months**.

Every employee including workman shall take **Safety Oath** daily without fail.

10.4.4. Toolbox Talk & Work Instruction

The TBT shall be conducted so that every worker on site at least two toolbox talks every week. The talk should highlight relevant safety and occupational health issues related to work on regular basis to raise their level of awareness.

The talk should be prepared so that they can be presented by the respective supervisors. Topics for the toolbox talks include:

- Personal Points	- Electrical Safety
- Personal Protective Equipments (PPE)	- Situational Awareness
- Manual Handling	- Noise
- Hand Tools	- Housekeeping
- Safety while working on Ladders	- Working Near Overhead Lines
- Safety while working on Scaffolding	- Working Alone
- Compressed Gas Cylinders – Air, O2, LPG & DA	- Hazardous Materials & Waste Disposal
- Drilling Machines	

Each talk should last between 10 ~ 15 minutes. The safety officer will maintain a record of such toolbox meetings at the site as per the format.

Work Instructions

i. The daily work instruction by the supervisors / Resident engineer will include the hazards likely to be encountered and the precautions to be taken to prevent any accident.
ii. If a new job is being started, the engineer/supervisors must ensure that the toolbox talk is carried out to all work force.

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10.5. POST-ACCIDENT OR NEAR MISS MEETING

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

11. SUBCONTRACTOR EVALUATION, SELECTION AND CONTROL

STRABAG will ensure that, his sub-contractors of any level, all persons employed by him on the Site and any person authorized by him to be on the Site will comply in every respect with the provisions of relevant statutory requirements and the Employer's safety documents and SHE Plan.

STRABAG will be fully responsible for safety on the Site, for the Works, his personnel, sub-contractors' personnel, the public domain and all persons directly or indirectly associated with the Works, on or in the vicinity of the Site.

The provisions of the GS regarding health and safety will apply to STRABAG's sub-contractors of any level for any part of the Works.

STRABAG will ensure that proper and adequate provisions to ensure compliance are included in all sub-contracts placed by him and into all sub-contract documentation.

The safety standards of the sub-contractors will be properly assessed prior to the placing of contracts and STRABAG shall employ only sub-contractors with a track record of maintaining the highest safety standards.

STRABAG will monitor its subcontractors' performance and against programs to ensure its compliance with its obligations under the Contract.

11.1. IDENTIFICATION OF THE SUB-CONTRACTOR

Subcontractor will be issued Safety **Non-Compliance Report** for any Violation of Safety norms and procedures. Record sheet shall be maintained for all the NCR and the same will be linked with Subcontractor's bill as well to make it more effective.

12. SHE INSPECTIONS

The purpose of SHE inspection is to identify any variation in construction activities and operations, machineries, plant and equipment and processes against the H&S Plan and its supplementary procedures and programs.

12.1. Safety Inspection & Follow-Up

Systematic inspection is the basic tool for maintaining safe condition and checking unsafe practices. Safety inspections are done to ensure that all safety requirements are observed, and any unsafe act / unsafe conditions noticed are immediately corrected.

The objective of the safety inspections is

i. To identify the unsafe condition and/ or act which may cause harm to safety
ii. To suggest suitable remedial action and facilitate implementation of corrective and preventive measures.
iii. To monitor the compliance status of the non-conformities identified in SHE inspections
iv. To demonstrate management commitment to safety.

STRABAG shall adopt following programme with respect to SHE Inspections,

a. Site Safety Supervisor will monitor site daily and fill site monitoring report form for information and corrective action by the Resident engineer.
b. Safety Supervisory Staff will conduct periodical inspections of equipment, tools & tackles and site conditions and will give reports to Construction Manager.

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c. Safety Officer undertakes weekly site safety inspection using comprehensive safety checklist and prepare report.
d. In case of high-risk activity, the inspections of the area, activity executed shall be carried out daily.
e. The Safety Officer shall carry out monthly inspection of the site conditions and activities and shall ensure that implementation of Health and Safety rules and policy.
f. Specific inspection at the request of MMRDA officials.

12.2. Inspection Regime

To ascertain fitness of equipments, tools & machinery in general the frequency of inspection shall be weekly. In case of high-risk activity, the inspection shall be carried out daily.

Below is given inspection regime and inspection checklists developed by STRABAG

A. Inspection Regime

Sl. No.	Items	By	Frequency
i)	Daily Walkthrough	Safety	Daily
ii)	Ladders	Safety	Weekly
iii)	Scaffold	Safety + Supervisor	Weekly
iv)	Hand Tools	Safety + Site Supervisor	Weekly
v)	Welding Set (Electrical)	Safety + Site Supervisor + Electrician	Weekly
vi)	Gas Cutting Set	Safety + Site Supervisor	Weekly
vii)	Flood Light Fittings	Safety + Electrician	Weekly
viii)	Power Distribution Board	Safety + Electrical Supervisor	Weekly
ix)	Electrical Extension Board	Safety + Electrical Supervisor	Weekly
x)	Power operated hand tools	Safety + Electrical Supervisor	Weekly
xi)	Chop-Saw	Safety + Electrical Supervisor	Weekly
xii)	Safety Belts	Safety	Weekly
xiii)	Monitoring – PPE	Safety	Weekly
xiv)	Monitoring – Unsafe Condition & Act	Safety	Weekly
xv)	First Aid Kit	Safety	Weekly
xvi)	Site Inspection & Housekeeping	Site Engineers + Safety	Weekly
xvii)	Lifting Tools & Tackle	Safety + Site Engineer	Before Use
xviii)	Lifting Machines (Chain Blocks)	Safety + Site Engineer	Before Use
xix)	Lifting Machines (Crane)	Safety + Site Supervisor	Before Use
xx)	DG Set	Safety+ Operator+ Elect Supervisor	Weekly
xxi)	Fire Extinguishers	Safety	Weekly
xxii)	Screw Jacks	Safety + Site Engineer	Weekly
xxiii)	Pallets / Trolley	Safety + Site Engineer	Weekly
xxiv)	Material Shifting Trolley	Safety + Site Engineer	Weekly

B. Specific Inspections

Sl. No.	Equipment	Inspection By
i)	Comprehensive Safety Inspection	Safety Officer
ii)	Inspection before a heavy lifting operation	Rigging Supervisor
iii)	Inspection before &after the entry of person into a confined space	Safety Officer
iv)	Inspection before &after a welding and gas cutting operation	Safety Officer
v)	Safety Survey –Inspection of particular dangerous activities, or area.	Safety Officer
vi)	Inspection following notifiable accident or dangerous occurrence	Safety Officer

C. Other Inspections

Sl. No.	Equipment	Inspection By
i)	Mandatory Inspection by Statutory Authorities	Govt. Labour Department
ii)	Mandatory Inspection of Lifting Tools, tackles and lifting machines	Competent Person
iii)	Specific Inspection by Client	GC/MMRDA Staff

Chief SHE Manager shall monitor and measure compliance with the schedule during safety inspection, surveillance exercise and audits. The shortcomings in schedule accomplishment shall be reported to the Project Manager.

12.3. Inspections Follow-up Action

1. The inspection reports should be discussed with the relevant Site Incharge who shall arrange for attending to all unsafe conditions.
- The remedial action to rectify any deficiency identified or unsafe practice discovered during the safety inspection should be implemented immediately.
- The site Safety Incharge may discontinue the task till the remedial action is complete. It is the responsibility of the Project/Construction Manager to ensure that the suggestion given by the Safety Officer is implemented.
2. In case the Project Manager staff (MMRDA) believe that the contractor workmen are using unsafe working method they shall inform to GC / Engineer in-charge, if unsafe activity continues it should be reported to the MMRDA Chief Safety Officer. Non-compliance of the instruction the MMRDA may take strict action.

13. SHE AUDIT

13.1. Internal SHE Audit

The Project Manager holds the responsibility in ensuring implementation of SHE audit program during the currency of the project.

13.1.1. Monthly Audit Rating Score (MARS)

Monthly Audit Rating Score (MARS) will be performed by MMRDA representative and Project Manager STRABAG, based on the pre-designed score-rating format. STRABAG Chief SHE Manager should also be invited to attend.

The audit score awarded internally by STRABAG is subject to review and verification by MMRDA and any discrepancy shall be intimated for amendment/corrective action. A minimum of 65% score on monthly basis is required to be achieved by STRABAG to avoid of non-payment (up holding) for lump sum item as per MMRDA General Requirements.

The MARS should be conducted at least 7 days prior to sitting of monthly SHE committee.

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Points will be objectively awarded by contractor based upon site safety and environmental conditions. Scoring will be as follows:

Excellent	(E) = 10
Good	(G) = 8
Average	(A) = 7
Insufficient	(IS) = 2,4 or 6
Non-conformance	(NC) = 0

All non-compliances will receive an action notice at the required level. All suspended operation notices will be referred to the Project Manager, who will visit site within 24 hrs to carry out further safety inspection. Any non-applicable topic and the corresponding "possible score" will not be marked and the score will be calculated by recognizing the relevant possible score as being 100% and the actual score as percentage of this.

The copy of Audit Report will be sent to MMRDA and all sub-contractors, with whom this shall be discussed in safety committee meeting in order to ensure that any corrective actions are agreed upon.

13.2. Monthly Electrical Safety Audit (MESA)

A-team comprising of STRABAG, SHE (Electrical) officer and MMRDA Representative shall conduct monthly electrical safety Audit covering the following and submit report to MMRDA.

i. Electrical Accidents investigation findings and remedy
ii. Adequacy of power generation and power requirements
iii. Power distribution and transmission system in place
iv. Updated electrical single line diagram (SLD) showing current condition of power source and distribution DBs arrangement.
v. Electrical protection devices – selection, installation and maintenance
vi. Earth and ground connection and earth pit maintenance detail.
vii. Education and training of electrical personnel undertaken
viii. Routine electrical inspection details
ix. Electrical maintenance system and register
x. Name plate details of major electrical equipment
xi. Classified zones in the site, if any.

13.3. External SHE Audit

- External SHE audits shall be conducted with within the 3 months period as per BS EN 18001:2007 and ISO 14001:2004 (2015) International Standards by external competent ISO qualified auditors approved by MMRDA.
- The audit shall be conducted on quarterly basis throughout the currency of the contract. External Audit and follow up audit reports shall be submitted to MMRDA within 7 days of audit completion.
- Where 'Major' non-conformances with international standards are identified, a follow- up external audit shall be carried out within 28 days for closing out of the non- conformance(s).
- Follow-up audits shall continue on a 28 days rotation until such time as Major non-conformances are closed to the satisfaction of the 3Party ISO accredited auditor.

14. SHE COMMUNICATION

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

14.1. SHE SUBMITTALS TO EMPLOYER

STRABAG's SHE management will send the following reports to Employer periodically:

- Daily Reporting of total no of workmen
- Monthly SHE Report

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- SHE Committee Meeting Minutes
- SHE Inspection Reports
- SHE Audit Reports
- Monthly Audit Rating Score (MARS) report
- External SHE Audit
- Electrical Safety Audit

14.2. DAILY REPORTING OF TOTAL NO OF WORKMEN

STRABAG shall report to the Employer the total no of workmen engaged by all including any subcontractor within 2 hours of starting of any shift in any day. This reporting shall be the primary duty of the SHE Manager or Construction Manager of the contractor and reporting shall be through tele-fax / email or any other means as mutually agreed.

14.3. MONTHLY SHE REPORT

Monthly SHE reports (Balanced score card, Monthly Report, statistical accidents) shall be prepared consisting of the following and shall be submitted within 7th of next month to the Head Office as well as to the client as per their requirement:

- Monthly man-hour details as specified in the Project SHE manual.
- Monthly accident / incident details as specified in the Project SHE manual.
- SHE committee details.
- Details of SHE training conducted in the month.
- SHE Inspection.
- SHE internal audit details like electrical audit etc.
- SHE Communication activities undertaken in the month indicating the number of posters displayed and balance availability in stock.
- Air quality / Noise monitoring details.
- Toolbox talks details.
- PPE details: Quantity purchased, issued to the workmen and stock available.
- Details on IP 44 panel boards, lighting poles, welding and cutting equipment's, Ladders, Hoists, tools & tackles.
- Housekeeping.
- Health & Welfare activities.
- Safety walk conducted by Contractors' Project Manager in the month.
- SHE Activities Planned for next month.

14.4. SHE BULLETIN BOARD

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

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

15. ACCIDENT INCIDENT INVESTIGATION PROCEDURE

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

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

15.1. DEFINITIONS

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

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

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

All such incidents shall be reported as per applicable law (Factories Act, 1948 / Building and other construction & Regulation of employment and condition of services) Rule – 1998.

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

15.2. INVESTIGATION

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

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

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

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

- Take photographs and make sketches.
- Examine involved equipment, work piece or material and the environmental conditions.
- Interview and record the statements of the injured, eyewitnesses and other involved parties.
- Consult expert opinion where necessary.
- Identify the specific contractor or sub-contractor involved.
- Having gathered information, it is then necessary to make an analysis of incident:
- Establish the chain of events leading to the accident or incident.
- Find out at what stage the accident took place.
- Consider all possible causes and the interaction of different factors that led up to the accident, and identify the most probable cause. The cause of an accident should never be classified as carelessness. The specific act or omission that caused the accident must be identified.
- The next stage is to proceed with the follow-up action:

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

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

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

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- Report the findings and conclusions in the form.
- Formulate preventive measures to avoid recurrence.

15.3. REPORTING

Any personnel immediately to inform about the occurrence of any accident & dangerous occurrences to the immediate Hierarchical Superior / CSHE / Site Administration / Security on duty/ client by the quickest possible means like Telephone, personally, messenger etc.
Investigation reports of all accidents and dangerous occurrences shall also be sent to the Head Office/ client within 24 hours as per the format. No accident / dangerous occurrences are exempted from reporting.
In addition to the above verbal and written reporting, as per Rule 210 of BOCWR, notice of any accident to a worker at the building or construction site that

- Causes loss of life; or
- Disables a worker from working for a period of 48 hours or more immediately following the accident.
- shall forthwith be sent by email, fax, or similar other means including special messenger within four hours in case of fatal accidents or cases where amputation is likely and 72 hours in case of other accidents, to:
- the Regional Labour Commissioner (central), wherein the contractor has registered the firm/work,
- the board with which the worker involved was registered as a beneficiary,
- Director General and the next of kin or other relative of the worker involved in the accident.
- Further, notice of accident shall be sent in respect of an accident which causes loss of life; or disables the injured worker from work for more than 10 days
- the officer-in-charge of the nearest Police Station.
- the District Magistrate or, if the District Magistrate by order so desires, to
- the Sub-Divisional Magistrate.

In case of an accident causing minor injury, first-aid shall be administered and the injured worker shall be immediately transferred to a hospital or other place for medical treatment.
The following classes of dangerous occurrences shall be reported to the Inspector having jurisdiction, whether or not any disablement or death caused to the worker, namely:

- collapse or failure of lifting appliances, or hoist, or conveyors, or similar equipment for handling of building or construction material or breakage or failure of rope, chain or loose gears; or overturning of cranes used in construction work.
- Collapse of excavation, Transmission.
- collapse or subsidence of soil, tunnel, pipelines, any wall, floor, gallery, roof or any other part of any structure, launching girder, platform, staging, scaffolding or means of access including formwork.
- explosion of receiver or vessel used for storage of pressure greater than atmospheric pressure, of any gas or gases or any liquid or solid used as building material.
- fire and explosion causing damage to any place on construction site where building workers are employed.
- spillage or leakage of any hazardous substance and damage to their container.
- collapse, capsizing, toppling or collision of transport equipment.
- leakage or release of harmful toxic gases at the construction site.
- Every notice given for fatal accidents or dangerous occurrences shall be followed by a written report to the concerned Authorities under Section 39 of BOCWA and the Director General in the specified Form XIV of BOCWR.

16. EMERGENCY PROCEDURE

16.1. PROJECT EMERGENCY PREPAREDNESS & RESPONSE PLAN

Any sudden / unexpected situation, which may lead to some major accident or fire, which may result any loss of life or property damage or serious effect on environment. Proper preparation helps ensure safety and survival. A written emergency response or action plan is the best preparation tool for handling emergencies.

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The following potential major SHE related emergencies have been identified at STRABAG work site.

1. Fire & Explosion
2. Serious Accidents – Road Accident, Falling from height, Land Slides (getting workers buried), Electrocution, or Chemical injury during works.
3. Collapse of lifting appliances and transport equipment
4. Collapse of building shed or structure etc.
5. Gas leakage,
6. Spillage of Oil/Petrochemical on the Soil and Water.
7. Bomb threatening/ Criminal or Militant attack
8. Natural calamity like Earthquake, Lightning etc.
9. Earthquake, storms & other natural calamities

FIRE

- Remain calm- assess the situation.
- Determine the type of fire and try to extinguish it immediately by the appropriate method.
- Class A – solid materials (ordinary combustibles)
- Class B - flammable liquids, gases, greases
- Class C - electrical
- Class D - combustible materials
- Use dry chemical extinguishers on A, B, C type fires. Don't aim high at flames.
- Fire extinguishers have limited operation time - 8 to 10 seconds.
- If fire cannot be extinguished by the extinguishers available at the spot, arrange for more extinguishers.
- Again, in case the fire cannot be extinguished immediately call the Fire Brigade.[101]
- Segregate the area and remove maximum possible inflammable / combustible materials from the spot.

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SITE EMERGENCY REPORTING SYSTEM

Accident / Incident

First aid shall be given to the victim at site

Site Supervisor / Engineer

1. Brief personal detail of injured person (who)
2. Time, Date of accident (when)
3. Exact location (where)
4. Brief of accident (what)
5. Cause of accident (why)

Report on telephone or in person

Construction In-charge

(In Case of Major Injury)

The injured person shall be sent to Doctor, / Nursing Home or Hospital for medical care & further treatment.

Very Important

In case of major / fatal accident, area must be barricaded and no one is allowed to disturb anything inside of barricading

Dy. Project Manager

SHE Manager For investigation and recommendation, corrective action taken and documentation for reference

Project Manager (STRABAG)

Administration

To help victim, arrangement of all medical facilities and dealing with legal matter

Emergency Telephones

Name / Location	Phone No.
Construction In charge	
Resident Engineer	
Site Safety In charge	
Ambulance	
Nursing Home / Hospital	
Fire Station	
Police Stations	
Project Manager	
Ch. SHE Manager	
MMRDA/Engineer-in-charge (GC)	
Mgr. Admin.	
STRABAG Office	
Others	

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GC/ MMRDA Officials

- **FIRE IN OFFICE/STORE/DG SET & OIL STORAGE AREA**
  - Proceed to nearest safe exit.
  - Disconnect Electrical connections.
  - Be aware of smoke, noxious fumes.
  - Think first of your safety and safety of others.
  - Use blankets, tarps as shield.
  - Crawl on hands, knees.
  - Post emergency numbers.[101]
  - Try to put out fire only if it is small and tame.
  - Alert fire department, when necessary; leave the firefighting to professionals.

- **MAJOR FIRE AT ELECTRICAL INSTALLATION**
  - Cut off supply, and raise alarm.
  - Inform Chief SHE Manager & Team & In charge and the fire Brigade.
  - Use CO2 / DCP for extinguishing the fire.
  - Proper precautions must be taken during fighting the fire with CO2 because it is harmful for human beings.
  - Cool down the advancement compartment / Area.
  - Take out the causality (if any) into open area and give first aid.
  - If required, then arrange emergency supply from outside sources.

- **COLLAPSE OF LIFTING APPLIANCES & TRANSPORT EQUIPMENT**
  - Inform Safety In-charge/ Site Engineer In charge.
  - Barricade the area.
  - If casualty is there, provide proper first aid and shift to the hospital if required.
  - Traffic can be diverted.
  - Deploy security guard till the area is cleared.

- **GAS LEAKAGE**
  - If toxic gas is suspected, warn operatives to leave the area.
  - Inform the Occupational Health & Safety Incharge /Department immediately.
  - Investigate and take remedial measures such as isolating the leaking cylinder and shifting it to open area, increasing ventilation etc.
  - If anybody feels any discomfort/gets fainted give him first aid and send him to site dispensary immediately.

- **ELECTRICUTION**
  - Call for help.
  - Disconnect the current supply immediately.
  - Do not touch electrocuted victim with bare hands.
  - Give first aid and send the victim to Hospital.

- **CHEMICAL INJURY DURING WORKS**
  - In case of contact to chemicals, wash that part of body thoroughly with plenty of waters.
  - Remove the clothes soiled with chemicals.
  - Keep the victim in open space under sunlight.
  - If victim is unconscious keep him on the ground in such a way so that his head is in lower position than rest of his body.
  - Loose his clothing especially round the neck.
  - Shift the patient to nearby medical Centre/ Hospital.

- In case of emergency follow the instruction given in material safety data sheet. [MSDS]

➢ **SPILLAGE OF PETROCHEMICAL/OIL ON SOIL**

The individual responsible for, or who discovers the petrochemical spillage/Oil spillage (here in after referred as Spillage), shall report the incident to the site Chief SHE Manager & Team/ site representative. The Chief SHE Manager & Team in consultation with the Works Manager will assess the problem and act as required. In all cases immediate response is to control /contain the spillage. All the details of the petrochemical/oil spillage and remediation actions shall be recorded.

➢ **LIGHTNING**

Lightning is nature's worst destroyer. A typical lightning volt contains several hundred million volts at 30,000 or more amperes

- Lightning need not strike a person directly to be dangerous.
- Lightning can crash down from virtually clear sky.
- Stay away from open doors or windows during thunder/lightning storm.
- Avoid using the telephone or television set and keep clear of all metal objects such as pipes and electrical appliances during a storm.
- Do not go outside
- If caught in the open, stay low.

➢ **EARTHQUAKE**

- If indoor, stay in the building.
- Take shelter under solid furniture, i.e. tables or desks
- Keep away from overhead fixtures, opening windows, cabinets or loose material piled up or moveable structures etc.
- If driving –STOP, but stay in the vehicle.
- Do not stop under trees, lamp posts, electrical power lines or signals.
- If outside, stay outside move to an open area away from buildings, trees, power lines and roadways.

➢ **BOMB THREATS**

Threats may be received in person or by phone. All bomb threats are to be taken seriously and followed up. Bombs could be disguised in packages delivered or found, or through explosions in or around the work area.

Bomb Threat Response

Bomb threats are most likely to be received by telephone therefore all personnel should be prepared to follow this procedure if they answer a bomb threat phone call. The Bomb Threat Telephone Checklist should be followed. It can also be found on the back page of the government telephone book and signal co-workers if possible.

Bomb Threat Evacuation

Managers must be immediately notified of any bomb threats. They will work with local Emergency Services to determine if workers / contract workers should be evacuated.
Upon notification to evacuate the company, site emergency controller will instruct all workers, contract workers and visitors to evacuate the company by the designated evacuation route, and assist others if needed.
Workers/contract workers must not re-enter the building until directed to do so by the site emergency controller.
Onsite emergency mock drill shall be conducted quarterly for all his workers & their subcontractor's workers.
The Monthly basis mock drill (rehearsal) on emergency is aimed to implement the response plan at whole project and promoting a culture of emergency preparedness. This drill also bringing together staff and worker of different department and agencies and provides a good energy in case of face-to-face unwanted events. Record shall be maintained for Mock Drills.

17. RISK ASSESSMENT

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

17.1. IDENTIFICATION OF OHS HAZARDS

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

- Site visit, study of various activities.
- Interview of concerned personnel.
- Interaction with (sub) contractor's/ service providers
- Facilities at the workplace
- Review of Normal, Abnormal and Potential Emergency Situations
- Review of past health surveillance data, incident & accident data, monitoring & measurement data related with noise, illumination etc.
- Review of applicable legal, corporate, customer and other requirements
- Review of past OHS accidents, emergencies, audit results
- Suggestions
- Identify Occupational Health and Safety Hazards as follows:
- Physical (operational, mechanical, heat, noise, electrical, slip and fall etc.)
- Chemical (fumes, gases, spills / leaks of chemicals, mist etc.)
- Biological (Bacteria, Virus, fungi, Snake / Dog / Reptile / Honey-Bee bites etc.)
- Ergonomic (push & pull, lifting, posture etc.)

17.2. EVALUATION OF OHS HAZARDS

Evaluate the Hazard / Concern and Indicate the:

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

The values attributed to each feature are those indicated below:

SEVERITY		PROBABILITY	
Explanation	**Rating**	**Explanation**	**Rating**
Leading to Permanent Disability / disorder / fatality	High (H)	- Will Happen; > 50% Chances	High (H)
Requiring medical Attention / Hospitalization; Loss of Man-days; Medical Compensation	Medium (M)	- May / Can Happen : < 50% >10% Chances - Has been Observed	Medium (M)
Leading to Temporary Discomfort or First Aid cases	Low (L)	- Rare Chances / Never Happened / < 10% chances	Low (L)

RISK LEVEL TABLE

PROBABILITY ↑				
H	3	4	5	
M	2	3	4	
L	1	2	3	

		L	M	H
		→ **SEVERITY**		

Also consider the risk controls as per table below.

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

Following Hierarchy of Controls shall be considered:

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

Note: Preventive Action Plans, periodic internal audits & inspections shall also be used for Risk Control.

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

Project Manager prepares the Improvement Management Programs and it is ensured that the same are:

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

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

STRABAG prepares the Method Statement, which includes:

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

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

17.5. UPDATING OF HIRA & REVIEW OF RISK CONTROL ACTIONS

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

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

18. OCCUPATIONAL HEALTH MEASURES

18.1. MEDICAL EXAMINATION

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

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

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

The medical examination shall include:

1. Full medical and occupational history.
2. Clinical examination with particular reference to
   - General Physique.
   - Vision: Total visual performance using standard Orthorator like Titmus Vision Tester should be estimated and suitability for placement ascertained in accordance with the prescribed job standards.
   - Hearing: Persons with normal must be able to hear a forced whisper at twenty-four feet. Persons using hearing aids must be able to hear a warning shout under noisy working conditions.
   - Breathing: Peak flow rate using standard peak flow meter and the average peak flow rate determined out of these readings of the test performed. The results recorded at pre-placement medical examination could be used as a standard for the same individual at the same altitude for reference during subsequent examination.
   - Upper Limbs: Adequate arm function and grip
   - Spine: Adequately flexible for the job concerned.
   - Lower Limbs: Adequate leg and foot concerned.
   - General: Mental alertness and stability with good eye, hand and foot coordination.
   - Any other tests which the examining doctor considers necessary.

18.2. FIRST-AID BOXES

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

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

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

19. WELFARE MEASURES FOR WORKERS

19.1. LATRINE AND URINAL ACCOMMODATION

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

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

19.2. DRINKING WATER

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

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

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

19.3. PREVENTION OF MOSQUITO BREEDING

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

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

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

20. PERMIT TO WORK SYSTEM

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

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

- Entry into confined spaces
- Work in close proximity to overhead power lines and telecommunication cables.
- Hot work.
- To dig—where underground services may be located.
- Working on electrical substation

- Stringing
- Working on or near energized conductors and equipment
- Heavy lifting operations and lifting operations closer to live power line.

21. PERSONAL PROTECTIVE EQUIPMENT

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

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

All employees including workmen	Traffic marshals
Hard hat with company Logo Safety boots Hi-visibility waistcoat covering upper body and meeting the following requirements as per BS EN 471:1994: Background in fluorescent orange-red in colour Two vertical green strips of 5cm wide on front side, covering the torso at least 500 cm2 Two diagonal strips of 5 cm wide on back in an 'X' pattern covering at least 570cm2 Horizontal strips not less than 5cm wide running around the bottom of the vertical strip in front and 'X' pattern at back. The bottom strip shall be at a distance of 5cm from the bottom of the vest. Strips must be retro reflective and fluorescent Waistcoat shall have a side adjustable fit and a side and front tear-away feature on vests made of nylon.	Hard hat with reflective tape Safety boots Hi-visibility jacket covering upper body and meeting the following requirements as per BS EN 471:1994 : Background in fluorescent orange-red in colour Jackets with full-length sleeves with two bands of retro reflective material, which shall be placed at the same height on the garment as those of the torso. The upper band shall encircle the upper part of the sleeves between the elbow and the shoulder; the bottom of the lower band shall not be less than 5cm from the bottom of the sleeve. Two vertical green strips of 5cm wide on front side, covering the torso at least 500 cm2 Two diagonal strips of 5 cm wide on back in an 'X' pattern covering at least 570cm2 Horizontal strips not less than 5cm wide running around the bottom of the vertical strip in front and 'X' pattern at back. The bottom strip shall be at a distance of 5cm from the bottom of the vest. Strips must be retro reflective and fluorescent.

The PPEs and safety appliances shall be confirming to the Bureau of Indian Standards (BIS) or equivalent standard.

All construction workers should be provided with high visibility jackets with reflective tapes confirming to the requirement specified under BS EN 471: 1994 as most of viaduct, girder and building works are executed either above or under right-of-way. The conspicuity of workmen at all times shall be increased so as to protect them from speeding vehicular traffic.

21.1. HEAD PROTECTION

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

Color coding for helmets

Safety Helmet Colour Code (Every Helmet should have the LOGO4 affixed /painted)	Person to use

4 Logo shall have its outer dimension 2"X2" and shall be conspicuous

White	Client's/GC's staffs
Violet	Contractors (Engineers / Supervisors)
Blue	All Sub-contractors (Engineers / Supervisors)
Red	Electricians (Both Contractor and Sub-contractor)
Green	Safety Professionals (Both Contractor and Sub-contactor)
Orange	Security Guards / Traffic marshals
Yellow	All workmen
White (with "VISITOR" sticker)	Visitors

21.2. HEARING PROTECTION

Hearing protection shall be worn by all personnel who are working exposed to a noise level of 90 Db(A) for 8 hours Lag.

21.3. EYE PROTECTION

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

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

21.4. FOOT PROTECTION

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

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

21.5. FALL ARRESTING SYSTEM

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

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

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

21.6. HAND PROTECTION

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

Logo shall be either painted or affixed
No words shall come either on Top / Bottom of Logo

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21.7. RESPIRATORY PROTECTION

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

Respiratory protection is of three basic types:

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

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

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

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

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

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

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

21.8. OTHER PPE

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

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

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

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

S. No	Activity Handled/Concern	Protection Against	Hazard	Approved PPE	Reference/IS Specification
1	Chemical Handling	Skin contact	Health issue	Acid/Alkali Proof rubberized hand gloves	IS 8807 : 1978
		Body Protection	Health issue	Rubberized apron Acid/Alkali Proof	IS:4501-1967
2	Chemical Handling, Processing	Dust / Fume inhalation	Breathing uneasiness	Chemical Mask Dust Respirator with Filter	IS 9623 : 1980
3	Electrical work	hands	Electric shock	Rubber gloves for electrical purposes	IS 4770 : 1991
		Body Protection	Electric shock	Rubber mats for electrical purposes	IS 5424:1969
4	Welding & Brazing	Eye and Face Protection	Fumes & Sparks (radiation)	Welders equipment for eye & face	IS 1179 : 1967
		Hand Protection	Hot Parts	Leather Hand Gloves	IS 6994:1973 Part 1
5	Foot Protection while compressor /Drum handling	Feet injury	Hit/Struck	Industrial Safety shoes with steel toe	IS:5852
6	Foot protection	Tank cleaning/ Sludge removal	Slip	Gum boots	IS 10667 : 1983

7	Sharp Edge Handling / uneven surfaces	Hands	Cut injury	Leather /cotton Hand Gloves	IS:6994-Part-1-1973
8	DG Operations, Press operations, Vacuum foaming, Air Compressors	Ear Protection	Hearing uneasiness	Cylindrical type earplug (made from foam) Ear muffs	IS:9167
9	Press operation	Body protection	Flying particles chips, hot slag etc.	Leather Apron	
10	Grinding operations, drilling, lathe machine	Eye protection	Eye injury	Zero Power Plain goggles with cup type filters on both ends	IS:2553-1977
11	Fall of object from height, working at height	Head Protection	Head injury	Industrial Safety Helmet	IS 2925-1975
12	Fall from height, working at height	Head & Body Protection	Head & Body injury	Full body harness	IS 3521

22. HOUSEKEEPING

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

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

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

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

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

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

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

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

Flammable chemicals / compressed gas cylinders shall be safely stored.

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

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

23. SAFE WORK METHOD FOR ANTICIPATED HAZARDS

23.1. WORKING AT HEIGHT

23.1.1. DEFINITIONS

Work at height:

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

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

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

- personal fall protection system
- ladders

Working platform:

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

23.1.2. ORGANISATION AND PLANNING

It shall ensure that work at height is:

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

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

23.1.3. COMPETENCE

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

23.1.4. AVOIDANCE OF RISKS FROM WORK AT HEIGHT

It shall ensure that work is not carried out at height where it is reasonably practicable to carry out the work safely otherwise than at height.

Where work is carried out at height, all suitable and sufficient measures shall be taken to prevent, so far as is reasonably practicable, any person falling a distance liable to cause personal injury.

23.1.5. FRAGILE SURFACES

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

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

- ensure, so far as is reasonably practicable, that suitable and sufficient platforms, coverings, guard rails or similar means of support or protection are provided and used so that any foreseeable loading is supported by such supports or borne by such protection;
- where a risk of a person at work falling remains despite the measures taken under the preceding provisions of this regulation, take suitable and sufficient measures to minimize the distances and consequences of his fall.
- Where any person at work may pass across or near, or work on, from or near, a fragile surface, every contractor shall ensure that
- prominent warning notices are so far as is reasonably practicable affixed at the approach to the place where the fragile surface is situated; or
- where that is not reasonably practicable, such persons are made aware of it by other means.

23.1.6. FALLING OBJECTS

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

The contractor shall ensure that no material or object is thrown or tipped from height in circumstances where it is liable to cause injury to any person.

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

23.1.7. INSPECTION OF PLACES OF WORK AT HEIGHT

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

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

23.1.8. REQUIREMENTS FOR GUARDRAILS, TOE-BOARDS, BARRIERS AND SIMILAR COLLECTIVE MEANS OF PROTECTION

Means of protection shall:

- be of sufficient dimensions, of sufficient strength and rigidity for the purposes for which they are being used, and otherwise suitable;
- be so placed, secured and used as to ensure, so far as is reasonably practicable, that they do not become accidentally displaced; and
- be so placed as to prevent, so far as is practicable, the fall of any person, or of any material or object, from any place of work.

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

- toe-boards shall be suitable and sufficient to prevent the fall of any person, or any material or object, from any place of work; and
- any intermediate guardrail or similar means of protection shall be positioned so that any gap between it and other means of protection does not exceed 470 millimeters.

23.1.9. REQUIREMENTS FOR PERSONAL FALL PROTECTION SYSTEMS

A personal fall protection system shall be used only if:

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

A personal fall protection system shall:

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

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

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

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23.2. SCAFFOLDING

Scaffolds are intended to provide safe working positions at elevations. To eliminate fall exposures, scaffolds must have complete handrails, midrails, and decking. Do not use fall arrest equipment as a substitute for handrails, midrails, or a complete deck.

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

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

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

23.2.1. ERECTING SCAFFOLDS

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

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

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

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

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

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

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

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

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

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

23.2.2. SCAFFOLD INSPECTION

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

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

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

23.2.3. TRAINING

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

- The nature of scaffold hazards
- The correct procedures for erecting, disassembling, moving, operating, repairing, inspecting, and maintaining the type of scaffold.
- The design criteria, maximum intended load-carrying capacity, and intended use of the scaffold.
- Employees who perform work while on a scaffold shall be trained by a qualified person so they will recognize hazards associated with the type of scaffold being used and understand the procedures to control those hazards. Training will cover the following topics as necessary:
- The nature of any electrical hazards, fall hazards, and falling object hazards in the work area.
- The correct procedures for dealing with electrical hazards and for erecting, maintaining, and disassembling the fall protection systems and falling object protection systems used.
- The proper use of the scaffold and the proper handling of materials on the scaffold.
- The maximum intended load and the load-carrying capacities of the scaffolds used.

23.3. USE OF LADDER

- Ladder shall not be used as a platform.
- Ladder shall be of adequate strength for its intended use.
- Ladder shall be secured at the top and the base. Rise at each step will be same.
- Ladder shall be erected on level and firm ground at an angle not exceeding 75° or a 4 (heights): 1 (base ratio)
- If possible hand rail shall be provided with ladder.
- Ladder shall protrude 1m above the level of landing.

23.4. LIFTING APPLIANCES AND GEAR

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

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

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

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- The site conditions, including the ground where the machine will be set up, access roads and ramps it must travel, space for erection and any obstacles that might impede access or operation.

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

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

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

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

23.4.1. TEST AND PERIODICAL EXAMINATION OF LIFTING APPLIANCES AND GEARS

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

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

23.4.2. AUTOMATIC SAFE LOAD INDICATORS

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

23.4.3. QUALIFICATION OF OPERATOR OF LIFTING APPLIANCES AND OF SIGNALMAN ETC

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

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

23.4.4. GENERAL REQUIREMENTS OF APPLIANCES

Out of fit level

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

Boom

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

All welds shall be crack and corrosion free.

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No member of the boom shall be bent.

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

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

All hydraulic piping and fittings shall be maintained leak proof.

The operator cab shall possess good and safe:

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

23.4.5. RIGGING

Rigging shall be done under experienced and qualified rigger only.

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

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

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

Hand spliced slings up to 32mm diameter shall not be used at site for any lifting purpose.

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

Requirement of Outriggers

- All outriggers shall be fully extended & kept on firm level surface.
- Heavy duty blocking having large bearing area shall be necessary to prevent sinking of floats
- All loads shall have tag-lines attached in order to ensure that the load can be controlled at all times.

23.5. CONTRUCTION MACHINERY

23.5.1. REVERSE HORN

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

23.5.2. OTHER REQUIREMENT

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

Minimum lighting is to be ensured at all lifting operations.

23.6. MACHINE AND GENERAL AREA GUARDING

All motors, cogwheels, chains and friction gearing, flywheels, shafting, dangerous and moving parts of machinery shall be securely fenced or legged. The fencing of dangerous part of machinery shall not be removed while such machinery is in motion or in use.

23.7. MANUAL LIFTING AND CARRYING OF EXCESSIVE WEIGHT

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

PERSON	MAXIMUM WEIGHT IN KG
Adult Man	55
Adult woman	30

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

23.8. ELECTRICITY

23.8.1. COMPETENCY OF ELECTRICAL PERSONNEL

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

23.8.2. STRENGTH AND CAPABILITY OF ELECTRICAL EQUIPMENT

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

23.8.3. WORK ON SITE

STRABAG shall also submit electrical single line diagram, schematic diagram and the details of the equipment for all temporary electrical installation and these diagrams together with the temporary electrical equipment shall be submitted to the Employer's for necessary approval.

23.8.4. ADVERSE OR HAZARDOUS ENVIRONMENTS

Electrical equipment, which may reasonably foreseeably be exposed to-

- mechanical damage;
- the effects of the weather, natural hazards, temperature or pressure;
- the effects of wet, dirty, dusty or corrosive conditions; or
- any flammable or explosive substance, including dusts, vapors or gases, shall be of such construction or as necessary protected as to prevent, so far as is reasonably practicable, danger arising from such exposure.

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

23.8.5. ELECTRICAL PROTECTION CIRCUITS

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

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

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

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

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

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

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

23.8.6. CABLES

Cables shall be selected after full consideration of the condition to which they shall be exposed and the duties for which they are required.

23.8.7. PLUGS, SOCKET-OUTLETS AND COUPLERS:

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

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

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

23.8.8. CONNECTIONS

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

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

23.8.9. PORTABLE AND HAND-HELD EQUIPMENT

Double insulated or all-insulated portable electrical hand equipment may be used without earthling (i.e. two core cables), but they shall still be used only on 230V because of the risk of damage to trailing leads.

23.8.10. OTHER EQUIPMENT

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

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

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

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

23.8.11. WORK ON OR NEAR LIVE CONDUCTORS

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

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

Sl. No.	Type of Lighting	Area of Requirement	Luminaries
1	Area Lighting	Workmen and vehicles to move about in safely.	Shovel type: non-symmetrical Symmetrical or non-symmetrical tungsten halogen
2	Beam flood lighting	Concentrated light over an area from a relatively great distance.	Portable flood light (Conical beam) Wide angle flood (fan shaped beam) Medium or narrow angle flood (Conical beam)
3	Dispersive lighting	Lighting for indoor	Dispersive (Mercury florescent) Cargo cluster Florescent trough
4	Walkway lighting	Lighting for stairways, ladder ways, corridors, scaffold access routs, etc.	Well glass unit Bulkhead unit (tungsten filament) Bulk head unit (Florescent)
5	Local lighting	Lighting on sites and fittings are generally accessible to operatives	PAR (Parabolic Aluminized Reflector) lamp cluster Festoons (with or without shades) Adjustable florescent work lamp Portable flood lamp (mounted on own cable drum)

23.8.12. INSPECTION AND MAINTENANCE

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

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

23.9. LIGHTING

Sufficient site lighting, of the right type, properly effective and at the right place shall be provide. Lighting ought not to introduce the risk of electric shock. Therefore, 230V supplies should be used for those fittings, which are robustly installed, and well out of reach e.g. flood lighting or high-pressure discharge lamps.

Selection of Luminaries

Luminaries as per the area requirement shall be selected from the table indicated below:

Luminaries should always be placed so that no person is required to work in their own shadow and so that the local light for one person is not a source of glare for the others. Strongly made clamps should be available for attaching luminaries to poles and other convenient supports.

Luminaries should be robust, resistant to corrosion and rain proof especially at the point of the cable entry.

The correct type of lamp for each luminary should always be used and when lamps need to be replaced if shall be in accordance with the supply voltage.

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23.10. LOCK OUT TAG OUT

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

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

23.11. HAND TOOLS & POWER TOOLS

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

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

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

23.11.1. HAND TOOLS

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

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

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

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

Usage of proper PPEs is mandatory.

23.11.2. POWER TOOLS

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

Electric tools are properly grounded or / and double insulated.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

23.12. WELDING, GOUGING AND CUTTING

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

23.13. FIRE PREVENTION PROTECTION AND FIGHTING SYSTEM

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

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

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

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

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

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

23.14. CORROSIVE SUBSTANCES

As per BOCWR Rule 41, corrosive substances including alkalis and acids shall be stored and used by a person dealing with such substances at a building / construction site in a manner that it does not endanger the building worker and suitable PPE shall be provided to the worker during such handling and work.

23.15. TRANSPORT OF MATERIAL

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

- Materials must be perfectly secured to the vehicle box or chassis, by means of straps and slings, to prevent them from slipping or falling.
- They should not protrude from the box in excess of the legally stipulated distance.
- Driver must have adequate driving license.
- Speed limit at work site/store yard shall be restricted to 20 KMPH.
- Regular maintenance and upkeep of vehicle shall be ensured.

23.16. MATERIAL HANDLING

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

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

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

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

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

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

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

No One shall stand under suspended load.

All material shall be stacked adequately.

23.17. ALCOHOL AND DRUGS

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

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

24. VISITORS AND SECURITY ARRANGEMENT

24.1. MEANS OF ACCESS

- Means of access will be maintained in a safe condition.
- Where special safe means of access to or work places are provided, workers will use them for going to and from work places.
- As far as reasonably practicable, adequate and safe means of access will be provided for all work places.
- Protection against Unauthorized Persons
- Construction sites in built-up areas and alongside main traffic routes will be barricaded.
- Unauthorized persons will not be allowed to access construction sites.
- Placing of Watchman
- In the works where it's possible to quickly alleviate the safety clearance for the passage of trains, the placing of watchmen in adequate locations is foreseen.

24.2. ACCESS CONTROL

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

- Personnel of STRABAG that have attended the compulsory safety course.
- Personnel of the Sub-Contractor that have attended the compulsory safety course.
- Visitors, when accompanied by personnel that have attended the compulsory safety course.

24.3. VISITORS PLAN

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

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

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25. SITE ENVIRONMENTAL PLAN

25.1. Introduction

Environment is an essential element of quality of life and main source for economic development. Technological progress has reduced the involvement of human resources for a particular task; it has also reduced today the consumption of environmental resources by efficient resource management and recycling. High competitive corporate companies pursue technologies and display behaviour by respecting the environment, in order to obtain management advantage.

Our environmental strategy points to

- transform environmental ties in success factors.
- realize project and purchase of eco-compatible products and components.
- adopt technologies that permit saving of environmental resources.
- our sustainable vision promotes a better approach with public administrations, control agencies and media. Our prime actions will be based on ethical code and on communication systems.

STRABAG is committed to compliance with the MTHL project Environmental Policy and recognizes its responsibility for the impact of its operations on local communities in India and the natural environmental resources.

This is an evolving document and will be updated throughout the duration of the project. Periodic reviews of the Plan and procedures will be performed to ensure continual improvement as regards to adequacy of the plan and it will be expanded and updated during the project duration.

25.1.1 Scope of Work

This Environmental Plan covers STRABAG works on the Mumbai Trans Harbor Link Project (MTHL) .

STRABAG will be undertaking works on the MMRDA Project and will be responsible for the design and manufacture of sub system in Package -4 of MTHL and as such it will be responsible for the impact of its operation to the local community and natural environment.

STRABAG will produce Method Statements for their works to ensure that the environmental impact of its activity is taken into consideration and that effective environmental measures are put in place. STRABAG will also ensure that the procedures are put in place to deal with packaging associated with the VAC system shipped from India and overseas that all waste is dealt with a manner, which is environmentally friendly.

STRABAG will be responsible on the respect of all appropriate categories/areas, such as air quality, noise, water quality that are to be considered in the environmental study.

STRABAG will conform to the Indian Environmental Laws and codes as applicable including CRZ and flamingo-related matters and conditions of MOEF and MCZMA clearances/recommendations . The current National standards established by the Ministry of Environment and Forest, Government of India and other government agencies for control of environmental pollutants such as air, water, noise and visual impacts/aesthetics will be followed for compliance during the project.

25.1.2 Purpose

The purpose of this plan is to outline STRABAG's environmental management system and the relationship with the Employer.

Depending on the area in which STRABAG is working, the Project Manager or his representative will liaise directly with environmental issues. They will prepare and issue for approval to the Employer's Representative the methods statements that cover these works as per environmental regulations.

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25.1.3 Standards Compliance

STRABAG will comply with all Government enactments which will include but are not limited to:

- Environment Protection Act,1986
- Air (Prevention and control of Pollution) Act,1981
- Water (Prevention and Control of Pollution) Act,1974
- The Noise Pollution (Regulation & Control) Rules, 2000
- The Hazardous Waste (Management & Handling) Rules, 1989
- Manufacture, Storage and Import of Hazardous Chemicals Rules, 1989
- Municipal Solid Waste (Management & Handling) Rules, 2000
- ISO 14001-2004: Environmental Management System

STRABAG is in compliance with Bid Documents.

25.1.4 STRABAG Environmental Policy

STRABAG Environmental Policy is reported in the **Appendix A.**

25.2. Environmental Impacts

STRABAG will take all precautions and guidelines to avoid any untoward incidents arising from its operations. This will be accomplished, wherever possible by suppression of these incidents at source rather than abatement of the nuisance once generated.

Activities of STRABAG have the potential to impact on the environment in the following ways:

- Noise problem to the local community: STRABAG will take all appropriate measures to ensure that work carried out by them and its sub-Contractors, whether on or off the Site, will not cause any unnecessary or excessive noise which may disturb the occupants of any nearby dwellings, schools, hospitals, or premises with sensitivity to noise.
- Dust problem to the local community: STRABAG will take all necessary precautions to minimise dust emissions from operations. STRABAG will not allow emissions of dust from any transport, handling, construction or storage activity without providing sufficient dust control measures.
- Dust/mud/dirt on public highways: STRABAG will take precautions to minimise visible particulate matter from being deposited upon public roadways as a direct result of its operations. All construction equipment will be washed clean of visible dirt/mud before exiting the construction sites and material will be located in a manner that will minimise dust production.
- Discourteous parking and/or use of vehicles.
- Waste/litter management and general housekeeping: STRABAG will handle waste in a manner that ensures that they are contained securely without loss or leakage thus minimising potential for pollution, maintaining and cleaning waste storage areas regularly. STRABAG will constitute a special group of housekeeping personnel in charge of each work section, in order to maintain the site reasonably clean, keep free from obstruction and properly store any construction equipment, tools, and materials.
- Spillage of hazardous liquids through accidental spillage: a Spill Prevention and Control Procedure will be prepared to identify project components such as storage areas, storage tanks that could allow discharge of oil grease or hazardous materials to the drainage system or ultimately in any water body during spillage.
- Water pollution: STRABAG will comply with all Indian Government legislation and other State regulations in existence in Maharashtra insofar as they relate to water pollution control and monitoring. STRABAG will provide adequate precautions to ensure that no spoil or debris of any kind will be pushed, washed, falls or deposited on land adjacent to the site perimeter.
- Landscape and aesthetics impacts: STRABAG will consider landscape and aesthetics quality with appropriate actions taken in order to mitigate negative impacts due to construction.

STRABAG will be implementing environmental procedures to control their works and any impacts they may have.

25.3. Roles and Responsibilities

25.3.1 Project Manager and Site Environmental Representative

- Will be responsible for compliance with STRABAG Environmental policy.
- Will be responsible for implementing the STRABAG Environmental plan and shall be the main contact person for all environmental issues including environmental incidents.
- He will also be responsible for compliance with MMRDA Environmental plans and procedures.
- He will ensure that all STRABAG staff and contractors working for STRABAG are made aware of the MMRDA Environmental policy, STRABAG Environmental policy and STRABAG Environmental plans and procedures.
- Report all environmental incidents to STRABAG and to MMRDA.
- Communicate all environmental briefs received from MMRDA or STRABAG to STRABAG staff and any other concerned party.
- Discuss STRABAG environmental management performance on a monthly basis with the concerned parties.

25.3.2 STRABAG Personnel Responsibilities

- All personnel working for STRABAG will comply with all Environmental Plans and procedures connected with the project.
- Always work in accordance with method statements and risk assessments as provided.
- Take care of their immediate environment whilst at work. Ensure activities do not cause a nuisance to others.
- Report all incidents in accordance with agreed procedures.
- Suggest ways of eliminating environmental impacts.

25.4. Training

STRABAG will ensure that all of his staff will attend the correct induction course prior to the commencement of work in order to understand the contract requirements concerning the Environmental issues and procedures.

The method statement, prepared in association with the relevant parties, will cover specific environment issues connected with the task/activity. This will be communicated by a briefing at the start of the works by the person in-charge.

STRABAG Site Environmental Representative

STRABAG Site Environmental Representative will be made aware of the environmental issues that affect the MMRDA Project by the following:

- Will attend MMRDA safety induction which covers the environmental issues and the environmental procedures.
- Will have access to MMRDA Environmental plans and procedures.
- Will attend Environmental Briefings.
- Will attend Environmental Meetings.

STRABAG Environmental and Safety Department will inform the Site Environmental Representative of any changes to environmental legislation.

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25.5. Local Community

STRABAG believes in working with the community. We will ensure that all of our staff and contractors do not cause any inconvenience to the community in any way, by complying fully with the project requirements, regulations, method statements and risk assessments.

Work outside normal working hours will be kept to a minimum to avoid any noise issues: our strategy will be to minimize noise intrusive impacts during most noise sensitive hours by adopting plan noisier operations during times of highest ambient noise levels and keeping noise levels relatively uniform, avoiding excessive and impulse noises.

STRABAG may be using vehicles to access part of the MMRDA Project. STRABAG will provide to comply with the following rules:

- Ensure that the vehicle is clean before going on to the public roads.
- Ensure that transport vehicles and other equipment will conform to emission standards fixed by Statutory Agencies of Government of India from time to time at Mumbai.
- Ensure that parking vehicle does not cause a nuisance to the local community.
- Ensure that the vehicle engine is turned off when parked.
- Comply with the speed limits set by MMRDA while on site.

25.6. Management of Potentially Polluting Liquids

STRABAG's main activities on site are the inspection and commissioning of equipment. STRABAG in this phase will not use any chemicals or hazardous materials/substances.

Foreseen items that have been identified as cause for an environment hazard are:

- Spillage of vehicle oil.
- Spillage of vehicle fuel (petrol/diesel).

Maintenances/servicing of STRABAG vehicles will be carried out off site to reduce the risk of spillages. Spill kits will also be carried in his vehicles for emergency.

STRABAG will not store any potentially polluting liquids on site for the safety of workers and worksites.

Control of Substances Hazardous to Health (COSHH)

If any hazardous substance is used by STRABAG, a COSHH assessment will be carried out and a copy of the safety data sheet will be attached to the assessment.

25.7. Waste Management

A Waste Management Programme (WMP) shall be develop during the construction of the project, which may include:

- Identification of disposal sites.
- Identification of quantities to be excavated and disposed off.
- Identification of split between waste and inert material
- Identification of amounts intended to be stored temporarily on site location of such storage.
- Identification of intended transport means and route.
- Obtaining permission, where required, for disposal.

Such a mechanism is intended to ensure that the designation of areas for the segregation and temporary storage of reusable and recyclable materials are incorporate into the WMP. The WMP should be prepared and submitted to the Engineer for approval.

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

Waste shall be remove in a timely manner and disposed off at landfill sites after obtaining approval from concerned authority for disposal.

Burning of wastes is prohibited.

All waste will be disposed of in accordance with all applicable legislation.

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

25.8. ENVIRONMENTAL MONITORING SUMMMARY

25.8.1 NOISE AND VIBRATION

STRABAG does not consider that his activities will cause any excessive noise or vibration to the employees or to any others working in the same area.

STRABAG main activities on site are installation, inspection, testing and commissioning of systems which will involve the use of equipment which do not cause any excessive noise or vibration.

STRABAG will monitor his activities to ensure that his employees and others are not put at risk from noise or vibration. Work outside normal working hours will be kept to a minimum to avoid any noise issues.

STRABAG will comply with all regulations and requirements concerning noise and vibration.

25.8.2 AIR QUALITY MANAGEMENT

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

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

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

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

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

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

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

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

25.8.3 WATER QUALITY MANAGEMENT

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

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

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

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

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

The Contractor shall apply to the appropriate authority for installing bore wells for water supply at site.

25.9. HAZARDOUS WASTE MANAGEMENT

Waste generated as per the construction activity shall be classified as hazardous under the "Hazardous Wastes (Management & Handling) Rules, 1989, amendments 2000, 2003" & shall be disposed off in a manner in compliance with the procedure given in the rules under the aforesaid act.
Chemicals classified as hazardous chemicals under "Manufacture, Storage and Import of Hazardous Chemical Rules, 1989 of Environment (Protection) Act, 1986 shall be disposed off in a manner in compliance with the procedure given in the rules under the aforesaid act.
The nature and quantity of hazardous waste generated as a result of construction activities shall be identified and file a 'Request for Authorization' with Maharashtra Pollution Control Committee along with a map showing the location of storage area.
Outside the storage area, 'display board' shall be place, which will display quantity and nature of hazardous waste, on date. Hazardous Waste needs to be stored in a secure place.
Hazardous wastes shall be stored, based on the composition, in a manner suitable for handling, storage and transport. The labelling and packaging is required to be easily visible and be able to withstand physical conditions and climatic factors.
Only Authorized Recyclers shall be approach of Hazardous Waste for disposal of Hazardous Waste, under intimation to the Employer.

25.10. Energy Management

STRABAG will provide to use energy efficiently, in order to protect the environment by preventing pollution. STRABAG will work with an aim to optimize the use of tools and plants and equipment to perform tasks with correct power. Optimizing cable sizes and joints can control voltage drops. A plant projected in a right way will permit to avoid any wrong energy management.
The equipment shall be maintained in such a way to conserve energy.
Measures to conserve energy include but not limited to the following:

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

STRABAG will plan in advance and select locations to receive and store material to have the least distance from place of use. Such an approach will result in less energy being consumed since optimum energy will be expended for transport of material.

25.11. Environmental Plan Review and Audits

STRABAG Project Manager will regularly review the Environmental Plan. The review process will ensure that all arrangements are still appropriate, and any additional environmental impacts have been incorporated, and that the document is reissued to all appropriate personnel. Any changes will be discussed and authorized by the respective companies.

STRABAG will undertake an internal audit using the process and monthly audit report form (MAR) as prescribed within OHS&E.

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Appendix A – STRABAG Environmental Policy

- STRABAG are committed to protect the environment, health & safety of its workforce & stakeholders where it operates.
- Adherence to this policy is the individual and collective responsibility of all its employees.
- STRABAG will achieve these goals through EHS system and strive for continual improvement by:
- Ensuring that the workforce (direct / indirect /contractors) employed at workplaces shall follow, defined safety procedures.
- Considering Prevention of Accidents as of prime importance in all phases of operation
- Educating and training to institutionalize EHS Policy & Procedures throughout the Business Group.
- Ensuring effectiveness of deployment and its monitoring, through set targets, periodic reportage, reviews and audits.

ANNEXURES

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Technical Proposal

Safety Plan / Environment Management Plan / Health Plan

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Technical Proposal

Safety Plan / Environment Management Plan / Health Plan

2-OHSE Annexures I, II, III & V

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ANNEXURE I – SAMPLE ID CARD FORMAT

Size: 85 mm x 55mm

Front side of ID Card:

NCRTC, RRTS Project

QR Code

Contractor & Sub-contractor Logo, Name & Address

Name:
Designation:
Blood Group:
Contact No.
Valid upto:

Photo

Authorised Signatory

Backside of ID card:

Employee Address with emergency no. :_____

Induction date	Medical examination:	Registration No.
Basic 16 hrs training	PF/UAN No.	Emergency contact No.

This card is the property of "XX" (Main / Sub / Labour Contractor) and must be returned on demand and on transfer / cancelation of employment.

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ANNEXURE II - WORK PERMIT SYSTEM

OBJECTIVE

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

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

RESPONSIBILITIES

Project Manager or Delegate

Project Manager (or delegate) is responsible for ensuring:

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

Construction Managers

Each Contruction Manager is responsible for:

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

Issuing Authority

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

Affected Area Authority

An Affected Area authority is an area authority whose area of responsibility will be affected by work being undertaken principally in another area and under the control of the Issuing Authority.
The Affected area authority is required to be aware of, and in agreement with, work activities taking place, which have a potential impact on his area of responsibility and control.

Performing Authority

The Performing Authority is the person who requires the work to be done (or who will do the work) and is the senior person in charge of the work controlled by a permit.
He shall ensure that he, and all the members of the operation team involved, understands the conditions, limitations, and precautions necessary as stipulated in the Work Permit, and that these are complied with.
Note: The same person shall not have the role of both Issuing authority and Performing Authority for the same Permit to Work.

Confined Space Attendant

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

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

The Site Health & Safety Manager

The Health and Safety Manager is responsible for:

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

WORK PERMIT AUTHORIZATION

Work Permit authorization form shall be completed with the maximum duration period not exceeding 08 hours.

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

NO PERMIT REQUIRED

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

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

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

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

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ANNEXURE III – OPERATIONAL CONTROL PROCEDURE CHECK LIST

FM-SHE-01: TOOLBOX TALK ATTENDANCE RECORD

PROJECT/ SITE:..... **DATE.....**

The Toolbox Talk conducted at.....Hrs, **Given by.....**

Talk Subject: .....

SI.NO.	Name of Person	ID. NO.	Designation	Signature
1.				
2.				
3.				
4.				
5.				
6.				
7.				
8.				
9.				
10.				
11.				
12.				
13.				
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18.				
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23.				
24.				

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FM-SHE-02: SAFETY TRAINING ATTENDANCE RECORD

PROJECT / SITE:..... **DATE.....**

SHE Training was attended by workers/ staff of M/s..... (Time Period.....hrs.)

TRAINING TOPIC: .....,

Sl. NO.	Name of Person	ID. NO.	Designation	Signature
1.				
2.				
3.				
4.				
5.				
6.				
7.				
8.				
9.				
10.				
11.				
12.				
13.				
14.				
15.				
16.				
17.				
18.				
19.				
20.				
21.				

Name & Signature of:

Coordinator		**Date**	
Construction Manager		**Date**	

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FM-SHE-03: WALK THROUGH SITE INSPECTION CHECKLIST

Station/ Site ..... **Date**.....

Sl. No	Requirement	Compliance Status		Remark
1.	Safety Indicator	Displayed	Not Displayed	
2.	Vehicle Movement	Controlled	Erratic	
3.	Personal Protective Equipment's	Issued	Not issued	
4.	Housekeeping	Good	Bad	
5.	Excavation (if any)	Safe/barricaded	Unsafe	
6.	Safety Posters and Singes	Displayed	Not Displayed	
7.	Scaffolding Towers	Mounted orderly	Mounted Disorderly	
8.	Gas and Arc welding /	Safe	Not in order	
9.	Fire Extinguisher	In order	Not in order	
10.	Material Storage	In order	Not In order	
11.	Waste	In proper bins	Haphazardly kept	
12.	DG power mgt	In order	Not in order	
13.	Gas cylinders	Stored upright	Not in order	
14.	PPE	Issued to workers	Not provided/ Not wearing	
15.	Full Body Harness	Issued for height work	Not issued / Not wearing	
16.	Hoists properly anchored	Yes	No	
17.	First aid box /record book	Available /Maintain	Not available	
18.	Crane operations	In order /barricaded	Not in order	
19.	Cutouts/ opening etc in vicinity	Protected	Not Protected	
20.	Ladders	Secured	Not secured	
21.	Scaffolds	Proper & Secured	Not safe	
22.	Clean drinking water provided	Yes	No	
23.	Emergency evacuation procedure	In place	Not in place	
24.	Child labour	Noticed	No	
25	Toilets	Provided/ Cleaned	Not Provided	
26.	Rest Location	Provided	Not Provided	
27.	Assembly point	Notice Displayed	Not Displayed	

Site Safety Incharge	**Sign.**	**Name:**	**Date**
Site Incharge	**Sign.**	**Name:**	**Date**

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FM-SHE-04: NEAR MISS INFORMATION

SITE ..... **DATE**.....

Near-miss Description (what happened)		
Obvious Cause of the Incident (if any)		
Contributing Factor		
Time & Date of Incident		
Weather Conditions:		
Personnel Involved		
Was any plant, machinery or equipment involved (if Yes give detail)		
What has been done to prevent a re-occurrence		
Name of Person Marking Report	**Company**	
Job Title	**Signature**	**Date & Time**
Distribution: Construction Manager, Safety Manager, Sub-contractor, Notice Board		

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FM-SHE-05(1): ACCIDENT / DANGEROUS OCCURRENCE REPORT FORM

NAME OF CONTRACTOR:	CONTRACT NO.	ACCIDENT NO.

Instructions:
1. A copy of this form be completed every Accident and Dangerous Occurrence
2. It must be signed by a senior site management reprehensive.
3. A copy shall be sent to the Employer's Representative within 24 hours of the Accident.

Part A : Details of Injured Person

Name		D.O.B.	(Male / Female)
Address			
Job Title		Name Of Employer	

Part B: Details of the Accident

Accident Date & Time		Location	

- Describe the task the injured person was doing at the time of the accident
- Describe in details how the accident happened (Attach, sketch, plan photographs etc.)
- Was any plant or machinery involved yes/no : if yes give details:
- Name of any Witnesses :

Part C: Details of the Inquiry

What was the Injury? (e.g. Fracture, Lacerations,)				
What part of the body was injured?				
Was the injury:	Major Injury	Fatal Injury	Minor Injury	Firs Aid Injury
Was the injured person sent to	Doctor	Hospital	Home	

Part D: Certification

I have checked the above information and can confirm that it is a true record the accident

Name & Sign:	Supervisor/ Engineer	Site Incharge
Name & Sign:	SHE Manager	Project Manager

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FM-SHE-05(2): ACCIDENT REPORT AND INJURY ANALYSIS FORM

SITE:

ACCIDENT NO:		**ACCIDENT TYPE**	
Name Of Contractor		**Contract No.**	
Name Of Injured Employee		**D.O.B.**	(Male / Female)
Address			
Job Title		**Name Of Employer**	
Accident Date & Time		**Location**	

CAUSE OF ACCIDENT:

1. Machinery	5. Falling Objects	9. Gas Poisoning & other toxic substances	13. Miscellaneous
2. Electricity	6. Stepping on or striking against an object	10. Explosion or fire	
3. Hand Tools	7. Fall of Person	11. Handling goods or equipment	
4. Foreign Body in Eye	8. Hot or Corrosive substances	12. Transport	

SEVERITY OF INJURY

1. First Aid	3. Medical Aid	5. Three days or less	7. Over three days
2, Discharged	4. Detained	6. Fatal	8. Days lost

NATURE OF INJURY (Enter in order of seriousness)

1. Amputation	5. Crush / Compression	9. Foreign body in eye	13. Sprain / Strain
2. Cut	6. Contusion / Bruise	10. Foreign body	14. Inhalation / Ingestion
3. Laceration	7. Fracture	11. Puncture	15. Concussion
4. Abrasion	8. Dislocation	12. Scald / Burn	16. Other

PART OF BODY INJURED (Enter in order of seriousness)

Head and Neck	**Trunk**	**Upper Extremities**	**Lower Extremities**
1. Skull	11. Back	18. Shoulders	26. Hips / Buttocks
2. Scalp & Forehead	12. Chest	19. Upper Arm (R/L)	27. Thigh
3. Eyes	13. Abdomen	20. Elbow (R/L)	28. Knee
4. Ears	14. Groin	21. Forearm (R/L)	29. Shanks
5. Nose	15. Respiratory System	22. Wrist (R/L)	30. Ankles
6. Mouth, Teeth Jaws	16. Digestive System	23. Hand (R/L)	31. Heel / Sole / Instep
7. Face & Cheeks	17. Others	24. Thumb (R/L)	32. Toes
8. Neck & Shoulders		25. Others	33. Others
9. Brain			

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10. Others

FM-SHE-05(2) : ACCIDENT REPORT AND INJURY ANALYSIS FORM (contd...)

UNSAFE CONDITIONS

1. Rough / slippery
2. Design effect
3. Worn / frayed
4. No protective gear
5. Defective protective gear
6. Improper dress
7. Improper guard
8. Improper ventilation
9. Improper illumination
10. Improper procedure of job, Traffic or process operation etc.
11. Inadequate procedure
12. Inadequate aisle space
13. Unsafe planning / layout
14. Unsafe Process / Job method
15. Overloading
16. Poor Housekeeping
17. No unsafe condition

PERSONAL FACTOR

1. Attitude
2. Knowledge or skill
3. Physical defect
4. Unsafe act of other
5. No unsafe personal factor

UNSAFE ACT

1. Operating without authority
2. Failure to secure or warm
3. Operating at unsafe speed
4. Using hands instead of tools
5. Making safety devices or equipment inoperative
6. Using defective equip , materials, tools or vehicle
7. Using equip, tools, materials or vehicle unsafely
8. Failure to use personal protective equipment
9. Failure to use equipment provided (except PPE)
10. Unsafe loading, placing and mixing
11. Unsafe lifting & carrying (including insecure grip
12. Taking an unsafe position / posture
13. Adjusting, cleaning jams, or machinery in motion
14. Failure to use safe attire Factor
15. Horseplay
16. Poor housekeeping
17. Carelessness
18. No unsafe act

How would a similar accident be avoided?

What has been done to prevent similar accidents?

COMMENTS:

Safety Officer	**Sign.**	**Name:**	**Date**
Project Manger	**Sign.**	**Name:**	**Date**

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FM-SHE-06: OPERATIONAL CHECKLIST FOR FIRST AID KIT

Site..... **Date**.....

Sl. No.	Description of Check Points	Status		Remarks/ Usages
		Desired	Available	
1.	Is box painted in	YES/ NO		
2.	Is box marked distinctly with "FIRST AID"?	YES / NO		
3.	Is there anything except first aid contents in the box (detailed below)	YES/ NO		
4.	First aider available	YES / NO		
5.	Eye wash cup plastic	01		
6.	Packet of sterilized cotton wool	01		Wound cleaning
7.	Dettol / Sevlon 50ml antiseptic solution	01		Antiseptic to clean / wash wound
8.	Antiseptic Cream & Burnol (burn ointment) Cream	01		Antiseptic cream to cover wound & Cream to cover burn area
9.	A pair of stainless steel scissors with plastic handle	01		Cut dressing, bandages or clothing
10.	Roll of adhesive plaster (6cm x 1m) & (2cm x 1m)	01		Secure dressing
11.	Pieces of sterilized eye pads in separate sealed packets.	02		Cover eye wounds
12.	Aspirin or any other analgesic and Paracetamol Tablets	10+10		Headaches / pain killer + Anti Inflammatory
13.	Digene Tablets	10		Antacid
14.	Roller bandages 10cm & 5cm wide	04 + 04		For dressing of wound
15.	Packets of safety pins	01		Secure dressing and slings
16.	Pair of Disposable Gloves	01		Prevention of cross infection
17.	Copy of first aid leaflet issued by the Director General.	01		First Aid reference

Safety Officer	**Sign.**	**Name:**	**Date**
Construction Manager	**Sign.**	**Name:**	**Date**

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FM-SHE-07: FULL BODY HARNESS (SAFETY BELT) INSPECTIONCHECK LIST

Site..... Date: .....

Sr. No.	Type of Belt	ID No. / Make	Status / Condition of								Remarks
			Waist belt	Leg straps	Buckles	Shoulder straps	'D' Ring(s)	Lanyard(s)	Loops / hook	Lifeline	
1.											
2.											
3.											
4.											
5.											
6.											
7.											
8.											

Safety Officer	Sign.	Name:	Date
Construction Manager	Sign.	Name:	Date

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FM-SHE-08: CHECK LIST - PORTABLE LADDERS

SITE	Report No. #.....	Date .....

Sl. No.	ID No.	Type of Ladder	Location	Condition / Status of								Remarks
				Length	Placement	Vertical Members	Shoes	Rungs	Locking Devices	Top Platform	Lashing / Hooks	
1.												
2.												
3.												
4.												
5.												
6.												
7.												
8.												

(Only the aluminum ladders shall be used. Every ladder should be of good construction, made of sound material and of adequate strength)

Safety Officer	Sign.	Name:	Date
Construction Manager	Sign.	Name:	Date

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FM-SHE-09: CHECKLIST – MOBILE TOWER SCAFFOLDS

Site ..... **Date:**.....

Sl. No	Aspect			Scaffold No.		
				#	#	#
1.	Location of Scaffold					
2.	Is the height is restricted to 3.5 times the minimum base width?	**Small Base Arm**	**Height**			
3.	Is scaffold approval system being followed?					
4.	Is constructed for Light – 225Kg or Heavy 450 ~ 675Kg duty?					
5.	Is working platform fully boarded? Are gratings / planks of good quality, proper length, adequately supported & secured?					
6.	Is the top rail, mid rail, and toe board provided on all sides?					
7.	Are all bracing in place?					
8.	Are couplings / locking assemblies in good condition?					
9.	Are coupling bolts & clamps projecting / interfering in access, protected suitably?					
10.	Are castor wheels in good working order and having proper locking arrangement?					
11.	Are wheels being locked before the workman Ascending/ Descending on it?					
12.	Is scaffold erected on even / leveled ground or sound base?					
13.	Is supported on boxes, drums, pipe loose tiles or such material?					
14.	Is scaffold overloaded or otherwise misused?					
15.	Is positioned safely and not obstructing movement of personnel and material?					
16.	Is there loose material, rubbish etc. stacked on the work platform?					
17.	Is securely fixed to existing structure / supported by wire rope / guys?					
18.	Is ladder to reach platform provided appropriately and secured?					
19.	Is "SAFE TO USE" tag is validated?					

Note: -

a) Every component of scaffold should be made of sound material and free from defects and should conform to relevant national standard. The scaffold should be erected/ altered under the supervision of responsible persor .

b) The scaffold will be inspected, as per checklist after erecting and will be tagged. The tag will become invalid if any component s are removed or changed

c) Validity for Certification is 7 days from the date of inspection & the validation voids in case of major weather changes / Alterations in the scaffold

SAFE FOR USE	SAFE WITH PRECAUTIONS	NOT SAFE FOR USE
#	#	#

Name & Signature of Safety Officer: ..... **Date:** .....

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FM-SHE-10: FIRE EXTINGUISHERS INSPECTION /CHECK LIST

SITE ..... **Date**.....

Sl. No.	Type	Cyl. No.	Location	Hydraulic Test Done On	Charged/ Refilled On	Status / Condition of									
						Body & Paint	Sticker	Lifting Handle	Valve / Gauge	Locking Pin / Clip	Hose / Nozzle	Cartridge / Portho le	Gas Pressure	Content Weight (kg)	Remarks
1															
2															
3															
4															
5															
6															
7															
8															
9															
10															

Access to the fire extinguishers/ fire buckets should not be blocked. Any equipment found defective / empty, should be replaced immediately.

Safety Officer	**Sign.**	**Name:**	**Date**
Construction Manager	**Sign.**	**Name:**	**Date**

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FM-SHE-11: SHE COMMITTEE MEETING ATTENDANCE RECORD

Contract:..... **Date:** .....

The following SHE Committee Members and Representatives of Contractors, Client's Representative and Invitees whose name and signatures are appended below participated in the ..... , SHE Committee Meeting held at .....

Sl. No.	Name of Member / Invitee	Company & Designation	Work Site/ Location	Mail Address/ Telephone No.	Signature
1.					
2.					
3.					
4.					
5.					
6.					
7.					
8.					
9.					
10.					
11.					
12.					
13.					
14.					
15.					
16.					
17.					
18.					

Safety Manager	Sign.	Name:	Date .....
Project Manager	Sign.	Name:	Date .....

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FM-SHE-12: GAS CUTTING / GAS CUTTING SET -INSPECTION REPORT

Sl. No.	Items Checked	Yes	No	Remarks
	Gas Cylinders			
1.	Cylinders installed are in an upright position and secured			
2.	Cylinders are kept away from sunlight, sparks excessive heat and electrical circuits			
3.	Cylinders installed in open are provided with Safety shelter			
4.	Oxygen and Acetylene cylinders are kept apart			
5.	Cylinders are soap solution tested for leaks			
6.	Empty and filled cylinders are kept separately and marked			
7.	**Regulators / Hoses / Torches**			
8.	Regulators and torches are of substantial design and in good working condition			
9.	Hoses are pressure tested and free from tape / wrapping materials plugging for leaks etc.			
10.	Green/ blue hose is connected to oxygen cylinder while red to acetylene cylinder			
11.	Flash arrestor provided for cylinders			
12.	Flash arrestor provided for the torch			
13.	Proper connections are used for fastening			
14.	All joints are soap solution tested for leaks			
15.	Hoses are kinked or tangled			
16.	Hoses are properly laid to prevent tripping			
17.	Cables are protected from mechanical damage			
18.	Hoses protected from burning			
19.	Cutting torch is left hanging over cylinders parts			
20.	Only friction lighter is in use.			

Comment:

Resident Engineer / Site Supervisor	**Sign.**	**Name:**	**Date**
Safety Officer	**Sign.**	**Name:**	**Date**

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FM-SHE-13: ARC WELDING MACHINE INSPECTION REPORT

Sl. No.	Items Checked	Yes	No	Remarks
Welding Set				
1.	Connections are proper and well insulated			
2.	Shock prevented built-in installed			
3.	ON / OFF Switch in good working condition			
4.	Proper earthing provided			
5.	Battery terminals properly greased to prevent sulphation			
Cables & Joints				
6.	Cables and joints are proper and in good condition			
7.	All wire including joint connectors are well insulated			
8.	Cables used are of correct rating to power supply			
9.	Any overheating of cable due to over loading			
10.	Are cables properly laid to prevent tripping?			
11.	Are cables away from power supply cables and high tension wires?			
12.	Are cables exposed to or contact with oil, grease, sharp edges water and falling sparks			
Electric Holders				
13.	Electrode holders in use are good to work and properly insulated with no exposed metal parts			
14.	Holders are kept dry and properly hung up after use\			
15.	Are holders in contact with metal parts?			
16.	Are electrodes detached after the use and kept aside securely?			
17.	Frames of welding unit is grounded properly			
18.	Are stub pieces of welding electrode collected separately?			

Comments:

Resident Engineer / Supervisor	**Sign.**	**Name:**	**Date**
Safety Officer	**Sign.**	**Name:**	**Date**

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FM-SHE-14: CHECK LIST HEAVY LIFTING OPERATION

I have inspected the location and placement of crane, lifting area / equipment's / tools and tackles available with the machine, hooking of load, lighting, horn, limit switch and other arrangements.

Site / Location Of Work:.....**Date:** ..... **Time:**.....

Brief Description Of Work:.....

Sr. No.	Condition of equipment	Yes/No	Remarks
1.	Is crane operator and crew members are fit to work.		
2.	Are they wearing required PPE?		
3.	Is Crane certified and good for the job?		
4.	Load chart is provided / SWL clearly marked.		
5.	Outriggers of cranes are fixed on a flat / firm ground		
6.	All lifting tools and tackles are certified		
7.	SWL clearly marked on Slings, D Shackles etc.		
	Safety Precautions		
1	Is Lifting Area barricaded and caution signs displayed?		
2	Are unauthorized persons sent out of the lifting area?		
3	The platform for positioning load is clear and okayed		
4	Are the Agencies working in cautioned?		
5	Is Crane properly positioned?		
8	Is Lifting Supervisor present?		
7	Is Load to be lifted marked / known .....Ton?		
8	Working radius .....Meter SWL.....T under working radius		
9	Is there a Safe clearance from overhead electrical lines in area?.		
10	Is the load path clear of obstructions and Is visibility good?		
11	Is adequate lighting arrangement made for lifting during dark hours in the area of lift and level path of load?		
12	Are the Operator, Riggers and Signalmen clear about the job.		
13	Is tool box conducted?		
14	Is machine fitted with following? - Head and rear lights - Reverse horn - Signal horn - Warning lights (Blinkers) - Load indicator - Angle indicator - Limit switches - Warning buzzer - Over hoist warning device	Are required Documents valid? - HV Driving License - Vehicle Fitness Certificate - 3rd Party Inspection certificate - Vehicle Insurance - PUC certificate	- Vehicle Registration No. - Make/ Model / Year of mfg. - Capacity

The work to be done has been discussed with the crane operator, riggers / sling man, and they have visited areas of Load Lifting & Load placement and have understood the job. Under the existing environmental conditions it is safe to lift / placement ---------- from its present location / placement platform.

Name &Signature of Site Engineer /Lifting Supervisor.....**Date / Time**.....

The load under consideration is Safe to lift / Not Safe to lift

Name & Signature of Site Safety Officer: .....**Date/ Time**.....

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FM-SHE-15: CHECK LIST TANDEM LIFTING

SITE / LOCATION OF WORK:.....**DATE:** ..... **TIME**.....

Brief Description of Work:

Weight of Load under Lift:..... **Cranes Capacity While Lifting Load:** .....

Sr. No.	Condition of equipment	Yes/No	Remarks
1.	Is crane operator and crew members are fit to work?		
2.	Are operators and crew members wearing required PPE?		
3.	Are Cranes certified & cleared by designated person good for job?		
4.	Are load charts on M/C provided and SWL clearly marked?		
5.	Outriggers of cranes are fixed on a flat / firm ground.		
6.	Are lifting tools and tackles certified?		
7.	Is SWL clearly marked on Slings, D Shackles etc.?		
	Safety Precautions		
1	Is Lifting Area barricaded and caution signs displayed?		
2	Are unauthorized persons sent out of the lifting area?		
3	Is the platform / area for positioning load clear and okayed?		
4	Are the Agencies working in vicinity duly cautioned?		
5	Are Cranes positioned properly and okayed by the Designated person?		
8	Is Lifting Supervisor present?		
7	Is Load to be lifted marked / known .....Ton?		
8	Working radius (A).....(B).....meter, SWL of M/c (A).....(B).....Ton		
9	Is there a Safe clearance from overhead power lines in area (if any)		
10	Is the load path clear of obstructions and Is visibility good?		
11	Is adequate lighting arrangement made during dark hrs? in area of lift &level path of load?		
12	Are the Operator, Riggers and Signalmen clear about the job?		
13	Is toolbox conducted?		

13	Is machine fitted with following?	A	B	Are required Documents valid?	A	B	- Vehicle Registration No. A B
	- Head and rear lights - Reverse horn - Signal horn - Warning lights (Blinkers) - Load indicator - Angle indicator - Limit switches - Warning buzzer - Over hoist warning device			- HV Driving License - Vehicle Fitness Certificate - 3rd Party Inspection certificate - Vehicle Insurance - PUC certificate			- Make/ Model/ Year of mfg. A B - Capacity A B

I have inspected the location and placement of cranes, lifting area / equipment's / tools and tackles under use, hooking of load. Cranes operators, riggers/ sling men have understood the job. Under the existing environmental conditions it is safe to lift from the present location and its placement at the receiving platform.

Name &Signature of Site Engineer/ Lifting Supervisor.....**Date / Time**.....

I have checked the above. The load under consideration is Safe to lift / Not Safe to lift.

Name & Signature of Site Safety Officer: .....**Date/Time**.....

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FM-SHE-16: LIFTING TOOLS & TACKLES INSPECTION CHECK LIST

SITE: ..... **Date:** .....

Sl. No.	Item	SWL	Identification No.	Load Test		In-house Inspection		Remarks
				Done On	Due On	Condition of Equipment	Done By	
1.								
2.								
3.								
4.								
5.								
6.								
7.								
8.								
9.								
10.								

(The lifting machines, tools & tackles except fibre rope/ fibre sling, shall be tested and thoroughly examined by a **competent person** and their certificate shall be available as prescribed)

Safety Officer	**Sign.**	**Name:**	**Date**
Construction Manager	**Sign.**	**Name:**	**Date**

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FM-SHE-17: SITE NOISE MONITORING REPORT

Site ..... **Date**.....

Sl. No.	Location	Activity	Noise Level dB(A) 1m away from Source					Remark
			1	2	3	4	Range	
1.								
2.								
3.								
4.								
5.								
6.								
7.								

The permitted time (in hours) of exposure to continuous or short-term noise level [dB (A)] is given in the table below.

Permitted Hours of Work (hrs)	Level of sound dB(A)	Permitted Hours of Work	Level of sound dB(A)	Note
8	90	1 ½	102	• No exposure in excess of 115 dB (A) is to be permitted.
6	92	1	105	• For any period of exposure falling in between any figure and the next higher figure of lower figure as indicated in column (1), the permissible sound pressure level is to be determined by extrapolation on a proportionate basis.
4	95	¾	107	
3	97	½	110	
2	100	¼	115	

Safety Officer	**Sign.**	**Name:**	**Date**
Construction Manager	**Sign.**	**Name:**	**Date**

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FM-SHE-18:SITE ILLUMINATION LEVEL CHECK LIST

SITE..... **DATE**.....

Sl. No.	Work Location	Activity / Work	Distance (m) of Light Source	Type of Light Fitting Fixed / Temp	Illumination Level (Lux)				Remarks
					Recommended	Inst. Reading	CF	Corrected Reading	
1.									
2.									
3.									
4.									
5.									
6.									
7.									
8.									
9.									
10.									

Correction Factor (CF):
Mercury Lamp : x 1.1
Fluorescent Lamp : x 1.0
Incandescent Light : x 1.0
Day Light : x 1.0

Recommended Illumination (lux):
Office: Offices, drafting, meeting room etc - 540
Site: **Access** - Exit ways, Walkways , ladders & Stairs - 150 ~ 300
Work Areas(general) - 325
Mechanical Electrical Equipment Room – 110
Welding Shop - 325

Store : Indoor stockroom, active / bulk Store 110
Indoor rack store – 270
Outdoor storage – 33
Facilities: Toilet, wash rooms - 110

Safety Officer	**Sign.**	**Name:**	**Date**
Construction Manager	**Sign.**	**Name:**	**Date**

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STRABAG	OUTLINE OCCUPATIONAL HEALTH, SAFETY & ENVIRONMENT PLAN	एम एम आर डी ए MMRDA

M-SHE-19: WEEKLY HOUSEKEEPING INSPECTION CHECKLIST

SL. NO.	CHECK POINTS	OBSERVATION	RECOMENDATION	STATUS
1.	General cleanliness of worksites	Good/ Bad/ Satisfactory		
2.	Are work areas cluttered and poorly arranged?	Yes/ No/ NA		
3.	Do bins and containers overflow?	Yes/ No/ NA		
4.	Office and stores are maintained	Tidy/ Untidy		
5.	Are combustible materials stored Away from sources of ignition?	Yes/ No/ NA		
6.	Are piling of materials untidy and insecure?	Yes/ No/ NA		
7.	Are items stored no longer needed?	Yes/ No/ NA		
8.	Do materials stuffed in corners and out-of-the-way places?	Yes/ No/ NA		
9.	Are First aid box(s) equipped at designated location(s)?	Yes/ No/ NA		
10.	DG set properly positioned and earthed?	Yes/ No/ NA		
11.	DG area is properly maintained and barricaded?	Yes/ No/ NA		
12.	Are 'No Smoking' signs displayed conspicuously?	Yes/ No/ NA		
13.	Is suitable safety and warning signs or notices displayed at conspicuous places?	Yes/ No/ NA		
14.	Are Power Distribution Boards, Extension Boards etc. properly located / installed?	Yes/ No/ NA		
15.	Are cables trailing around the work area?	Yes/ No/ NA		
16.	Are areas, floor set clear to perform work?	Yes/ No/ NA		
17.	Proper access & egress is provided/ available at all work places	Yes/ No/ NA		
18.	Material is stacked properly and not scattered around.	Yes/ No/ NA		
19.	Extra material removed / secured from/at worksite	Yes/ No/ NA		
20.	Are adequate material storage area/ facilities available at site?	Yes/ No/ NA		

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SL. NO.	CHECK POINTS	OBSERVATION	RECOMMENDATION	STATUS
21.	Is Adequate lighting provided?	Yes/ No/ NA		
22.	Are Passageways, aisles kept clear of obstacles?	Yes/ No/ NA		
23.	Are tools and left over materials/ scraps removed to their proper places on completion of job?	Yes/ No/ NA		
24.	Are materials with protruding nails / sharp edges left in position to cause injuries?	Yes/ No/ NA		
25.	Is access clear to installed FF equipment and power isolators?	Yes/ No/ NA		
26.	Are waste containers / bins for the type of waste provided	Yes/ No/ NA		
27.	Regular disposal of rubbish and waste is arranged	Yes/ No/ NA		
28.	Is water station maintained properly?	Yes/ No/ NA		
29.	Are water taps leaking?	Yes/ No/ NA		
30.	Are Toilet / Urinal facilities provided and kept clean?	Yes/ No/ NA		
31.	Is rest area maintained provided and maintained properly?	Yes/ No/ NA		
32.	Is Drainage facilities maintained properly?	Yes/ No/ NA		
33.				
34.				
35.				
36.				
37.				
38.				
39.				
40.				

Safety Officer	**Sign.**	**Name:**	**Date**
Construction Manager	**Sign.**	**Name:**	**Date**

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FM-SHE-20: EMERGENCY (MOCK) DRILL REPORT

1. Location : _____ Place : _____
2. Mock Drill conducted on : (Date) _____ Time : _____
3. Agencies present : _____
4. Emergency Situation : *Fire *Explosion *Release of Gas *Evacuation
   *Occupational Emergency *Any other
5. Name of the Observer
   a. Internal : _____
   b. External : _____
6. Time of Declaration of Emergency: ..... Hrs. ..... Minutes
7. Whether cordoning of the area done ? *Yes *No
8. Whether emergency alarm sounded : *Yes *No
9. First Responders Response Time :
10. Whether workmen assembled at assembly point : *Yes *No
11. Whether Ambulance / Medical Staff was called and time taken accordingly .....
12. Time of All Clear: ..... Hrs. ..... Minutes
13. Total Time Elapsed: ..... Hrs. ..... Minutes
14. Previous Total Time: ..... Hrs. ..... Minutes
15. Deficiencies observed during the exercise : _____

16. Action recommended for improvement :

S. No.	Recommendations	Action by	Expected Completion Date
1			
2			
3			
4			
5			

17. Name of the person responsible to follow up the above : _____
18. Other remarks if any : _____

Name &Signature of Emergency Co-coordinator of STRABAG.

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FM-SHE-21: Safety Violation Format

WARNING NOTICE	**Dated:**
Project Name : **Project No :** **Contractor:** **Client :**	
☐ 1st Warning Date: ☐ 2nd Warning ☐ 3rd Warning	
Employees **Name:** Trade: Employee no:	

Reason for Warning

Therefore, the following disciplinary action will be taken against you with immediate effect:

☐ Wage deduction hrs.			
☐ Suspended from:	Date:		To Date:
☐ Dismissed from site location:	Date:		

ORIGINATOR

Name:
Designation:
Signature:

Employee acknowledgment:

Received on: **Date**
Signature:

Report prepared by: Name: **Sign:** **Date:**

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FM-SHE-22: RECORD OF GENERATION & MANAGEMENT OF WASTE

SITE ..... **MONTH** .....

Sl. No.	Description of Waste	Quantity generated Previous Month	Quantity generated Current Month	Cumulative Disposed	Remark
1.	Metal waste				
2.	Welding Buds				
3.	Wooden				
4.	Cardboard				
5.	Polythene				
6.	Thermocol				
7.	Glasswool / Rockwool				
8.	Others				
9.					
10.					
11.					

Comments:

Safety Officer	**Sign.**	**Name:**	**Date**
Construction Manager	**Sign.**	**Name:**	**Date**

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FM-SHE- 23: PERMIT TO WORK FORMAT

SAFETY WORK PERMIT
(Excavation, Hot Work, Work at Height, Heavy Mat. Lifting, Electrical Work, Confined Space Work)

PERMIT NO.

Station/ Site:

Detail of work to be done:

Location of the work:

Date / Time From : **To :**

Precautions to be taken:

1) Supervisor to walk the work area and to ensure it is safe to work.
2) Ensure area is barricaded and danger notices displayed as required.
3) Ensure all equipment and cables are worthy for work.
4) Electrical control panels are properly covered and DB is fitted with ELCB and properly earthed.
5) To arrange safe work access - scaffold platform shall be properly erected and Ladder used shall have proper footing and secured properly.
6) To explain workers engaged to carry out the job – the work method, existing & anticipated hazards and precaution required for safe working.
7) To impress workers not to operate any equipment / machine unauthorizedly.
8) Ensure workers supplied and using Suitable PPE as

Safety Helmet	Safety Shoes	Hi Vi Jacket	Boiler Suit
FB Harness & lifeline	Welding goggle/ Hood		Safety / Cutting Goggle
Safety / Welding Gloves		Dust Respirator	Ear Protectors

9) To arrange & ensure proper ventilations and area lighting / illumination.
10) To keep fire extinguishers, sand / water buckets handy as required.
11) Screen arranged and installed to protect others from the flying objects, UV/ IR Radiation etc.
12) Ensure Fire Watch is trained to use FF Equip and in raising alarm in case of Fire.
13) Fire watch to remain on worksite; 30mins after the work to watch and ensure that no smoldering or such hazard which can ignite fire exist there.
14) In case of Emergency – Stop work, extinguish fire & leave Area.

ELECT. ISOLATION -Done / Not Done / Not Required

Method ----------

Date----------Time----------

By: ----------

(Name & Sign of person doing Elect. Isolation)

CONFINED AREA ENTRY CLEARANCE:
Confined Area Gas
Test Results:

O_2 %	CO %	H_2S%
CH_4 %	Explosive %	

Entry Granted – YES / NO
Name & Sign of Authority.....

Date----------Time ----------

EXCAVATION CLEARANCE: Granted Yes/ No/ NA

Electrical Engineer: .....

Civil Engineer: .....

Date / Time.....

RECEIPT :By STRABAG Site / Contractor Supervisor

Certify that I have understood the job details and agree to abide by the precautions & safety measures mentioned herein. I have explained the job to be done and precautions to be taken to workers deployed on the job in my control.

Date.....**Time**.....

Name & Sign of Supervisor----------

Names of Workers to be deployed on job

1.	4.
2.	5.
3.	6.

Are workers briefed of Job to be done, Hazards and precautions to be taken.

YES / NO

NOTE: The issue of Safety Work Permit does not make working condition safe but inform permittee of exact state in which he receives the plant equipment or place, specified precautions which shall be taken & special precaution be enforced by permittee.

Certified that required Safety Measures are in place

Date.....**Time**.....

Name & Sign of STRABAG Safety Incharge.....

AUTHORIZATION: By STRABAG Section Manager / Engineer

Certify that location specified above has been inspected and subject to the said precaution being taken the work can proceed.

Name & Sign ----------

Date----------Time ----------

The work detailed above has been Completed / Not completed and the Work Permit is surrendered after cleaning the work place on,

Date ----------**Time**----------**Name & Sign of Supervisor surrendering PW**----------

The Work Permit is hereby Cancelled & Closed on,

Date----------**Time**----------

Name & Sign of Authority ----------

Electrical Re-connection done on,

Date----------**Time**----------

By: ----------

(Name & Sign of person doing re-connection)

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SAFETY PERMIT TO WORK - RISK CONTROL MEASURES

Risk Control to be applied - Tick (✓) Box as appropriate and ensure compliance

EXCAVATION		LIFTING OPERATION	
Is hidden hazards identified (UG energized line) fouling the excavation area?		Ensure that the area is Safe for material handling & movement of vehicles and load set down area	
Ensure hand dig only in case U/G services / utilities are there (Tools to be specified) Mechanical excavation after 1.5m		Ensure adequate lift plan is available and understandable.	
Ensure for excavation more than 2m deep shoring provided to prevent caving in of loose soil.		Ensure firm footing for crane is provided and crane / lifting machine and all the lifting gears are certified.	
Ensure men & material to kept away (1m) from the edge of excavation.		Is lifting equipment been checked and fit for lifting operation? (SWL & Load chart of crane displayed)	
Provide adequate access ladders provided for person to reach excavated pit safely.		Ensure the operator and personnel selected to undertake this lifting operation have correct level of competence.	
Ensure barriers to prevent fall of person/ material & lighting for proper illumination provided.		Have the potentially affected parties been informed of lifting activities.	
Ensure no one remains inside the pit at the end of day.		Area is barricaded and warning notices are displayed	
Are the persons aware of Evacuation Procedure in case of emergency to escape from excavated pit		Visibility in area and lift path is clear and adequate supervision present	
Is there procedure to check O2 level inside the excavated pit. If o2 is less than 20% remove men from the pit immediately		Others (Specify)	
Have workers been trained in the proper use of safety equipment?		**HOT WORK**	
Others (Specify)		Ensure area is clear from inflammable & combustible materials OR material shifted & secured at safe location.	
WORK AT HEIGHT		Ensure welding machine / Gas cutting & welding set in good working order.	
Ensure access is proper; task lighting is sufficient &safe and electrical and other tools are safe to work.		Ensure that welding & earthing cables are healthy and machine is properly earthed.	
Use only metallic ladder, scaffold with staging and platform supported properly and secured.		Ensure gas cylinders are secured. Hoses are good & flash back arrester provided at Cylinder & Welding Torch	
Ensure scaffold platform is strong and sturdy with hand rails & toe board		Ensure all wall & floor openings communicating with lower / upper & adjacent floors are covered properly	
Are specific hazards for work at height for all stages of task (openings, fragile roof etc.) identified and precautions taken?		Combustible and Flammable materials are secured / kept at safe location and fire watcher is posted	
Safety harness to be used. Ensure suitable life line is installed and adequate arrangement is made for hooking of safety harness		Ensure Fire Extinguishers are in good working condition and kept handy.	
Ensure to carry tools in a tool box/ pouch. Precautions to be taken to avoid falling of tools.		Others (Specify)	
Ensure area below is barricaded and no one is working below. Install safety net below as required.		**ELECTRICAL WORK**	
Workers been trained in proper use of safety and electrical equipment and to work at height.		Before working on electrical equipment, the Authorized Person shall be informed to disconnect the source of power and then lock it out and tag it.	
Others (Specify)		Ensure that circuits and equipment to be worked on are disconnected from all electric energy sources.	
		Ensure electrical isolation is done and Permit to Work is obtained	
		Ensure all tools to be used are good to use for the type of work.	
		Others (Specify)	

CONFINED SPACE				MANDATORY CHECKS FOR ALL WORK PERMIT	
Physically examined the work area. Ensure environment is safe to work (TLV of gases)				Is area is safe to work. Are there barricading needed, around, above or below the task? Signboards displayed?	
O_2 (20.8%)		N_2O (3ppm)		Is Work Procedure is in place and all concerned informed.	
CH_4 (5% of LEL i.e. (0.53%)		H_2S (10ppm)		Have all electrical equipment and cables been inspected and adequate tools and material available?	
Is arrangement for task lighting sufficient? Use only 24 V hand lamp & ensure hand tools are properly earthed and good for the work.				Is Electric Isolation done appropriately (LOTO followed) and entered in registered?	
Ensure the person to work inside is provided with safety harness and trained observer is stationed.				Are enough people assigned to the job to carryout safety measures? Is Safety briefing to the workers done?	
Is the area adequately illuminated and necessary measures in place to protect persons from falling materials?				Others (Specify) –	
Others (Specify)					

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FM-SHE-24: OPERATIONAL CHECKLIST FOR MONITORING UNSAFE ACTS &UNSAFECONDITIONS, PERSONAL & ORGANIZATIONAL FACTORS

Site..... **Date**.....

SL. NO.	UNSAFE ACTS	OBSEVATION Yes (✓)/ No (x)/NA	CORRECTIVE ACTION RECOMMENDED	STATUS/ REMARKS
1	Working / operating without authority			
2	Working on moving or dangerous equipment			
3	Failure to secure or warn others of danger			
4	Leaving equipment in a dangerous condition			
5	Using equipment at the wrong speed			
6	Using hand instead tool or improper equipment or tool			
7	Unsafe equipment or tool or using equipment unsafely			
8	Disconnecting safety devices such as guards			
9	Using defective equipment/ tool			
10	Using equipment for the wrong tasks			
11	Taking unsafe position or posture			
12	Unsafe loading, placing or mixing			
13	Failure to use safe attire or wear PPE			
14	Incorrect loading of vehicles			
15	Failure to lift loads correctly			
16	Being in an unauthorised place playing around			
17	Smoking in areas where this is not allowed			
18	Under influence of alcohol or drugs			
ORGANIZATIONAL FACTORS				
1	Manmanagement System Pressures			
2	Organization Financial Restrictions			
3	A Lack Of Commitment To Do The Task By Management			
4	A Lack Of Experience Within The Organization			
5	A Lack Of Organization Policy And Standards			
6	Insufficient Training Of Team For The Task			

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SL. NO.	UNSAFE CONDITION	OBSEVATION Yes (✓)/No (x)/NA	CORRECTIVE ACTION RECOMMENDED	STATUS/ REMARKS
1	Inadequate supervision			
2	Improper or inadequate procedure			
3	Improper planning or layout of job, traffic or activity			
4	Unsafe process or job method			
5	Lack or inadequate guarding or barrier to moving machine parts			
6	Inadequate protective equipment			
7	Defective tools or equipment			
8	Congestion or restricted action			
9	Inadequate warning systems			
10	Fire and explosion hazards			
11	Rough / slippery work area / work location			
12	Ineffective housekeeping			
13	Hazardous work environment -dust, gases, vapours etc.			
14	High or low temperature exposure			
15	Excessive noise exposure			
16	Exposure to radiation			
17	Inadequate or excess illumination			
18	Inadequate or improper ventilation			
PERSONAL FACTORS				
1	Physical Defects			
2	Illness			
3	Behaviour In The Workplace (Perception Of Risk)			
4	Individual Attitude			
5	Group Attitudes			

Safety Officer	**Sig.**	**Name:**	**Date**
Construction Manager	**Sig.**	**Name:**	**Date**

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FM-SHE- 25: CHECKLIST – DG SET

SITE.....

Date.....

Sl. No.	Location	- KW - RPM - Supply Volts - Frequency	- Clearance Around (min 0.75 m) - From other DG (min 1.83 m)	House-keeping	Condition / Status of								
					- Engine Exhaust - Noise Level	- Canopy - Cooling Fan - Radiator	System - Oil Leak - Fuel Leak	- Coupler - Belt - Guard	Neutral Insulation	Body Earth Connection	- Cable Termination - Battery Terminals	- Danger - No Smoking Board	- Vib Pad - Vib Level

Name & Signature of Construction Manager	Name & Signature of Safety Officer
Date:	Date:

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FM-SHE-26: PANEL / DISTRIBUTION BOARD EQUIPMENT CHECKLIST

SITE..... Date:.....

SL. NO.	PANEL / DISTRIBUTION BOARD / EQUIPMENT	LOCATION	PROTECTIVE EQUIPMENT				INDICATING LAMP	TEST PERFORMED & VALUE	Cable Condition		INTERNAL WIRING	DOOR & LOCK	REMARKS
			ELCB, MCB,MCCB										
			Rating	Condition	Connections	Sensitivity			Glanding	Thimbles			

Resident Engineer (Electrical)	Sign.	Name:	Date
Construction Manager	Sign.	Name:	Date

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STRABAG	OUTLINE OCCUPATIONAL HEALTH, SAFETY & ENVIRONMENT PLAN	एम एम आर डी ए MMRDA

FM-SHE-27 : ELECTRICAL EQUIPMENT & TOOLS CHECK LIST

SITE..... **DATE:**.....

Sl. No.	Equipment Name / Make / ID No.	Condition / Status of									
		Type of Equipment	Operating Voltage	Wheel, Drill Bit / Locking Device Etc	Rating / Cable Insulation / Connections	Start / Stop Switch / Button	Type & Colour Coding of Socket & Plug	Earthling Connection	Body Frame/ Body Screws / Guards	Noise Level	Work Environment
1.		Fixed Portable & Double Insulate	415V - 3phase 230V – s phase	Good / Bad Effective/ Bad	OK / Underrated OK for load/Not OK Good / Bad Suitable / Improper	Good / Bad	Weatherproof / Substandard As per IS – Yes / No	OK / Not OK / NA	Good/ Not Good Secured / Missing In-place / Missing or Damaged	Acceptable - Yes / No	Conducive / Adverse for
2.		Fixed Portable Double Insulate	415V - 3phase 230V – s phase	Good / Bad Effective/ Bad	OK / Underrated OK for load/Not OK Good / Bad Suitable / Improper	Good / Bad	Weatherproof / Substandard As per IS – Yes / No	OK / Not OK / NA	Good/ Not Good Secured / Missing In-place / Missing or Damaged	Acceptable - Yes / No	Conducive / Adverse for
3.		Fixed Portable Double Insulate	415V - 3phase 230V – s phase	Good / Bad Effective/ Bad	OK / Underrated OK for load/Not OK Good / Bad Suitable / Improper	Good / Bad	Weatherproof / Substandard As per IS – Yes / No	OK / Not OK / NA	Good/ Not Good Secured / Missing In-place / Missing or Damaged	Acceptable - Yes / No	Conducive / Adverse for
4.		Fixed Portable Double Insulate	415V - 3phase 230V – s phase	Good / Bad Effective/ Bad	OK / Underrated OK for load/Not OK Good / Bad Suitable / Improper	Good / Bad	Weatherproof / Substandard As per IS – Yes / No	OK / Not OK / NA	Good/ Not Good Secured / Missing In-place / Missing or Damaged	Acceptable - Yes / No	Conducive / Adverse for
5.		Fixed Portable Double Insulate	415V - 3phase 230V – s phase	Good / Bad Effective/ Bad	OK / Underrated OK for load/Not OK Good / Bad Suitable / Improper	Good / Bad	Weatherproof / Substandard As per IS – Yes / No	OK / Not OK / NA	Good/ Not Good Secured / Missing In-place / Missing or Damaged	Acceptable - Yes / No	Conducive / Adverse for

a. Plugs, sockets outlets and couplers shall be "splashed proof" type and in compliance with IP44 (minimum degree of Ingress Protection).
b. The plugs and fitting used at site shall be of weatherproof type and colour coded in accordance with IEC i.e. 240V - Blue and 415V – Red

Resident Engineer (Electrical)	**Sign.**	**Name:**	**Date**
Construction Manager	**Sign.**	**Name:**	**Date**

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ANNEXURE V – COVID 19 PROTOCOL GUIDELINE

1. Keep yourself and others safe:

Protect yourself and those around you:

- Get vaccinated as soon as it's your turn and follow local guidance on vaccination.
- Keep physical distance of at least 1 metre from others, even if they don't appear to be sick. Avoid crowds and close contact.
- Wear a properly fitted mask when physical distancing is not possible and in poorly ventilated settings.
- Clean your hands frequently with alcohol-based hand rub or soap and water.
- Cover your mouth and nose with a bent elbow or tissue when you cough or sneeze. Dispose of used tissues immediately and clean hands regularly.
- If you develop symptoms or test positive for COVID-19, self-isolate until you recover.

2. Wear a mask properly

To properly wear your mask:

- Make sure your mask covers your nose, mouth and chin.
- Clean your hands before you put your mask on, before and after you take it off, and after you touch it at any time.
- When you take off your mask, store it in a clean plastic bag, and every day either wash it if it's a fabric mask or dispose of it in a trash bin if it's a medical mask.
- Don't use masks with valves.

3. Make your environment safer

The risks of getting COVID-19 are higher in crowded and inadequately ventilated spaces where infected people spend long periods of time together in close proximity.

Outbreaks have been reported in places where people have gather, often in crowded indoor settings and where they talk loudly, shout, breathe heavily or sing such as restaurants, choir practices, fitness classes, nightclubs, offices and places of worship.

To make your environment as safe as possible:

- Avoid the 3Cs: spaces that are closed, crowded or involve close contact.
- Meet people outside. Outdoor gatherings are safer than indoor ones, particularly if indoor spaces are small and without outdoor air coming in.
- If you can't avoid crowded or indoor settings, take these precautions:
  - ✓ Open a window to increase the amount of natural ventilation when indoors.
- Wear a mask (see above for more details).

4. Keep good hygiene

By following good respiratory hygiene you protect the people around you from viruses that cause colds, flu and COVID-19.

To ensure good hygiene you should:

- Regularly and thoroughly clean your hands with either an alcohol-based hand rub or soap and water. This eliminates germs that may be on your hands, including viruses.
- Cover your mouth and nose with your bent elbow or a tissue when you cough or sneeze. Dispose of the used tissue immediately into a closed bin and wash your hands.
- Clean and disinfect surfaces frequently, especially those which are regularly touched, such as door handles, faucets and phone screens.

5. If you feel unwell:

If you feel unwell, here's what to do.

- If you have a fever, cough and difficulty breathing, seek medical attention immediately. Call by telephone first and follow the directions of your local health authority.
- Know the full range of symptoms of COVID-19. The most common symptoms of COVID-19 are fever, dry cough, tiredness and loss of taste or smell. Less common symptoms include aches and pains, headache, sore throat, red or irritated eyes, diarrhea, a skin rash or discoloration of fingers or toes.
- Stay home and self-isolate for 10 days from symptom onset, plus three days after symptoms cease. Call your health care provider or hotline for advice. Have someone bring you supplies. If you need to leave your house or have someone near you, wear a properly fitted mask to avoid infecting others.
- Keep up to date on the latest information from trusted sources, such as WHO or your local and national health authorities. Local and national authorities and public health units are best placed to advise on what people in your area should be doing to protect themselves.

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Technical Proposal

Quality Assurance Plan

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MUMBAI TRANS HARBOUR LINK PROJECT (MTHL)

IFB No.: MMRDA/ENG1/0002561:

Document No.	Document Name		Document Revision
0002	OUTLINE QUALITY PLAN		R00
	Prepared By	Checked By	Approved By
Name	Sandeep	Mubashshir	Anuj
Designation	Manager	DGM	GM
Date	29.11.2021	29.11.2021	29.11.2021

STRABAG	OUTLINE QUALITY PLAN	एम एम आर डी ए MMRDA

Revision History

Sl. No.	Date	Prepared By	Checked By	Approved By	Rev.
1	29.11.2021	Sandeep	Mubashshir	Anuj	R00
2					
3					
4					
5					

STRABAG	OUTLINE QUALITY PLAN	एम एम आर डी ए MMRDA

EMPLOYER	**MUMBAI METROPOLITAN REGION DEVELOPMENT AUTHORITY**
ENGINEER	**GENERAL CONSULTANT (GC)** Consortium of AECOM, PADECO, DAR and T.Y.LIN
VERIFIER	**General Consultant**
CONTRACTOR,	STRABAG,
IFB #	**MMRDA/ENG1/0002561** Design, Supply, Installation, Testing and Commissioning of Intelligent Transport System (ITS), Toll Management System, Electrical works, Highway and Bridge streetlighting system, Construction of Toll Plazas and Administrative Buildings including Command Control Centre

LOG OF MAJOR CHANGES

SN	DESCRIPTION
1	
2	
3	
4	
5	
6	

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1. DESCRIPTION OF THE PROJECT

1.1. PROJECT BRIEF DESCRIPTION:

Package -4: Design, Supply, Installation, Testing and Commissioning of Intelligent Transport System (ITS), Toll Management System, Electrical works, Highway and Bridge streetlighting system, Construction of Toll Plazas and Administrative Buildings including Command Control Centre.

1.2. SCOPE OF THE PROJECT:

Scope of work:

Design, Supply, Installation, Testing, Integration and, Commissioning of :

1. Intelligent Transportation System (ITS)
2. Toll Management System (TMS)
3. Traffic Management Stem and associated Fiber Optic System (ATMS)
4. Security Surveillance at all Substations, Toll Plazas, Administrative Buildings
5. Electrical Powering System with BMS Automation System
6. Power on Fire Fighting, Dehumidification and Navigational Aids
7. Highway Illumination System and Providing Specified Aesthetic Lighting and Controls
8. Design and Construction of Administrative Buildings including CCC with state of Art Interiors, Furnitures and Mechanical, Electrical, Plumbing and Fire Fighting Services
9. Design and Construction of Toll Plazas with associated MEPF Services
10. Development of Food Plaza incl. MEPF works

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1.3. DETAILS OF THE EMPLOYER

The Engineer-in-Chief, MTHL-PIU,
Mumbai Metropolitan Region Development Authority (MMRDA),
2nd Floor, New Office Building, Plot No. R-05, R-06 & R-12, 'E' Block
Bandra-Kurla Complex, Bandra (E), Mumbai Maharashtra, INDIA 400051

1.4. CONTRACT PACKAGE

MMRDA/ENG1/0002561

1.5. PERIOD OF THE PROJECT

460 Days from the "Commencement Date" (XX-XXX-XXXX)

2. PURPOSE

The purpose of this quality plan is to describe the quality system that STRABAG International GmbH will apply during the Implementation of the Project.
The application of this quality plan should ensure that the Design, Engineering, Manufacturing, Delivery, Construction, Testing, Commissioning, Training, Defect Notification Period of the project are carried out in accordance with the specifications, contractual requirements, laws & regulations, the organisation's General Quality Management System.
The objectives of this plan are:

- Establish the requirements & specifications with which the products and performance process of the described work must comply, as regards quality.
- Define the ways to meet aforementioned requirements and specifications for the described work.
- Support & assist the Project Manager of his work and decision-making process.
- Consolidate Roles & Responsibility of the key persons directly involved with this project.

3. QUALITY POLICY

Top Management of STRABAG International GmbH has defined a Corporate Quality Policy expressing its commitment to assure product conformity, client satisfaction and continuous improvement of our Quality System. The policy applies to the whole organisation and is available for consultation for our clients, subcontractors, collaborators and external interested parties.

Current Quality Policy is included in ***ANNEXURE-1.***

4. REFERENCE DOCUMENTATION

In order to ensure that activities are developed in accordance with its quality assurance system STRABAG has implemented a set of general procedures.

Also, procedures and forms from the STRABAG can be used for controlling the execution of the works, if necessary. In this case the codes & logos for the documents/forms will remain as established by company. The documents developed especially for this project shall have the project codes.

The list of valid Procedures included in ***ANNEXURE-***

4.1. SCOPE OF QUALITY PLAN

This quality plan is applicable to all the activities carried out by STRABAG as mentioned in the contract.

5. DEFINITIONS, ABBERVIATIONS & STANDARDS

5.1. DEFINITIONS

Quality: Degree to which a set of inherent characteristics fulfils requirements.

Project: Means all the activities to execute the Civil, ATMS, Toll management system, Electrical & Mechanical works for Package of MTHL Project.

Quality Management System: Organizational structure, procedures and processes are resources needed to implement quality management.

Mandatory Hold Point: An inspection point, defined in an appropriate document, beyond which an activity must not proceed without the approval of a designated organization or authority.

Witness Point: An inspection point, defined in an appropriate document, beyond which an activity can proceed after notifying the designated organization or authority.

Review Point: A review point, defined in an appropriate document, is the point at which a work activity cannot proceed without first ensuring the review and approval of applicable documents or personnel qualifications by a designated organization or authority.

Quality Assurance (QA): All the planned and systematic activities implemented within the quality system, and demonstrated as needed, to provide adequate confidence that an entity will fulfil requirements for quality.

Quality Control (QC): The operational techniques and activities that are used to fulfil requirements for quality.

Quality Control Procedure (QCP): A QCP is a documented procedure detailing the processes necessary to complete a specific work activity.

Quality Manual, which describes the system implemented in management.

Quality Procedures, to be applied to all activities of STRABAG, that include documented procedures related to activities/processes which are common to all areas.

Plans & Programmes, developed by STRABAG as per Employer's requirements, to guarantee the effective planning, operation and control of its processes.

Method Statements, developed to control the work carried out during the project.

Other Documents, requested by the organisation to guarantee the effective planning, operation and control of its processes, including a **List of Documents Appliable to the system.**

Records, as requested by the Employer or required as per **Quality Procedure.**

Site Quality Plan will submit separately prior execution of work.

Inspection & Test Plan (ITP): Inspection & Test Plan: Plan shall be prepared prior to the commencement of works in line with proposed schedules. Further, all testing and commissioning results shall be recorded and documented within the operation and maintenance manuals as per the requirements of specifications. Monitors, reviews and checks the preparation and submission by respective Engineers-in-charge in conformance with contract specifications. The methods used to carry out and verify material and process traceability shall be included within the Method Statements/inspection and test plans where relevant and may include but not necessarily be limited to:.

- mapping and/or as built drawings,
- registers and production records,
- Unique report references.
- Mill test certificates
- Concrete pour cards

- Welder's certification and identification
- Workmen certification (painters, riggers, electrician, lineman, plumber, tradesmen as per scope of works).

The hierarchy of Quality Management System documentation for managing & controlling all the activities having direct impact on quality is as follows.

5.2. ABBREVIATIONS

FAT	Factory Acceptance Test
GCC	General Consortium of Consultant
IA	Internal Audit
ISO	International Organization for Standards
ITP	Inspection and Test Plan
MOM	Minute of Meeting
MPR	Monthly Progress Report
MR	Material Requirement
MTP	Manufacturing Test Plan
MQR	Management Quality Review
MRM	Management Review Meeting
MRR	Management Review Report
MMRDA	MUMBAI METROPOLITAN REGION DEVELOPMENT AUTHORITY
NABL	National Accreditation Board for Testing and Calibration Laboratories
NONO	Notice of No Objection
NCR	Non-Conformance Report
NTP	Notice to Proceed
CPM	Chief Project Manager
PMP	Project Management Plan
PRM	Project Review Meeting
PQP	Project Quality Plan
QA	Quality Assurance
QC	Quality Control
QM	Quality Manager
QMS	Quality Management System
TPIA	Third Party Inspection & Testing Agency

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5.3. STANDARDS, CODES OF PRACTICE

Works will be performed in accordance to the International/Indian Standards referred in the Contract Agreement/Technical Specifications for each activity to be carried out. The standard are:

Standard	Standard no	Description
ADC		**Air Diffusion Council (airflow test code)**
	1062	Test Code for Grilles, Registers and Diffusers
AFBMA		**Anti-Friction Bearings Manufacturers Association**
	AFBMA 9 -2015	Load Ratings and Fatigue Life for Ball Bearings
	AFBMA 11-2014	Load Ratings and Fatigue Life for Roller Bearings.
AMCA		**Air Moving and Control Association**
	AMCA 210-16	Laboratory Methods of Testing Fans for Rating
	AMCA 300-14	Test Code for Reverberant Room method for Sound Testing of Fans
	AMCA 301-14	Method for Publishing Sound Ratings for Air Moving Devices
ANSI		**American National Standards Institute**
	B46.1-2009	Surface Texture, Surface Roughness, Waviness and Lay,Part 1
	C 1	Specification of General Requirements of a Quality
	S12.34	Survey Methods for Determination of Sound Power Levels of Noise Sources
	S12.36	Survey Methods for Determination of Sound Power Levels of Noise Sources.
	Z49.1	Safety in Welding and Cutting
	Z55.1	Grey Finishes for Industrial Apparatus and equipment
ARI		**American Refrigeration Institute (USA)**
ASHRAE		**American Society of Heating, Refrigeration and Air Conditioning Engineers**
	51-16	Laboratory Methods of Testing Fans for Aerodynamic Performance Rating (AMCA Standard 210-99) (ANSI approved)
	52-76	Method of Testing Air Cleaning Devices used in General Ventilation for Removing Particulate Matter.
	62-89	EPA Ambient-Air Quality Standards for Outdoor Air
	68	Laboratory Method of Testing In-Duct Sound Power Measurement Procedure for Fans
	87.1	Method of Testing Fan Vibration -- Blade Vibrations and Critical Speeds (ANSI approved AMCA
	128	Method of Rating Unitary Spot Air Conditioners (ANSI Approved)
ASME		**American Society of Mechanical Engineers**
ASTM		**American Society for Testing and Materials**
	A 36	Structural Steel
	A53/A53M-04a	Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless.
	A 123	Zinc (Hot Galvanized) Coatings on Products Fabricated from Rolled, Pressed and Forged Steel Shapes, Plates, Bars, and
	A 193	Alloy-Steel and Stainless Steel bolting Materials for High-Temperature Service.

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Standard	Standard no	Description
	A 194	Carbon and Alloy Steel Nuts for Bolts for High- Pressure and High-Temperature Service.
	A 239	Locating the Thinnest Spot in Zinc (Galvanized) Coating on Iron or Steel Articles by the Peerce Test (Copper Sulphate
	A 276	Stainless and Heat-Resisting Steel Bars and Shapes
	A 525	Steel Sheet, Zinc Coated (Hot Galvanized) by the Hot-Dip Process.
	A 588	High Strength Low Alloy Structural Steel with 50 Psi (345 MPa) Minimum Yield Point to 4 Inch (100 mm) Thick
	A 666	Authentic Stainless Steel, Sheet, Strip, Plate, and Flat Bar for Structural Applications.
	B247	Certification for Aluminum Alloy Die Forgings, Hand Forgings and Rolled Ring Footing.
	B75-02	Standard Specification for Seamless Copper Tube.
	B 88	Seamless Copper Tube for Water, Gas and Sanitation
	B 117	Salt Spray Test
	E477	Test Method for Measuring Acoustical and Airflow Performance of Duct Liner Material and Prefabricated
	B 686	Aluminum Alloy Castings, High Strength
	C177	Steady State Heat Flux measurements and Thermal Transmission Properties by mean of the Guarded Hot Plate
	C 423	Standard Test Method for Sound Absorption
	C 534	Perform flexible elastomeric cellular thermal insulation in sheet and tubular form
	D 635	Rate of Burning and/or Extend and Time of Burning of Plastics in the Horizontal Position
	D 781	Standard Test Methods for Puncture and Stiffness of Paperboard and Corrugated and Solid Fiberboard
	D1056	Flexible cellular materials-Sponge or Expanded Rubber
	E 84	Surface Burning Characteristics of Building Materials
	E90	Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements
	E 138	Wet Magnetic Particle Inspection.
	E 94	Radiographic Testing
	E 96	Water Vapor Transmission of Materials
	E 155	Reference Radiographs for Inspection of Aluminum and Magnesium Castings.
	E 477	Test Method For Measuring Acoustical and Air Flow Performance of Duct Linear Materials and Prefabricated Silencers
	E 709	Wet Magnetic Particle Inspection
AWS		**American Welding Society**
	D 1.1	Structural Welding Code – Steel
	D 1.3	Structural Welding Code - Sheet Steel
BS		**British Standards**
	142	Electrical protection relays
	729	Hot Dip Galvanized Coatings on Iron and Steel Articles

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Standard	Standard no	Description
	848	Method For Noise Testing
	874 Part 2	Determining thermal insulating property part 2. Test for thermal conductivity and related properties
	2757	Thermal classification of Electrical Insulation
	2871 Part 1	Copper Tube for water, gas and Sanitation
	4999	General requirement for Rotating Electrical Machines
	5000	Rotating Electrical Machines for Particular Types or for Particular Applications
	5501	Electrical Apparatus for Potentially Explosive Atmosphere
	476	Fire Test on Building Materials and Structure
	729	Hot Dip Galvanized Coating on Iron and Steel Articles
	5422	Method for specifying thermal insulating materials for pipes, tanks, vessels, ductwork and equipment operating within the
	5970	Code of practice for thermal insulation of pipe work and equipment (in the temperature range -100°C to +870°C)
	BS 381C/BS 4800:	Specification for colors for identification, coding and special purposes.
	BS 921:	Rubber mats for electrical purposes.
	BS 1432:	Specification for copper for electrical purposes: high conductivity copper rectangular conductors with drawn or
	BS 1650:	Specification for capacitors for connection to power- frequency systems.
	BS 2757:	Method for determining the thermal classification of electrical insulation.
	BS 7211	Specification for thermosetting insulated cables (non-armored) for electric power and lighting with low emission of
	BS 5685:	Electricity meters.
	EN 312:2003	Part 1: Methods of Sampling, Conditioning and Test
	6387	Specification for performance requirements for cables required to maintain circuit integrity under fire conditions.
	7346-5	Components for smoke and heat control systems. Functional recommendations and calculation methods for smoke and heat
	EN 10142	Continuously Hot-Dip Zinc Coated Low
	EN 12944-6	Corrosion Protection of Steel Structures by Protective Paint System
	4718	Method of Test for Silencers for Air Distribution System
	BS EN 20354	Acoustic Measurement of Sound Absorption in Reverberation Room
	5169	Fusion Welded Steel Air Receiver
	5750	Quality System
	5500	Specification for Unfired Fusion Welded Pressure Vessel
	2871	Copper and Copper Alloys
	DW/142	Specification for Sheet Metal Ductwork, Low Medium and High pressure (Velocity Air System)
	DW/143	A Practical Guide to Ductwork Leakage Testing
DIN		**German Institute for Standardization**

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Standard	Standard no	Description
	52615	Test for Water Vapor Permeability
EN		**European Standard**
	50121-1	Railway Applications – Electromagnetic Compatibility Part 1: General
	50121-2	Railway Applications – Electromagnetic Compatibility Part 2: Emission of the Whole Railway System to the outside world
	50121-4	Emission and Immunity of the signalling and Telecommunication Apparatus
	50121 – 5	Emission and Immunity of Fixed Power Supply Installations and Apparatus
	50122-1	Railway applications: fixed installations; protective provisions relating to electrical safety and earthing
	50122-2	Railway applications: fixed installations; protective provisions against the effects of stray currents caused by D.C. traction
	50204	Radiated Electromagnetic Field from Digital Radio Telephones Immunity Test
	50126	Railway applications. The specification and demonstration of reliability, availability, maintainability and safety (RAMS)
	50128	Railway Applications - Communications, Signalling and Processing Systems - Software for Railway Control and
HVAC		**Heating Ventilation and air-conditioning**
	DW 144	Specification for Sheet Metal Ductwork, Low, Medium and High Pressure/Velocity Air Systems.
	DW151	Specification for Plastics Ductwork
IEC		**International Electro technical Committee**
	34-1	Rotating electrical machines: rating and performance
	34-5	Rotating electrical machines: classification of degrees of protection provided by enclosures of rotating electrical
	34-6	Rotating electrical machines: methods of cooling (except traction engine)
	34-7	Rotating electrical machines: classification of types of constructions and mounting arrangements (except traction
	34-8	Rotating electrical machines: Terminal markings and direction of rotation
	34-9	Rotating electrical machines: noise limits
	34-14	Rotating electrical machines: mechanical vibration of certain machines with shaft heights 56mm and higher. Measurement,
	85	Thermal evaluation and classification of electrical insulation
	801-3	Radiated electromagnetic field requirements
	870-2-1	Operating conditions
	870-4	Performance requirements
	892	Effects of unbalanced voltages on the performance of three phase cage induction motors
	60034-1	Rotating Electrical Machines - Part 1: Rating and performance
	60034-12	Rotating electrical machines - Part 12: Starting performance of single-speed three-phase cage induction motors
	60335-2-104	Household and similar electrical appliances - Safety - Part 2-104: Particular requirements for appliances to recover and/or

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Standard	Standard no	Description
	60364-1	Electrical installations of buildings - Part 1: Fundamental principles, assessment of general characteristics, definitions
	60848	Preparation of function charts for control systems
	60947-2	Low-voltage switchgear and control gear – Part 2: Circuit-breakers
	60947-3	Low-voltage switchgear and control gear – Part 3: Switches, Dis-connectors, Switch-dis-connectors and fuse-combination
	60947-4-1	Low-voltage switchgear and control gear – Part 4-1: Contactors and motor-starter – Electromechanical contactors and motor-
	60947-7	Low-voltage switchgear and control gear – Part 7: Ancillary equipment
	60228	Conductors of Insulated cables
	60502-1	Power cables with extruded insulation and their accessories for rated voltage from 1 kV – Part 1: Cables for rated voltage of 1
	60332	Tests on electric cables under fire conditions
	61034-2	Measurement of smoke density of cables burning under defined conditions – Part 2: Test Procedure and Requirements
	60754	Tests on gases evolved during combustion of electric cables
	61000	Electromagnetic compatibility
	61508	Functional safety of E/E/PE safety-related systems
IEEE		**Institute of Electrical and Electronic Engineers**
	85	Standard Test Procedure for Airborne Sound Measurements on Rotating Electric Machinery
	112	Test Procedure for Polyphase Induction Motors and Generators
	519	Recommended Practices and Requirements for Harmonic Control in Electric Power Systems
IP		**Ingress Protection**
	42	4 describes the level of Protected against solid objects over 1 mm (tools, wires, and small wires) and 2 describes the level of
	54	5 describe the level of protection from solid objects and 4 describe the level of protection from liquids.
	65	6 describes the level of totally protected against dust and 5 describes Protected against low pressure jets of water from all
IS		**Indian Standards**
	277: 2003	Specification for galvanized steel sheet (plain and corrugated)
	374 –1979	Electric ceiling type fans and regulators
	655: 1963	Specification for metal air ducts
	8623 : Part 1 :1993	Specification for Low-Voltage Switchgear and Control gear Assemblies - Part 1 : Requirements for Type-Tested and
	13947 : Part 1 : 1993	Specification for Low-voltage Switchgear and Control gear - Part 1 : General Rules
	13947 :Part 2 : 1993	Specification for Low-voltage Switchgear and Control gear - Part 2 : Circuit Breakers
	13947 : Part 3: 1993	Specification for Low-voltage Switchgear and Control gear - Part 3 : Switches, Dis-connectors, Switch Dis-connectors and
	13947 : Part 4 : Sec 1	Specification for Low-Voltage Switchgear and Control gear - Part 4 : Contactors and Motor-Starters - Section 1 :

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Standard	Standard no	Description
	IS 1477-2	Code of practice for painting of ferrous metals in buildings, Part 2 Painting
	IS 14428	Guidelines for painting of structures in aggressive chemical environment.
ISO		**International Organization for Standardization**
	281	Rolling bearings: dynamic load ratings and rating life
	1680	Test code for the measurement of airborne noise emitted by rotating electrical machinery: engineering method for free
	ISO 117	Method of testing the performance of jet fans
	ISO 5801	Industrial Fans Performance Testing using Standardized way
	ISO 4063	Welding Process
	ISO 1461	Hot Dip Galvanized Coating on Fabricated Iron and Steel
	ISO 9227	Salt Spray Test
	5135	Noise: Air distribution and diffusion
	8821	Mechanical vibration: balance. Balancing shaft and fitment key convention
	MIL	**Military Specifications**
	MIL-P-24441/A	General Specification for (Ships), Paint, Epoxy Polyamide.
	MIL-P-24441/1A	Paint, Epoxy Polyamide, Green Primer, Formula 150,Type 1
	MIL-P-24441/2A	Paint, Epoxy Polyamide, Exterior Top Coat, Haze Grey, Formula 151, Type 1.
NBC	**NBC 2016**	**National Building Code**
NEMA		**National Electrical Manufacturer's Association**
	ICS-1	General Standards for Industrial Control and Systems
	ICS-1.1	Safety Guidelines for the Application, Installation and Maintenance of Solid-State Control.
	ICS-2	Industrial Control Devices, Controllers and Assemblies
	ICS-3	Industrial Systems
	MG-1	Motors and Generators
	MG-12.54	Efficiency
NFPA		**National Fire Protection Association**
	90A (2018)	Standard for the Installation of Air-Conditioning and Ventilating Systems
	90B (2018)	Standard for the Installation of Warm Air Heating and Air-Conditioning Systems
	NFPA -92 B (2009)	Standard for Smoke Management Systems in Malls, Atria, and Large Spaces
	NFPA – 101 (2018)	Life Safety Code
	130 (2017)	Standard for Fixed Guide way Transit and Passenger Rail Systems
	NFPA – 204 (2018)	Standard for Smoke and Heat Venting
	MG1-12.54	Efficiency
SMACNA		**Sheet Metal and Air Conditioning Contractors National Association**
	68	Laboratory Method of Testing to Determine the Sound Power in a Duct (AMCA Standard 330) (ANSI approved)

Standard	Standard no	Description
	120	Method of Testing to Determine Flow Resistance of HVAC Ducts10 and Fittings (ANSI Approved)
	126	Method of Testing HVAC Air Ducts (ANSI approved)
	1286	Fire, Smoke & Radiation Damper Installation Guide for HVCAs
SSPC		**Steel Structures Painting Council**
	PA-1	No. 1 Shop, Field and Maintenance Painting
	PA-2	Method for Measurement of Dry Paint Thickness with Magnetic Gauges.
	SP – 1	Solvent Cleaning
	SP – 2	Hand Tool Cleaning
	SP – 3	Power Tool Cleaning
	SP – 6	Commercial Blast Cleaning
	SP – 10	Near White Blast Cleaning
TAPPI	**404**	**Tensile Breaking Properties of Paper and Paperboard Using Constant Rate of Elongation Apparatus**
UL		**Underwriters Laboratories**
	94	Flammability of Plastic Materials for Parts in Devices and Appliances
	508	Industrial Control Equipment
	555	Fire Dampers
	555S	Leakage Rated Dampers for Use in Smoke Control Systems
	762	Power Roof Ventilators for Restaurant Exhaust Applications, (UL 762)
	793/705	Power Ventilators for Smoke
	900	Test Performance of Air Filter Units
IEC		**International Electro technical Committee**
	IEC 60255/EN 60255:	Electrical protection relays.
	IEC-1036, 687, 1286	Direct reading single / three phases meter (Digital Type).
	IEC 60228/BS 6360:	Specification for conductors in insulated cables and cords.
	IEC 60185/BS 3938:	Specification for current transformers.
	EN 60051:	Direct acting indicating analogue electrical measuring instruments and their accessories.
	IEC 61439/ EN 61439: Part 1:	Specification for low-voltage switchgear and control gear assemblies. Specification for type-tested and partially type-
	IEC 60529/ EN 60529:	Specification for degrees of protection provided by enclosures (IP code).
	IEC 60947/ EN 60947: Part 2:	Specification for low-voltage switchgear and control gear. Circuit- breakers.
	IEC 60947/ EN 60947: Part 3:	Specification for low-voltage switchgear and control gear. Switches, dis-connectors, switch-dis-connectors and fuse-

In case of any discrepancy or disagreement between different specifications to be followed for any item of work, the preferences shall be adopted in the order of precedence as defined in the Contract Agreement. Notwithstanding the precedence specified in the contract agreement, STRABAG shall always seek advice from Employer in the event of conflicts between specifications.

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6. CONTEXT OF THE ORGANIZATION

6.1. Understanding the organization and its context

STRABAG has identified the external and internal issues that are relevant to its purpose and that can influence the performance of the Quality Management System in this project. Issues are captured considering various internal or external contexts, positive or negative factors and include Quality condition that either affect or are affected by us. Identified and new external and internal issues shall be monitored and reviewed in MRM once in a year and updated by QA Manager.

The internal and external issues are described in **Annexure-VII**

6.2. Understanding the needs and expectation of interested parties

STRABG has identified interested parties both external and internal and their needs and expectations which are relevant to the Quality Management System. The needs and expectation of interested parties shall be monitored and reviewed in MRM Once in a year and updated by Functional Heads/Project Manager and QA Manager

Reference: **Annexure-VII**

6.3. Determining Scope of the Quality System

The Quality Management System, which is elaborated in this Project Quality Plan, is for MUMBAI TRANS HARBOUR LINK PROJECT (MTHL) of STRABAG International GmbH.

When determining the scope, following are considered:

- the external and internal issues.
- the requirements of relevant interested parties.
- the TVE System of the organization.

6.4. Quality Management System

STRABAG has established, documented, implemented & maintained a Quality Management System & continually improves its effectiveness in accordance with the requirements.

STRABAG has determined the processes needed for the quality management system & their application throughout the MUMBAI TRANS HARBOUR LINK PROJECT (MTHL) has:

a) determined the inputs required and the outputs expected from these processes.
b) determined the sequence and interaction of these processes.
c) determined and applies the criteria and methods (including monitoring, measurements and related performance indicators) needed to ensure the effective operation and control of these processes.
d) determined the resources needed for these processes and ensure their availability.
e) assigned the responsibilities and authorities for these processes.
f) addressed the risks and opportunities as determined in accordance with the requirements.
g) evaluated these processes and implements any changes needed to ensure that these processes achieve their intended results.
h) improved and further improves the processes and the quality management system.

If any process that affects product conformity with requirements is outsourced, then control over such outsourced process is ensured and the same are defined within the Quality Management System appropriately as follows:

In Project and Service Operations, the outsourced Processes are:

(1) Monitoring and Control of master's Calibration Process.
(2) Monitoring and Control of Material testing Process.

Processes which are relevant to this, are identified, their interactions are also captured and are included in the system.

STRABAG further:

a) maintains documented information to support the operation of its processes.

b) retains documented information to have confidence that the processes are being carried out as planned.

7. WORK ORGANISATION

7.1. Leadership (Top Management) - GENERAL

Top Management of STRABAG (Project Manager at MMRDA Project) demonstrates leadership and shows its commitment with respect to the Quality management system by:

a) Taking accountability for the effectiveness of the Quality management system.

b) Ensuring the Quality policy and Quality objectives are in line with the strategic direction and the context of the organization as indicated in the strategic planning process.

c) Ensuring the integration of the Quality management system requirements into the organization business processes by providing relevant guidelines in strategic planning process.

d) Providing adequate resources for achieving Quality objectives and Quality management system through annual budgeting and providing any special approvals as needed.

e) Communicating the importance of effective Quality management and conforming to the Quality management system requirement through various meetings such as Internal Quality meeting, MRM.

f) Ensuring the intended outcome of Quality management system through setting and achieving Quality objectives.

g) Directing and supporting persons to contribute in the Quality management system by setting various targets, approving various programs, providing various related decisions.

h) Promoting continual improvement includes identified internal and external issues, Risk and opportunities, needs and expectation of interested parties and setting of Quality objectives to achieve intended outcome of QMS.

i) Supporting other management roles to demonstrate their leadership as it applies to their area of responsibility.

STRABAG is fully committed to the development & deployment of the Quality Management System as well as initiating actions for continually improving its effectiveness through:

a) Establishing Channels of Communication for communicating the importance as well as adherence to statutory, regulatory & GC/MMRDA requirements.

b) Establishing a Quality Policy & revisiting the same as & when the need arises

c) Establishing Quality Objectives & reviewing them periodically for appropriate changes.

d) Conducting Management Reviews

e) Ensuring availability of Resources.

7.2. Customer Focus

Marketing Manager of STRABAG empowered and made accountable to ensure that GC/MMRDA requirements are appropriately determined before commencement of the Project & also that they are met. At the completion of the Project a Customer Satisfaction Survey (CSS) is initiated internally by the Marketing Manager.

The Project Manager review the findings of the CSS & initiate Action Plans for enhancing the Customer Satisfaction.

Thus, it is ensured that the requirements related to Products are determined & met & on 'Customer related Processes', as well as monitoring of & measuring of Customer Satisfaction ensured.

7.3. PROJECT ORGANISATION CHART

The organisation of the company's own human resources is defined in the Work Organisation Chart (included in ***ANNEXURE-IV***), together with the hierarchical and functional relationships and their connection with the organisation chart, if necessary.

All personnel managing or carrying out any work with an impact on Quality will be appointed up to the level of Manager(inclusive). The organisation chart complemented by a description of the functions of each position (described in the Project Plan).

If any person assigned to a position within the organisation chart needs to be replaced, the organisation chart shall be revised and modified according to the changes made. Provision of resources is the responsibility of the Human Resources Management Department.

7.4. SUBCONTRACTORS

At the moment, STRABAG has not hired any subcontractors for this project. When any subcontractor is hired, STRABAG will inform the GC/Engineer in Charge about its responsibilities within the project.

8. APPOINTMENT OF QUALITY MANAGER

STRABAG will appoint suitably qualified and experienced person as Quality manager, who shall be directly responsible to senior management level, for ensuring effective implementation of the Quality System and all Quality Plans. Details of the qualifications, experience, authority & responsibility of the Quality Manager shall be updated in ***ANNEXURE-III***

8.1. Monthly Progress Report

STRABAG shall continuously monitor the performance of his Quality Management System, which shall be included in each Internal Monthly progress report submitted to Chief Project Manager, which will cover:

a) The Quality Plan and all the measures and procedures provided therein are functioning properly and are being fully complied.
b) All work, including that of the Designer & all other designers, subcontractors at all tiers, suppliers, and fabricators, has been checked and/or inspected by the STRABAG Designer Assessor, that conforms to the requirements of the Contract.

8.2. Weekly Progress Report

STRABAG shall maintain Weekly records that provide factual evidence that required activities and/or tests have been performed, including the following:

a) Type, number and results of quality assurance and quality control activities, including but not limited to reviews, inspections, tests, audits, monitoring of work performance and materials analysis.
b) Qualifications of personnel, procedures and equipment used.
c) The identity of the Quality Control Engineer or data recorder, the type of test or observation employed, the results and the acceptability of the work and action taken in connection with any deficiencies noted.
d) Nature of nonconforming work causes for rejection, with photographs etc.
e) Preventive actions.
f) Proposed corrective actions.
g) Corrective actions taken and with whose authority.
h) Results of corrective actions.

9. SUBCONTRACTORS & SUPPLIERS

9.1. APPROVED SUPPLIERS AND SUBCONTRACTORS

Purchasing and subcontracting work for execution will be performed with accordance with the system established in the Purchase Management Procedure.

It is the responsibility of the Project Manager & Store Department.

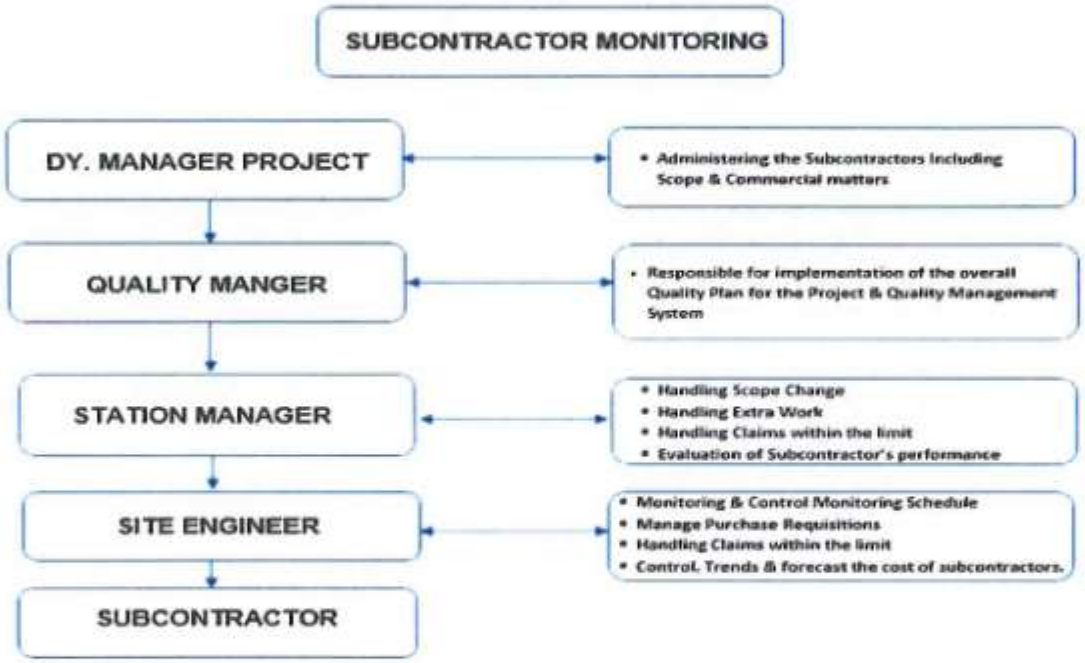
- To make a forecast for purchasing and subcontracting necessary to provide the service based on technical and economic requirement.
- Regarding the purchase of product/materials: To give preference to those with less negative impact on the environment. For example: recyclable and reusable products, products using less packaging, recyclable or degradable packaging etc.

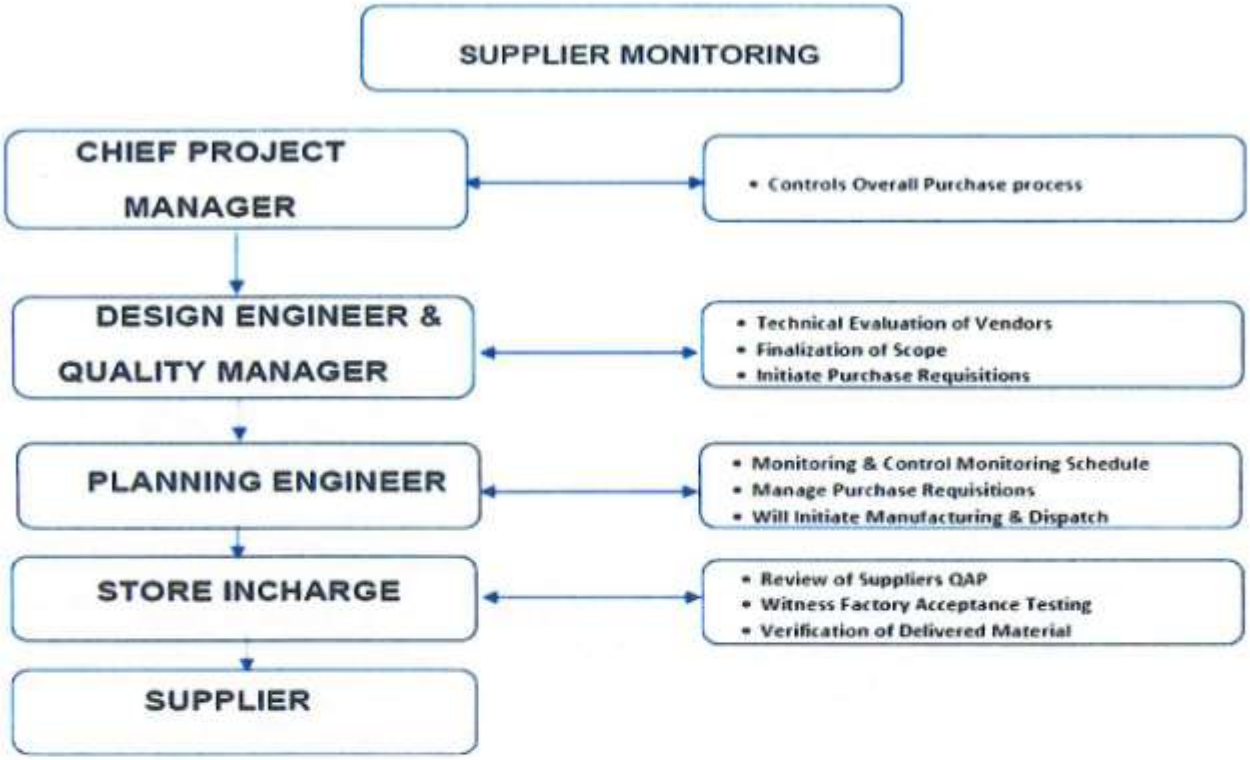
- To file the technical data sheets of the products purchased and to have a copy of these available at the work site.
- To ensure that correct filing and conservation of documentation generated by purchasing and subcontracting within the field of his activity.
- To inform subcontractors of their obligation to comply with the current legal regulations regarding environmental aspects arising from the execution of works as well as need to follow procedures established by STRABAG regarding Quality. This commitment will be expressed in the contract signed by the subcontractor.

9.2. MONITOR/CONTROL OF SUBCONTRACTORS/SUPPLIERS

Monitoring and Control of Subcontractors & Suppliers is of vital importance in development of Project.

The Structure for Monitoring & Controlling of Subcontractors as follows:





10. PERFORMANCE EVALUATION/MONITORING

10.1. GENERAL

STRABAG applies suitable methods for monitoring and where applicable, measurement of the Quality Management System processes. These methods demonstrate the ability of the processes to achieve planned results. When planned results are not achieved, correction and corrective action are taken, as appropriate.

STRABAG monitors and measures the characteristics (specifications) of the product to verify that, product requirements have been met. This is carried out at appropriate stages of the 'product realization process' i.e. at receiving inspection of the purchased product, in – process inspection of the product and final inspection of the product, in accordance with the planned arrangements mentioned in the Clause 5.9, Sec-6Aiii.

QC Engineer & QC Manager are primarily responsible for incoming, in-process and final inspection.

Receiving inspection and testing of all incoming material is done as per approved Quality Assurance Plan or Inspection & Test Plan.

Inspectors/ Engineers carry out inspection at various in-process stages as per approved Quality Assurance Plans or Inspection & test Plan. This is done to ensure that, respective specifications are met as per approved Quality Assurance Plans or Inspection Test Plan.

In case of non-conforming product resulted during the process, it is recorded and corrected by repair/rework or re-graded after inspection or rejected.

Final inspection is carried as per relevant approved Quality Assurance Plans or Inspection Test Plan and non- conformances observed are corrected before its offered to the GC/MMRDA for inspection & subsequent approval. Assistance is offered to GC/ MMRDA's representative for GC/ MMRDA inspection, Evidence of conformity with the acceptance criteria is maintained in the form of Inspection records at receiving, in process & final stage.

These records also indicate the person(s) authorizing the material / installation activity, for raising the inspection request to the GC/MMRDA for approval. Inspection and test records are properly maintained.

10.2. INTERNAL AUDIT

STRABAG conducts Internal Audits at planned intervals, throughout the year, to cover all Departments & Processes at least every six months, as per Annual Internal Audit Plan, to determine whether the 'Quality Management System':

a) Conforms to the 'planned arrangements', to the requirements of this Standard and to the Quality Management System requirements, established by STRABAG.

b) Is effectively implemented and maintained.

QA Manager is responsible for this activity.

QA Manager formulate Half Yearly Audit Schedules. Half Yearly Audit Schedule Plans are based on the yearly Internal Audit Plan, which takes into consideration the status and importance of the processes and areas to be audited, as well as the results of previous audits. The audit criteria, scope frequency and methods are defined in the documented procedure. QA Manager and Project Manager select the auditors who conduct audits in such a way that the objectivity and impartiality of the audit process is maintained. QA Manager & Project Manager Plans Internal Audit in such a way that internal auditors do not audit their own work.

A 'documented procedure' is established to define responsibilities and requirements for planning and conducting audits, establishing records and for reporting results. A record of the Audits & their results is maintained. It is ensured that the Internal ISO Auditors meet the qualification criteria of certified ISO Internal Auditor. Appropriate documented information is retained.

The Audit Schedule gives the name of Auditor, date and time of Audit. Auditor uses "Non-Conformity Report" & "Audit Report" to record the audit evidence.

By reviewing the "Non-Conformity Report" & "Audit Report", QA Manager ensures comprehensiveness of the audit covering all requirements of ISO 9001:2015 standard. Results of the audit are reported on Non-Conformity Report / Audit Report Formats and are brought to the notice of the 'Auditee'.

All concerned department heads, responsible for the area audited, will ensure that any necessary correction & corrective actions are taken on or before target dates without undue delay, to eliminate detected non-conformities and their causes.

A follow up activity (next Internal Audit) includes the verification of the actions taken (correction and corrective action) and the reporting of verification of results.

A summary of Audit Reports findings forms a part of the agenda of 'Management Review', held by the Project Manager .

Possibilities of preventive actions are explored, initiated implemented and monitored for effectiveness, in various areas, based on the trends & types of 'non-Conformities' in an area.

11. QUALITY MANAGEMENT SYSTEM

11.1. QUALITY PROCEDURES

The processes included in the Quality Management System implemented for this Project and the documents developed for their control are the following:

PROCESS	OBJECTIVE	DOCUMENT
DOCUMENT AND RECORD CONTROL	To approve the documents regarding their suitability before they are issued. To review and update the documents whenever necessary and approving them again. To make sure that the changes are identified as well as the state of the current version. To ensure that the relevant versions of the applicable document are available in the user points. To guarantee that the documents remain legible and easily identifiable.	***Project Document Control Refer annexure 2 for Details.***

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	To make sure that the external documents are identified and their distribution controlled. To prevent the unintentional use of obsolete documents and apply the appropriate identification if they are maintained for any reason. To record Control	
EXTERNAL COMMUNICATIONS	To control and record of external communications (including submissions)	***Project management Plan Submitted separately for Approval.***
EDUCATION, TRAINING, SKILLS AND EXPERIENCE	To establish the necessary knowledge that the personnel carrying out work related to complying with products/services requirements must have. To provide training or take other actions in order to achieve the necessary competence. To assess effectiveness of actions taken. To ensure that the company's personnel are aware of the relevance and importance of their activities and how they contribute to obtaining quality objectives. To keep appropriate records for education, training, skills, and experience of the company's personnel.	***Training and Information refer annexure 2 for Details.***
PURCHASES	To ensure that the product/service acquired complies with the purchase/contract requirements specified. To establish inspections and necessary activities to ensure that the product/service acquired fulfils the specified purchase requirements. To ensure identification and/or traceability of materials and/or services.	***Purchase orders refer annexure 2 for Details.***
HANDLING, STORAGE AND PRESERVATION OF MATERIALS	Inspection on reception of materials. Storage, handling and conservation of the materials. To establish identification and traceability of material/components	***Handling, Storage and Preservation of Materials refer annexure 2 for Details .***
MEASUREMENT AND TESTING EQUIPMENT	Identification, calibration and/or control of measurement and testing equipment.	***Control of Monitoring and Measurement Equipment refer annexure 2 for details***
OPERATIONAL CONTROL OF WORKS	To monitor work execution. Traceability of tests, inspections and non-conformance reports	***Method Statements list given in annexure V***
FOLLOW-UP AND MEASUREMENT	To demonstrate the product / service's conformity. To guarantee the conformity of the Quality Management System. To constantly improve the efficiency of the Quality Management System. To ensure that if a product / service does not conform with the customer's requirements, it will identify it and control it to prevent it being used or unintentionally delivered. To control of compliance with requirements for completed work or parts of work completed. To control of complaints.	***Internal Audits Nonconformity and Customer Complaints, Corrective and Preventive Actions Refer annexure 2 for Details.***
CORRECTIVE ACTIONS	To review the non-conformities (including the customers' complaints) To establish the causes for the non-conformities. To assess the need to adopt actions to guarantee that non-conformities do not reoccur. To establish and implement the necessary actions, at the appropriate level. To record the results of the actions taken. To review the effectiveness of corrective actions taken. To carry out necessary controls to guarantee that corrective actions are implemented and that they are efficient.	***Nonconformity and Customer Complaints, Corrective and Preventive Actions refer annexure 2 for Details.***

PREVENTIVE ACTIONS	To establish the potential non- conformities and their causes. To assess the need to act to prevent the reoccurrence of non-conformities. To establish and implement the necessary actions. To record the results of the actions taken. To review the effectiveness of preventive actions taken.	***Nonconformity and Customer Complaints, Corrective and Preventive Actions refer annexure 2 for Details.***

The ***Quality Management Plan*** and procedures mentioned above described in detail the method established by STARBAG for controlling these processes.

Applicable document: ***QP: Quality Plan***

11.2. METHOD STATEMENTS

Method Statements may be drawn up in which the basic activities are listed, with clear and sequential procedures, to be followed by all persons involved.

12. IMPROVEMENT

12.1. General

STRABAG considers the results from analysis and evaluation of Quality performance, internal audits and management review to make recommendation for improvement. STRABAG determines and selects opportunities for improvement and implement any necessary actions to meet GC/MMRDA requirements and enhance customer satisfaction. These include:

a) improving TVE System to meet requirements as well as to address future needs and expectations.

b) correcting, preventing or reducing undesired effects.

c) improving the performance and effectiveness of the quality management system.

12.2. Nonconformity and corrective action

When a nonconformity occurs, including any arising from complaints, STRABAG shall:

a) react to the nonconformity and, as applicable:

1) take action to control and correct it.

2) deal with the consequences.

b) evaluate the need for action to eliminate the cause(s) of the nonconformity, in order that it does not recur or occur elsewhere, by:

1) reviewing and analysing the nonconformity.
2) determining the causes of the nonconformity.
3) determining if similar nonconformities exist or could potentially occur.

c) implement any action needed.

d) review the effectiveness of any corrective action taken.

e) update risks and opportunities determined during planning, if necessary.

f) make changes to the quality management system, if necessary.

Corrective actions shall be appropriate to the effects of the nonconformities encountered. STRABAG takes action to eliminate the causes of non-conformities in order to prevent 'recurrence'. Corrective actions are appropriate to the effects of the non- conformities encountered.

A documented procedure is established to define requirements for

a) Reviewing non-conformities (including customer complaints),

b) Determining the causes of non-conformities.

c) Evaluating the need for action to ensure that non-conformities do not recur.

d) Determining and implementing action needed.

e) Retained documented information of the results of action taken for Project Quality Plan.

f) Reviewing the effectiveness of corrective action taken.

All Departmental Managers review nonconformity observed in the verification of product, process and system and determine the causes of non-conformities. Analysis is carried out for appropriate corrective action and is implemented. If it needs the corrective action from Supplier, the Supplier is requested for the same and the effectiveness of the corrective actions taken, is monitored in the subsequent lots received from the Supplier.

Non-conformities regarding customer complaints, product, process are reviewed for determining the causes of non-conformity and analysis is carried out for corrective action. The implemented corrective action is monitored in further processing or production for effectiveness of corrective action taken. Records of the results of these analysis and investigations and effectiveness of results of action taken are maintained.

Corrective action taken for non-conformities in Quality Management System are dealt with by QA Manager & QC manager as per documented procedures.

STRABAG retains documented information as evidence of:
a) the nature of the nonconformities and any subsequent actions taken.
b) the results of any corrective action.

12.3. Continual Improvement

STRABAG continually improves the suitability, adequacy and effectiveness of the Quality Management System through the use of the quality policy, quality objectives, audit results, analysis of data, corrective and preventive actions and management review, deploying of the concept of P.D.C.A Cycle.

The Plan-Do-Check-Act (PDCA) cycle, also known as the Deming wheel or the Deming cycle, is an iterative method for continual improvement of processes, products, or services and is a key element of lean management. The PDCA model was developed in the 1950s by William Deming as a learning or improvement process based on the scientific method of problem-solving. Deming himself called it by another term—the Shewhart cycle—because he created the model based on an idea from his mentor, Walter Shewhart. As all of these names suggest, the PDCA cycle is a loop rather than an end-to-end process. The goal is to improve on each improvement in an ongoing process of learning and growth.

The Plan-Do-Check-Act model is a helpful tool that can be used for a number of applications:

- Exploring and testing multiple solutions in a small, controlled trial
- Avoiding waste by catching and adapting ineffective solutions before rolling them out on a large scale
- Developing or improving a process

What is great about the PDCA cycle is that it can be applied across industries and organizational types. The process is further illustrated as:

1. Plan

The planning stage is for mapping out what you are going to do to try to solve a problem or otherwise change a process. During this step, you will identify and analyze the problem or opportunity for change, develop hypotheses for what the underlying issues or causes are, and decide on one hypothesis to test first.

As you plan, consider the following questions:

- What is the core problem we need to solve?
- Is this the right problem to work on?
- What information do we need to fully understand the problem and its root cause?
- Is it feasible to solve it?

- What resources do we need?
- What resources do we have?
- What are some viable solutions?
- What are the measures of success?
- How will the results from a small trial translate to a full-scale implementation?

During this stage, an affinity diagram can help you and your colleagues organize many ideas into groups. Once you have determined your course of action, write down your expected results. You will check your results against your hypothesis and expectations in the "Check" stage.

2. Do

The next step is to test your hypothesis (i.e., your proposed solution). The PDCA cycle focuses on smaller, incremental changes that help improve processes with minimal disruption.

Test your hypothesis with a small-scale project, preferably in a controlled environment, so you can evaluate the results without interrupting the rest of your operation. You might want to test the solution on one team or within a certain demographic.

3. Check

Once you have completed your trial, it's time to review and analyse the results. This stage is important because it allows you to evaluate your solution and revise your plans as necessary. Did the plan work? If so, were there any hiccups in the process? What steps could be improved or need to be eliminated from future iterations?

Your evaluation at this stage will guide your decisions in the next step, so it is important to consider your results carefully.

4. Act

Finally, it is time to act. If all went according to plan, you could now implement your tried-and-tested plan. This new process now becomes your baseline for future PDCA iterations.

Consider the following questions before you act:

- What resources do you need to implement the solution at full scale?
- What training is needed for successful implementation and adoption?
- How can you measure and track the performance of the solution?
- What opportunities are there for improvement?
- What have we learned that can be applied to other projects?

If the plan did not pan out as expected, you can cycle back to the planning stage to adjust and prepare for a new trial.

The improvement activities are identified & managed through a systematic & well-established Process, which entails the following steps:

1. Formulating & execution of Action Plans.
2. Monitoring effectiveness of Results.
3. Deployment of best practices to other locations in Project.
4. Document changes carried out, if applicable.

These Continual Improvement Initiatives, flowing from the Action Plans of the are reviewed for Status / Progress in management reviews as, opportunities for improving the Quality performance are identified during routine departmental reviews and during management reviews.

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Further, the opportunities are also identified by looking at the changes in issues, interested parties' requirements, risk changes and changes in opportunities. Such opportunities are reviewed in the MRM and are captured in the output of this MRM. Further for all the identified opportunities target timeframes and goals/ objectives are set and achievement is tracked.

13. PROJECT EXECUTION PROVISION UNDER CONTROLLED CONDITION

13.1. Design and development QUALITY control of Systems Under Paackege-4 during project stages:

A brief description are as follows:

a) Design and development controls

Appropriate controls are applied to the design and development process to ensure that the results to be achieved are defined and they include.

1) Design and development review:

Lead Designer perform systematic reviews of design and development, at every stage, in accordance with planned arrangements as mentioned in Contract provision in like Design requirements, Functional requirements and Operation requirements are met and applicable codes and standard are referred are followed. The design and development review are carried out to:

a) Evaluate ability of the results of design and development to meet requirements.

b) Identify any problem and propose necessary corrective actions.

Engineering drawings & documents for System Design are sent to Lead designer checker for approval. Comments & suggestions, if any, are incorporated suitably, prior to final approval & sealing of the same. This review ensures that the specified & implied needs & requirements of the are addressed & met.

2) Design and development validation:

Independent Lead Design Checker, perform design and development validation with 'planned arrangements' as mentioned in design and development to ensure that the resulting products/systems are capable of meeting the requirements as mentioned in contract provision.

Any necessary actions are taken on problems determined during the reviews, or verification and validation activities and highlighted and return for implementation of comments.

STRABAG ensures that design and development outputs, shall be in a form suitable for verification against the design inputs & shall be approved by Lead design checker prior to submission to GC/MMRDA/Engineer in charge. The design meets the:

- Meets the input requirements for design and development.
- Are adequate for the subsequent processes for the provision of Package-4, including appropriate information for purchasing, production and service provision.
- Contains monitoring and measuring requirements, as appropriate, and product acceptance criteria or gives references to it.
- Specifies the characteristics of the product / system that are essential for its safe and proper use and their safe and proper provision.

b) Control Procurement Process (Quality monitoring on External provided services):

a) Procurement Team ensures that, the Externally provided products/ services obtained from external providers, conform to specified requirements. ***(Refer ANNEXURE-XV C)***

b) The type and extent of "control" applied to the external provider and the purchased Products, is dependent upon

the effect of the purchased product on the subsequent product realization or on the final product or on the assembled & installed system operating performance.

c) Procurement Team also evaluates and selects external providers based on their ability to supply product in accordance with the organization's requirements & the criteria for selection, evaluation and assessment of external provider are established.

d) The selected external providers are included in the 'List of approved Suppliers' by MMRDA which includes external providers, supplying Raw Material, Components and Services.

e) Procurement/Purchase Department maintain records of the results of evaluations of quality performance of the approved Supplier's and any necessary actions arising from the evaluation, and these records are reviewed & updated appropriately & periodically.

f) The QA/QC Department has established and implemented the 'inspection' and' verification' activities necessary for ensuring that purchased product meets 'specified purchase requirements. If a need arises by QA/QC Manager the intended verification arrangements and method of product release in the 'purchasing information', as well as if the GC/MMRDA/Engineer in charge intends to perform 'verification' at the Supplier's premises. The purchasing document gives specific instructions, to that effect or else the same may be communicated through a separate document. Information on external providers Purchasing information' describes the product to be purchased, including where appropriate:

I. Requirements for approval of product, procedures, processes and equipment, the release of products and services.
II. competence, including any required qualification of persons.
III. the external providers' interactions with the organization.
IV. control and monitoring of the external providers' performance to be applied by the organization.
V. verification or validation activities that the organization, or its GC/MMRDA/Engineer in charge
VI. intends to perform at the external providers' premises (e.g., FAT).

Procurement Manager raises the Purchase Orders, which contains accurate data about product description, type, class, and grade wherever applicable. Reference is given wherever required to applicable issue of specifications, drawings, process requirements, and inspection procedures. Purchase orders are reviewed and approved before release. Approving authority are the person's duly authorized by the Chief Project Manager.

Procurement Manager ensures the adequacy of specified purchase requirements, viz. Accuracy related to description of goods, technical data, specifications, drawings, quality, quantity, price, delivery schedules etc., prior to their communication/release to the Supplier.

c) Project Execution provision

STRABAG plans and carries out Project Execution under controlled conditions. Controlled conditions include, as applicable:

a) the availability of documented information that defines:

I. the characteristics (Specifications)of the products to be produced, the services to be provided, or the activities to be performed.
II. the results to be achieved.

b) the availability and use of suitable monitoring and measuring resources.

c) the implementation of monitoring and measurement activities at appropriate stages to verify that criteria for control of processes or outputs, and acceptance criteria for Package-4, have been met.

d) the use of suitable infrastructure and environment for the operation of processes.

e) the appointment of competent persons, including any required qualification.

f) the validation, and periodic revalidation, of the ability to achieve planned results of the processes for production and service provision, where the resulting output cannot be verified by subsequent monitoring or measurement.

g) the implementation of actions to prevent human error.

h) the implementation of release, delivery, and post-delivery activities.

STRABAG validates processes for Project Execution, where the resulting output cannot be verified by subsequent monitoring or measurement and as a consequence, deficiencies become apparent only after the product is in use or the service has been delivered. Validation, if done, demonstrates the ability of these processes to achieve the planned results.

The control on such processes is carried out by verifying process validation reports and monitoring records, during inspection carried out at Suppliers end for their special processes, if any, as identified by QA Manager. At Project Site, the only Process for Validation is Welding for which the Operator is Qualified if he is not continuously doing this jobs past 6 months or otherwise can be Qualified, by samples of Welding joints prepared by him as per the Approved Welding Procedure Specification and Procedure Specification according to ASME Section IX Standard, and Test Coupon will be sent to a NABL Approved Testing Laboratory and / or Engineer in charge of NCRTS / his representative (Consultant,) for approval / Qualification after satisfactory testing. This above activity is carried out, by QA/ QC Manager of **STRABAG**.

Where appropriate, **STRABAG** 'identifies' the product by suitable means (names, tags or keeping it at designated locations, racks, bins), throughout product realization/Project Execution.

The material and/or process traceability requirements for specific quality activities shall be planned to ensure that the contract requirements are complied with in all respects.

Inspection and Test

The inspection and test status of product is identified through the use of inspection and test reports, Requests for inspection reports, Inspection and test registers, stamps, inspector signoff, tags, labels or other suitable means, which indicate the conformity or nonconformity of product. with regard to inspection, manufacturing, construction, assembly, installation and commissioning of the product to ensure that only product which has passed the required inspection and tests, or has been released under an authorized waiver, is dispatched, used or installed. The inspection status is documented on relevant inspection document, as applicable. The identification of the inspection authority responsible for the release of conforming product is recorded. Any nonconforming product and installation is removed from site immediately to avoid any accidental use.

d) Identification and traceability:

Where appropriate, STRABG identifies' the product by suitable means (names, tags or keeping it at designated locations, racks, bins), throughout product realization/Project Execution.

The material and/or process traceability requirements for specific quality activities shall be planned to ensure that the contract requirements are complied with in all respects. The methods used to carry out and verify material and process traceability shall be included within the Method Statements/inspection and test plans where relevant and may include but not necessarily be limited to:

- mapping and/or as built drawings,
- registers and production records,
- Unique report references.
- Mill test certificates

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- Welder's certification and identification
- Workmen certification (riggers, electrician, Fitter, plumber, etc as per scope of works).

Appropriate delivery documentation shall be provided according to specified requirements.

Storage of Materials as per below details.

Storage of material	Conditions	Standards Reference
DG Sets	Keep stored in dry and lockable area. Put on Wooden platform and covered by tarpaulin.	As per manufacturer Instruction.
CSS	Keep stored in dry and lockable area. Put on Wooden platform and covered by tarpaulin.	As per manufacturer Instruction.
Cable trays	Keep stored in dry area Proper stacking in rack with adequate space.	As per manufacturer Instruction.
Electrical cable	Keep stored in dry and lockable area. Put on Wooden platform and covered by tarpaulin.	As per manufacturer Instruction.
Electrical panel	Keep stored in dry and lockable area. Put on Wooden platform and covered by tarpaulin.	As per manufacturer Instruction.
VFD's	Keep stored in dry area If in open area covered by tarpaulin	As per manufacturer Instruction.
Isolator panels	Keep stored in dry area Proper stacking in rack with adequate space.	As per manufacturer Instruction.
DPT and VSPS	Keep stored in dry and lockable area. Put on Wooden platform and covered by tarpaulin.	As per manufacturer Instruction.
MCB's / MCCB's	Keep stored in dry area Proper stacking in rack with adequate space.	As per manufacturer Instruction.
GI sheets and ducting	Keep stored in dry area. Proper stacking in rack with adequate space.	As per manufacturer Instruction.
Pipes	Keep stored in dry area Proper stacking in rack with adequate space.	As per manufacturer Instruction.
Support MS structure (rods, anchor fasteners, angle, channels, I beams,	Keep stored in dry area Proper stacking in rack with adequate space.	As per manufacturer Instruction.
Fittings (bend, reducers, flanges)	Keep stored in dry and lockable area. Put on Wooden platform and covered by tarpaulin	As per manufacturer Instruction.
Valves and strainers	Keep stored in dry and lockable area. Put on Wooden platform	As per manufacturer Instruction.
Duct dampers	Keep stored in dry area Proper stacking in rack with adequate space.	As per manufacturer Instruction.
Pumps	Keep stored in dry area Proper stacking in rack with adequate space.	As per manufacturer Instruction.
Fans	Keep stored in dry area Proper stacking in rack with adequate space.	As per manufacturer Instruction.
Insulation material	Keep stored in dry area Proper stacking in rack with adequate space.	As per manufacturer Instruction.

STRABAG meets the requirements for post-delivery activities associated with MTHL Package -4 systems such as warranty service, repairs, AMCs. In determining the extent of these post-delivery activities, STRABAG has considered:

a) statutory and regulatory requirements.

b) the potential undesired consequences associated

c) the nature, use and intended lifetime

d) GC/MMRDA requirements.

e) GC/MMRDA feedback.

14. RECORDS

STRABAG has established the records included in the list ***ANNEXURE-II*** to provide evidence of conformity to requirements and of the effective operation of the Quality Management System.

ANNEXURE-I, QUALITY POLICY

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STRABAG International GmbH

STRABAG

STRABAG International GmbH Project Office
[illegible] Golf Course Road
Sector 54, Gurugram – [illegible], Haryana, INDIA

Quality Policy

In our domain of Intelligent Transportation Systems, we constantly strive to understand all our customer and applicable statutory and regulatory requirements and provide customizes solutions and services to fulfil them.

Further we are committed to the continual improvement of such solutions and services by ensuring the risks and opportunities that can affect conformity of products and services are determined and addressed. It will help to enhance customer satisfaction.

We will provide an empowered, transparent, learning and rewarding work culture for our employees to excel through commitment, accountability and innovation to meet the dynamic competitive business environment.

Sanjay Gupta
Quality Head

STRABAG International GmbH
Registered office
[illegible]
www.strabag-international.com

Tel [illegible]

STRABAG	OUTLINE QUALITY PLAN	एम एम आर डी ए MMRDA

ANNEXURE-II, LIST OF PROCEDURES & RECORDS

PROCEDURE		RECORDS	
1	QUALITY MANUAL	PE:STR-01	List of communications.
		QM:STR-02	Minutes of Meeting
2	DOCUMENT CONTROL	QM-STR-03	Document Submission Transmittal Form
		QM-STR-04	List of documents
		QM-STR-04	Control of distribution of documentation
		QM-STR-05(MMRDA)	Submission for Request for Information /Inspection
3	TRAINING & INFORMATION	QM-STR-06	Training Record
		QM-STR-07	Training Effectiveness Evaluation
4	CONTROL OF MONITORING AND MEASURING EQUIPMENT	QM-STR-08	Measuring Equipment Record
		QM-STR-09	Internal Calibration Record
5	INTERNAL AUDIT	QM-STR-10	Internal Audit Plan
		QM-STR-11	Internal Audit Report
6	NON-CONFORMITIES, CORRECTIVE ACTIONS & PREVENTIVE ACTIONS	QM-STR-12	Non-Conformity
		QM-STR-13	Corrective/ Preventive Action Report
7	PURCHASE MANAGEMENT	QM-STR-14	Purchase Order / Work Order
		QM-STR-15	Material Track Book
8	HANDLING, STORAGE & PRESERVATION OF MATERIAL	QM-STR-16	Store Inspection
		QM-STR-17	Material Receipt Note
		QM-STR-18	Material issue note
			Stock Register
			Issue Requisition Slip

Note: Details are given in subsequent pages

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PE: STR -01 Communication Form

Master list of Controlled copy holder .

Sl No	Controlled copy no	Date of Issue	Applicable PQP Section Numbers	Holder	Revision
1	Project Quality Plan				
2	Other Documents				
Document Controller					
Name:					
Signature:					
Date:					
Note: Withdrawal evidence of superseded documents to be established as per procedure.					

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MASTER LIST OF RECORDS

Sl No	Record description	Records (tick as applicable)		Hard copy			Retention period	Electronic Media			
		Hard Copy	Elect copy	File No/ title	Indexing	Location		File name	Back up		
									Method*	Location	Frequency of updatation
If records are maintained electronically identify method of back up (Hard disk at different location or CD or Pend rive).											
Revision status of this record:											
Signature :											
Date :											

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DOCUMENT CHANGE NOTE

Name:
Department:

Thro: QC Manager /Lead Design Manager

Document/Drawing Change request for :

DOCUMENT REF	
PRESENT STATUS	
DESCRIPTION OF CHANGE REQUIRED	
REASON FOR CHANGE	

DATE:

SIGNATURE

ACTION TAKEN BY

IF ACCEPTED, THEN THE DETAILS OF CHANGE INTRODUCED

IF REJECTED THEN REASON FOR REJECTION

Approved by	Checked By

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QM: STR-02 Minutes of Meeting Format

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AIAI-GC
GENERAL CONSULTANT FOR DELHI-MEERUT REGIONAL RAPID TRANSIT SYSTEM

Department: ECS/TVS (Package-23) Date:
Meeting No.

Minutes of Meeting Held on

Subject:
LOA Date: 01/02/2021

S. No.	Agenda	Discussion/ Conclusion	Status / Action by	Target Date

	Name	Designation	Signature	Date
Minutes By				
Accepted By				
Approved By				

List of Attendees:

S. No.	Name	Designation	Organisation
1			

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Verbal comunication records

Name of the Project:
Contract:
Request No. CVI:
We request your confirmation of your verbal instruction as follows:
Subject:
Reference: BOQ _____: Specification: _____: Drawings: _____: Others:_____
Verbal Instruction given by Mr _____ of GC NCRTC on _____ (date)

Initiated by	Department Head	Contractor Representative
Signature:	Signature:	Signature:
Name:	Name:	Name:
Department:	Department:	Department:
Date:	Date:	Date

(For use by the GC NCRTC)

Confirmation by the GC NCRTC

GC NCRTC	Chief Project Manager
Signature:	Signature:
Date:	Date:

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QM -STR -03: TRANSMITTAL FORM

QM-STR-04 SAMPEL LIST OF DOCUMENTATION

Document Description	Date of issued	Revision	Transmittal No.
Three Months Rolling Programe	Wednesday, April 7, 2021	00	NCRTC-DM-STR-GC-TM-0001
INTERFACE MANAGEMENT PLAN	Monday, April 12, 2021	00	NCRTC-DM-STR-GC-TM-0003
Monthly Progress Report-March 2021	Monday, April 12, 2021	00	NCRTC-DM-STR-GC-TM-0002
OCCUPATIONAL HEALTH, SAFETY & ENVIRONMENT PLAN	Tuesday, April 13, 2021	00	NCRTC-DM-STR-GC-TM-0004
Quality Plan	Friday, April 23, 2021	00	NCRTC-DM-STR-GC-TM-0006
Initial version of the Works Programme	Tuesday, May 4, 2021	00	NCRTC-DM-STR-GC-TM-0010
Design Submission Programme	Tuesday, May 11, 2021	00	NCRTC-DM-STR-GC-TM-0013
Testing & Commissioning Programme	Tuesday, May 11, 2021	00	NCRTC-DM-STR-GC-TM-0013
Design, Procurement, Manufacturing & Manufacturing Testing Programme	Tuesday, May 11, 2021	00	NCRTC-DM-STR-GC-TM-0013
Installation Programme	Tuesday, May 11, 2021	00	NCRTC-DM-STR-GC-TM-0013
EMI/EMC MANAGEMENT PLAN	Tuesday, May 11, 2021	00	NCRTC-DM-STR-GC-TM-0014
Material Control Schedule	Tuesday, May 18, 2021	00	NCRTC-DM-STR-GC-TM-0016
Design Plan & Design Verification and Validation Plan	Saturday, May 22, 2021	00	NCRTC-DM-STR-GC-TM-0017
Project Management Plan	Monday, May 24, 2021	00	NCRTC-DM-STR-GC-TM-0018
Monthly Progress Report-April 2021	Thursday, May 27, 2021	00	NCRTC-DM-STR-GC-TM-0020
KD-1-Submission of Preliminary Design	Thursday, May 27, 2021	00	NCRTC-DM-STR-GC-TM-0021
RAM PLAN	Monday, May 31, 2021	00	NCRTC-DM-STR-GC-TM-0023
Software Quality Assurance Plan	Monday, May 31, 2021	00	NCRTC-DM-STR-GC-TM-0023
System Safety Assurance Plan	Monday, May 31, 2021	00	NCRTC-DM-STR-GC-TM-0023
Contractor's Project Plan	Monday, May 31, 2021	00	NCRTC-DM-STR-GC-TM-0024
BIM EXECUTION PLAN	Monday, May 31, 2021	00	NCRTC-DM-STR-GC-TM-0026
OPERATION AND MAINTENANCE PLAN	Thursday, June 3, 2021	00	NCRTC-DM-STR-GC-TM-0028
Training Programme	Tuesday, June 8, 2021	00	NCRTC-DM-STR-GC-TM-0029
Training Plan	Tuesday, June 8, 2021	00	NCRTC-DM-STR-GC-TM-0029
Monthly Progress Report-May 2021	Tuesday, June 15, 2021	00	NCRTC-DM-STR-GC-TM-0033
Defect Notification Management Plan	Tuesday, June 15, 2021	00	NCRTC-DM-STR-GC-TM-0034
Procurement, Manufacturing, Delivery and Manufacturing Testing Plan	Monday, June 21, 2021	00	NCRTC-DM-STR-GC-TM-0036
Construction & Installation Management Plan	Tuesday, June 22, 2021	00	NCRTC-DM-STR-GC-TM-0037
Maintenance Plan	Monday, June 28, 2021	00	NCRTC-DM-STR-GC-TM-0038
Particular Uses of Site Plan	Monday, July 5, 2021	00	NCRTC-DM-STR-GC-TM-0039
Particulars of site Supervision Plan	Monday, July 5, 2021	00	NCRTC-DM-STR-GC-TM-0039
Installation, Test and Commissioning Plan	Monday, July 5, 2021	00	NCRTC-DM-STR-GC-TM-0039

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QM-STR-05 (MMRDA FORM) REQUEST FOR INSPECTION/INFORMATION

QM-STR -06 & 7 Training calendar & record Form

TRAINING CALANDER **PQP-WP-R1- F06**

PROJECT	NCRTC	QUALITY MANAGEMENT SYSTEM
CLIENT	NCRTC	ISSEED NO. 01
AREA		Date

TRAINNING CALANDER - YYYY

(Jan / Jun) / (Jul / Dec)

Training Area & Faculty	Month	Jan / July			Feb / Aug			Mar / Sep			Apr / Oct			May Nov			Jun / Dec		
	Week	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3
	Planned																		
	Conducted																		
	Planned																		
	Conducted																		
	Planned																		
	Conducted																		
	Planned																		
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	Conducted																		
	Planned																		
	Conducted																		
	Planned																		
	Conducted																		

	Legend		Training Planned	Training Performed
Prepared By		DATE		
Approved By		REV		

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TRAINING ATTENDANCE RECORD

Training Subject:

Contents covered in brief :

Names of Faculty :

Date :

Staffs / Workmen Attended

PQP-WP-R1- F07

Sl. No.	Name	ID NO *	Department	Area of work	Signature
1					
2					
3					
4					
5					
6					
7					
8					

*: For Staff

Name & sign of training coordinator:

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QM: STR -08, 09 Measuring Equipment record and Internal calibration record.

List of Instrument

List of instruments					
S.No	Equipments Description	Equipment No	Type (E/M)	Date of Purchase	Remark

Calibration record

List of instruments					
S.No	Equipments Description	Equipment No	Claibration due date	Responsibility	Remark

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QM-STR -11&12 Internal Audit Plan

Site Observations and Recomendataion

S.No	Date	Location	Responsible Incharge	Level	Photograph	Observation & Recommendation	TDC	Status	Compliance status	Client Acc	Date of Compliance	

PQP-WP-R1- F01

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PROJECT	**MMRDA**	**QUALITY MANAGEMENT SYSTEM**	
CLIENT	**MMRDA**	**ISSEED NO. 0**	**REV. NO. 0**
CONSULTANT	**General Consultant**	**Date:**	
AUDIT PLAN			

Area to be Audited	**Month**	**JAN**		**FEB**		**MAR**		**APR**		**May**		**JUN**		**JUL**		**AUG**		**SEP**		**OCT**		**NOV**		**DEC**	
	Week	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
	Audit No.																								
	Planned																								
	Conducted																								
	Planned																								
	Conducted																								
	Planned																								
	Conducted																								
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	Planned																								
	Conducted																								

			Legend			
Prepared By		Signature		Rev. No.	Plan	Extra Audit Perform
Approved By		Signature		Date	Actual	

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Date:

AUDIT NOTIFICATION **PQP-WP-R1- F03**

Location: Date: Sl. No:

To : **Section :**	
cc:	
This notification is to advise that an Audit has been scheduled to take place in your Site/Department as detail below. Please acknowledge receipt of this notification by signing and returning a copy of this form to the QMC (site)	
AUDIT DETAILS: Audit Number: Date Planned: Time: Proposed Audit Scope: The Auditor / Audit Team will be: The following personnel will be required to be available during the audit:	
Issued by MR Site: Signed: Date:	Received by Auditee (dept. head) (Title): Signed: Date:

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AUDIT REPORT

PROJECT : MMRDA AUDIT NO:

AUDIT TEAM: DATE OF AUDIT:

SCOPE OF AUDIT: PERSONS CONTACTED:

Effectiveness of Quality management system (QMS): Overall rating: ☐

(Scale for rating: (5 – excellent; 4 – Very good; 3 – Good; 2 – Fair; 1 – Poor)

1. Awareness & understanding of Quality Management System ☐
2. Improvement achieved through site internal audit & MRM ☐
3. Keenness & importance given in adopting the system ☐
4. Housekeeping of site ☐
5. Records (legibility, readability, Traceability/arrangement) ☐

Audit highlights:

Number of Minor NCRs	Number of Major NCRs	Number of Observations	Number of Improvements

Status of previous Audits:

Number of Minor NCRs pending	Number of Major NCRs pending	No. of Minor NCRs pending > 30 days	No. of Major NCRs pending > 30 days	Remarks

Enclosure: Detail audit report & NCRs

PQP-WP-R1- F04

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Auditor Name:	
Signature:	
Date:	

Minor Category NCR's	**Major Category NCR's**
a. Can be easily corrected by auditee, such as incorrect completion of forms, or lack of attention to detail in a number of occasions. b. Generally, does not require training of staff c. Can be corrected without cost to the Company. Can only be resolved through the issue of revised procedure text or content (not format) and associated documents. d. Does not result in breakdown of system.	a. Approval is not taken for any deviation from drawings / approved specifications / ITP / Procedure. b. Could affect the business and/or integrity of the system. c. Corrective action may cause significant costs to the Company d. Requires overview by QMC to maintain system integrity e. Result in breakdown of the system.

Observation	**Improvement**
a. A statement of fact based on evidence. b. Instances of best practices. c. Insignificant problems. d. Suspicions that need trailing. e. Feedback to the audit controller.	a. Findings warranting attention by the Organization. b. May require remedial actions. c. The organization will be made aware of findings. d. Instigate corrective action. e. Compliance for continual improvement.

Enclosure: Detail audit report & NCRs

PQP-WP-R1- F04

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QM-STR-12: Nonconformity and Corrective/Preventive action report:

NON-CONFORMANCE REPORT (NCR)

Location:		Date:	
Department:		Audit No.:	
Auditor(s) :	Signature:	NCR No.:	
Audited Document/Work:			
Non-conformance Observed:			
Objective Evidence of Non-Conformance:			
Auditee Name: Signature: Date:	**NCR Categories** (tick one) **MAJOR** / **MINOR**		**Reference: Clause(s)/Statement**
Root causes of NC:			
Correction Proposed:			
Corrective Action Proposed: Signature of Auditee: Completion target date:			
Corrective action taken as per proposal: YES / NO Signature of Auditee: Actual closing date:			
Objective Evidence for Corrective action and Closure			
Review of corrective action & closing of NCR: Auditor : Signature : Date			

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PQP-WP--R1- F05

Sub- Contractor Performance Review Half Yearly

Job Description		Job Site	
Business Unit		Subcontractor Category	
Subcontractor Name			
Phone		Date of Review	
WO Number		WO Description	
WO Date		WO value	
WO Start Date		WO end date	
Actual start date		Virtual Completion date	
Want Quarterly Performance rating		Yes / No	

Sl. No	Area of performance (Quality Check)	A- Very good (90% - 100%)	B- Good (70% - 89%)	C- Average (60%- 69%)	D- Poor (< 60%)
1	Safety Record	0	0	0	0
2	Ability to mobilize at short notice	0	0	0	0
3	Labor productivity	0	0	0	0
4	Control over wastage of materials	0	0	0	0
5	Control over workmen	0	0	0	0
6	Judicious & efficient utilization of Infra	0	0	0	0
7	Co- operation with other agencies	0	0	0	0
8	Compliance tolabor regulations	0	0	0	0

Remarks:

Assessed by:
R1- F8

PQP-WP--

Signature:

Date:

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QM-STR-14 PURCHASE ORDER AND WORK ORDER

QM-STR-15,16,17 & 18

MIN no Date

Material Issue Note

Material issued to

Date :

S.No	Description of Material	Qty	Unit	Remark

Store Keeper Approving Authority

STRABAG	OUTLINE QUALITY PLAN	एम एम आर डी ए MMRDA

MRN no - Date

Material Receipt Note

Challan No and Date	
PO no and Date	

S.No	Description of Material	Qty	Unit	Remark

Store Keeper Approving Authority

STRABAG	OUTLINE QUALITY PLAN	एम एम आर डी ए MMRDA

MRN no-	Date :

Material Inspection Report Incomming

Challan No and Date of Recipt of material	

S.No	Material Description	Dimensions	Observation	Visual Inspection of Material	MTC	Remark

Report

Store Keeper	Inspected By

QA/Qc Manager						

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MRN No	Date :

Material Rejection Report

Challan No and Date of Recipt of material

PO no and Date

S.No	Material Description	Dimensions	Observation 1	Observation 2	Cause of Rejection

Report

Store Keeper				Inspected By		
QA/Qc Manager						

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STOCK REGISTER

Item Code	Item Description	Unit	Partcode	Storage Location	Date	GR No.	D. C. No.	Supplier	Quantity Received	M. R. No.	Issued to	Issued Quantity	Balance Stock

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ANNEXURE-III, QUALITY MANAGER'S DETAILS

"COORPORATE QUALITY MANAGER Mr KSHITIZ SINGH IS QUALITY PERSON"

ANNEXURE-IV, PROJECT ORGANISATION CHART & RESPONSIBILITIES

Refer Project management plan for organization chart:

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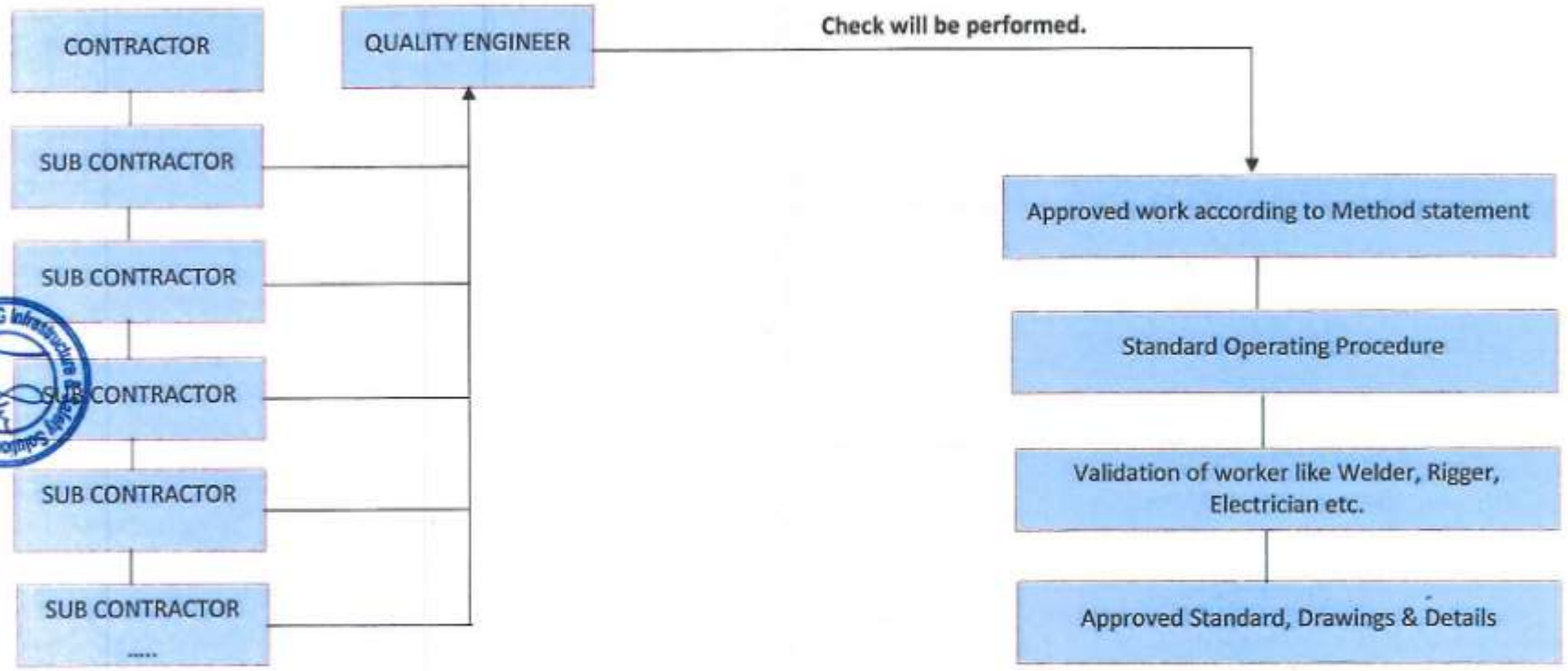
ANNEXURE-IV C



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RESPONSIBILTY OF KEY MEMBERS

1. **Project Manager:** The Project Manager has overall responsibility for the management of the Project also leading the Project Team, the main responsibilities and authorities are:

- ✓ Responsible for all aspects of performance in the execution of this contract.
- ✓ Carry out and achieve the goals established for the project.
- ✓ Provide site level management for quality construction within budget and on time. Supervise the activities of design, construction, and procurement.
- ✓ Implement and maintain the project standard for quality construction.
- ✓ Working with the Dept. Managers and project Engineers, prepare and update schedules.
- ✓ Review the designer's plans, details, and specifications for basic conformance with the quality standards of STRABAG, the Employer and other regulating agencies requirements.
- ✓ Review and approve material procurement and subcontractor requisitions.
- ✓ Review and approve costs for changes in the work. Ensure that the Employer is knowledgeable of any added cost and time.
- ✓ Handle management level contacts with the Employer.
- ✓ Review and approve any cost reports.
- ✓ Ensure the diligent performance of staffs, tradesmen, subcontractors, and suppliers, in the pursuit of planning, engineering, supervision, administration, and construction of the project, consistent with the time, quality, and cost objectives stipulated in the contract documents.
- ✓ Enforcing policies to meet and maintain the stated objectives of the Health & Safety, Security, Quality Assurance & Quality Control, Environmental Plans.
- ✓ Ensure that the project is run within the budget.
- ✓ To manage, coordinate and control the entire project in terms of cost, quality and schedule.
- ✓ To represent STRABAG in dealings with all concerned in the project.
- ✓ To direct the phasing in all operations of project and participate in the committee for appointment of that suitably appointed qualified personnel as in charge of the various parts of the work.
- ✓ To ensure that an overall construction program is produced, updated, and adhered and is communicated to respective section of the works as required.
- ✓ To attend meetings with Client as required.
- ✓ To organize and conduct internal meetings, to ensure smooth functioning of the project team.
- ✓ To ensure that all technical processes, tasks, and functions are fully adhered to and followed.

2. **Dy. Project Manager**: Report to Project Manager his roles and responsibilities are:

Overall responsible of the control of all deliverables and activities related of the project.
Ensure that the list of contractual documents is prepared and updated and distributed to all concerned.
Inform the client regarding missing contract documents.
Ensure consistency in Quality of deliverables. Also ensure timely delivery of technical submittals and drawings on site.
Attend the Initial Engineering & Coordination Meeting.

- ✓ Coordinate with the client for all approvals of the mockup, sample submission etc.
- ✓ Review Engineering Queries / Site Queries / information requests raised by Team Leader/ Team Members/ site coordinators and forward to the client using RFI template (Request for Information).
- ✓ After receipt of Input the Chief Project manager, will prepare/arrange to prepare project plan using Delivery Progress Monitor and will forward the same to customer.
- ✓ Periodically monitor the progress of the engineering activities through weekly review meeting with his team members.
- ✓ Ensure that the templates called Transmittal Note and Input tracker and Comment Tracker QC Checklist (with marked up drawings are retained).
- ✓ Ensure that the hard copy of the comments received from customer is maintained with document controller.
- ✓ Ensure that Quality procedure is maintained at station as detailed in project Quality assurance plan and shall ensure that corrective actions is taken for any nonconformity raised by QA&QC/Employer as and when required.
- ✓ Identity the Training needs of Team Members and Training shall be imparted to team member prior to start up and during execution of the project.
- ✓ Preparation, submission and getting approval of submittals for subcontractors, method statements and other related documents.

Prepare manpower resources schedule and histograms to achieve the timely completion of project.
Co-ordinate and assist the Project Manager for timely ordering of material, equipment, etc.
Develop cost loaded programs and assist the Project Manager in Preparation and submission of monthly invoices.
Monitor the progress of work at site and highlight the problems to the Project Manager as required.
Ensuring the safety procedures are fully and strictly implemented in accordance with the requirements of the agreed specific project safety plan applicable safety laws enforced in the country & the contract conditions.

3. **Design Manager**: Technical management of the works, performing the studies required during the performance of the work and roles and responsibility are:

- ✓ Study the Technical Requirements as per Contract.
- ✓ Receipt of the documents issued by the Project, requesting the additional documentation required and control and distribution of all the documentation.
- ✓ Provide inputs required for finalizing the room sizing and alignment.
- ✓ Preparation of Conceptual Design.
- ✓ Preparation of Preliminary Design.
- ✓ Equipment Sizing, Preparation of Bill of Materials.
- ✓ Submission of Vendor and Technical Proposal to client for approval.
- ✓ Preparation of all changes or modifications to the project that may arise during the performance, as well as new technical solutions that may arise at the request of the Works Management.
- ✓ Management of all activities relating to the surveying, on site layout and follow-up of the works, as well as preparation of all plans that may be necessary and the performance of measurements.

Guarantee the reliability of the site layout and surveying work.
HVAC design experience on Subway stations and other mission critical projects
Hands-on experience on Cooling load estimation and energy simulation software
Green building projects.

- ✓ Writing functional specifications of HVAC.
- ✓ Experience on design of Chilled water and air distribution systems.
- ✓ Testing and Commissioning reports.
- ✓ HVAC Operation and control philosophy, interfacing with BMS or SCADA
- ✓ Checking input design data with respect to Contract documents.
- ✓ Providing interdisciplinary coordination of engineering activities such as TVE with system wide contractors & UGC's for getting the inputs used for carrying out the various design activities, ensuring the most suitable technical and economical solutions are adopted.
- ✓ Checking the scope of the engineering activities.
- ✓ Ensuring that the Project complies with Codes, Standards and Local Regulations as QA/QC procedures.
- ✓ Ensuring that the Project technically complies with the Contract requirements.
- ✓ Incorporation of lead design checker comments, design submission for GC/MMRDA for approval.
- ✓ Conduct internal design review meeting and record the minutes of meetings.
- Raise design queries and request for information (RFI) and resolve ambiguities.
- Monitor, review and control of drawings and material submittal.
- To ensure contractual obligations are met in the preparations of design, drawings etc.
- To ensure compliance with the established QA/QC procedure, as applicable.
- To coordinate with TVE services design with system wide, architectural and structural design.
- Coordination of SCADA serviced design with system wide contractor.

4. **SHE Manager**: Chief SHE Manager will review and coordinate to update this construction phase plan to include the hazard and risk register contained within this document. All the OHS&E personnel shall report to the Chief SHE Manager. The Chief SHE Manager shall report directly to the Project Manager or Corporate Safety Head of the STRABAG.

- ✓ Chief SHE Manager, Safety Advisors and Officers are responsible for ensuring that reports on the performance of the SHE management system is presented to top management for review and used as a basis for improvement of the SHE management system.
- ✓ Chief SHE Manager, Safety Advisors and Officers are responsible for independently monitoring the operations of the subcontractor, where deficiencies are identified they are responsible to report their findings immediately to the Station managers /Project Manager who then must act as directed.
- ✓ He will lead a team of station SHE officers who reports to station manager having roles and responsibility as below:
- ✓ Directly report to Station Manager for safety related issues at station level.
- ✓ Responsible for giving safety toolbox talks and Risk Assessment briefings.
- ✓ Coordination with the interface contractors for safety related issues.
- ✓ Ensure necessary permits are in place.
- ✓ Ensure required safety document at site.
- Ensuring site safety committee meeting done regularly and compliance of fault finding.
- Site patrolling and on job training to workmen.

5. **Quality Assurance & Control Manager**: Monitor establishment and compliance with the Technical Specification of the works in accordance

with the Organization's guidelines.

- ✓ Collaborate in defining the Quality Plan, Quality Manual, and Specific Procedures.
- ✓ Enforce compliance with the applicable Plans and Procedures.
- ✓ Conduct Training for the Staff & Work Force.
- ✓ Conduct Periodic Internal Audits.
- ✓ Coordination during external Audits.
- ✓ Supervise the non-conformity reports issued for the works.
- ✓ Control on site the documentation relating to quality.
- ✓ QA Manager shall report to the Project Manager / Sr. Management of STRABAG.
- ✓ QA Manager shall have the authority, independent of the site team, in the implementation and maintenance of the Quality Management System for the Project.
- ✓ He shall be responsible for overseeing the implementation of the overall Quality Plan for the Project.
- ✓ He shall be responsible for effectively managing the Quality of the work as per contract.
- ✓ He shall be Responsible for the task of ensuring that the requirements of the Quality Management System are implemented and maintained.
- ✓ Review the contractual requirements and detail planning and development of the Quality System Management specific to the project.
- ✓ Recruit QA/QC Engineers / Inspectors for the project and allocates work for them.
- ✓ Monitors, reviews and checks the preparation and submission of inspection and test plan and method statements prepared by Deputy Project Manager conformance with contract specifications.
- ✓ Ensuring conformance of Quality Management System as per the Project Quality Plan & Contract documents through Internal Quality Audits as planned.
- ✓ Reporting to the Top Management & Contractor Representative regarding the performance of Quality Management System in Project.
- ✓ Monitoring and Evaluation of the Project Quality Plan by means of execution and follow up through internal Audits.
- ✓ Ensuring that corrective actions have been taken when necessary and have been suitably contained.
- ✓ Review Project Coordination & Inspection Procedures.
- ✓ To review the contractual requirements, detail planning and development of the Quality Management System specific to the project.
- ✓ Monitoring, reviewing, and checking of Inspections & Test Plans and Method Statements prepared by Deputy Project Manager with contract specifications.
- ✓ To guide Quality Control Engineers/ Inspectors and make frequent visits to the operational areas to ensure QS compliance.
- ✓ To inspect and arrange material through QA/QC Engineers / Inspectors after being received and checked by the storekeeper to ensure compliance with the approved Drawings, Contract Specifications and Purchase Order.

6. **Planning Manager and Scheduling manager**: He has the duty to ensure overall control of time and cost of the Project in accordance with Contract requirements. He reports to the Project Manager & well supported by Planning team. In particular, he has main responsibility and authority for:

- ✓ Preparing and maintaining the Project Control and Progress Measurement procedures.
- ✓ Coordination of time and cost planning including development of Project schedules, budget and cash flow diagram.
- ✓ Measurement of progress and preparation of periodic Progress Reports.

- ✓ Supporting the Project Manager in evaluating time and cost factors regarding the technical solutions under consideration. Wil work seamlessly with Project Team, Design Team & Employer.
- ✓ Preparation & updating of Document Control Schedule.
- ✓ Preparation & updating of Material Control Schedule.
- ✓ Preparation, updating & monitoring of Work Program.
- ✓ Preparation of Progress Reports as per Project/Contractual Requirements.
- ✓ Alert the Project Manager & all the stake holders in case of slippages and deviations in planned activities.
- ✓ Preparation of cost & revenue rolling forecasts.
- ✓ Risk analysis for the project.

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ANNEXURE-V

TENTATIVE LIST OF METHOD STATEMENTS

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TENTATIVE LIST OF METHOD STATMENT: **ELECTRICAL SYSTEM**

Sr No.	Description of Method statement
01	Method statement for installation of Electrical Panels
02	Method statement for installation of VFDs
03	Method statement for installation of Cable Trays
04	Method statement for Power Cable Laying & Termination
05	Method statement for installation of MDB, SMDBs
06	Method statement for installation of Electrical Conduits
07	Method statement for installation of Electrical Switchboards

TENTATIVE LIST OF METHOD STATMENT: **SCADA SYSTEM**

Sr No.	Description of Method statement
01	Method statement for installation of PLCs
02	Method statement for installation of Remote Terminal Units (RTU)
03	Method statement for installation of Server Equipment

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ANNEXURE-VI

TENTATIVE LIST OF INSPECTION & TEST PLANS

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TENTATIVE LIST OF INSPECTION AND TEST PLAN: **ELECTRICAL SYSTEM**

Sr No.	Description of Method statement
01	Inspection & test plan for installation of Electrical Panels
02	Inspection & test plan for installation of VFDs
03	Inspection & test plan for installation of Cable Trays
04	Inspection & test plan for Power Cable Laying & Termination
05	Inspection & test plan for installation of MDB, SDBs
06	Inspection & test plan for installation of Electrical Conduits
07	Inspection & test plan for installation of Electrical Switchboards
08	Inspection & test plan for installation of DG Sets
08	Inspection & test plan for installation of CSS

TENTATIVE LIST OF INSPECTION AND TEST PLAN: **SCADA SYSTEM**

Sr No.	Description of Method statement
01	Inspection & test plan for installation of PLCs
02	Inspection & test plan for installation of Remote Terminal Units (RTU)
03	Inspection & test plan for installation of Server Equipment

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ANNEXURE-VII

IDENTIFIED LIST OF ISSUES, NEEDS & EXPECTATIONS OF INTERESTED PARTIES & IDENTIFIED RISKS

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ISSUES:

Dept.	Function	Issues	Category	Internal/ External
Projects	Marketing/ Sales	Delay in receipt of Offer with correct pricing from supplier	Supplier	External
		Delays in obtaining clarity on ambiguities in Tender from consultant/customer	Customer	External
		Delay in receipt of Advance payment from Customer	Customer	External
	Design Development & Planning	Delays in receipt of correct Architectural layout /Reflected Ceiling Plan related drawings from customer	Customer	External
		Post order changes in design & scope by customer	Customer	External
		Delay in opening of GO (General Order) file.	Commercial	Internal
		Delay in finalization of suppliers/ contractors for submission of Technical Data Sheets by Materials	Procurement	Internal
		Delay in approvals of the shop drawings/ Technical Data Sheet from consultant/customer	Customer	External
		Delay in receipt of amendment for additional scope quantity & Extra items	Customer	External
	Execution	Delay in mobilization of adequate resources for site execution	Operation	Internal
		Shortage of labours & labour sub-contractors.	Supplier	External
		Delay in receipt of materials with long lead time	Supplier	External
		Delays in Measurement certification from client.	Customer	External
		Delays in release of payment to suppliers	Finance	Internal
		theft of material from site	Operation	External
		lapses in safety compliance at Project site	Supplier	Internal
		Delays in attending Snag points during commissioning results in additional snag points & delay in handing over of project.	Operation	Internal

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INTERESTED PARTIES & NEEDS & EXPECTATIONS

Dept.	Function	Interested parties	Needs & expectations
Projects	**Marketing/ Sales**	Customer/ Consultant/ Architect	Techno-commercial offer submission on time without major deviations
			Single point responsibility & quick response.
		Suppliers	For major equipments -Signing of MOU at the sales stage- Prebid agreement.
		Suppliers	Favourable commercial terms & condition
		STRABAG Management	Adherence to SOP
			Increase Sales Booking
	Design Development & Planning	Customer / Consultant/ PMC	Timely Submission of Technical Documents and Layouts
			Approval of basic engineering/Design Philosophy. (For design built /WMBD Projects)
			Value Engineering, Engineering Bill of Quantities.
			Timely release of GFC(Goods for Construction) Drawings , Regular Tracking of Document control Index Template & Material control Index Template.
		Suppliers	Clarity in Scope and Specification
			Adherence to SOP , Suppliers satisfaction
	Project Execution	Client / Consultant	Site Mobilisation as per Project Schedule with Site Infrastructure , Manpower , T&P , Safety , Security etc
			Micro Schedule and Resource Planning
			Daily Progress Report
			Project Milestones to be achieved
			Safety and Quality Management System
			Monthly Measurement Certification , Billing and Payments
		Suppliers	Timely Materials Inspection and Dispatch Clearance
			Timely PO amendments for extra items if any
			User Friendly Bills Registration
			Timely inspection and Dispatch clearance
			Timely Payment with details of Payments
			Schedule of Payment in case of Delay.

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Dept.	Function	Interested parties	Needs & expectations
		Labour sub contractors	Availability of approved shop drg/Technical Data sheets
			Approved work method statement
			Check list
			Timely availability of material
			Timely availability of work front at site
			Timely release of Work order
			Timely measurement certification for their executed services
			Timely approval of running bills
			Timely release of payment
		Management	Adherence to Safety and Quality Management System
			Meeting Customer requirement within Estimated Time and Cost
			Project Progress Review and Reports
			Adherence to SOP
			Statutory and Labour Compliance
			Timely Billing and Payments
			Project Closure with Completion certificate for Future Projects Qualification

Execution

Risk	Action Plan	Responsibility	Effectiveness evaluation method
Too Many Snag points after commissioning	1.Field Quality Plan to be prepared. Quality Check at regular Intervals with action points and closure of quality Observations with in specified time.	Project Manager	Reduction in no. of snag points after commissioning
	2.Review with Contractors for Quality of Workmanship. Providing Training to their Workmen for specific and critical work.	Project manager /Procurement coordinator	% of snag points completed within agreed time frame
Delay in Project Completion	3.Usage of Project Management Tools like MSP / Prima Vera for Review and Tracking	Project Manager/ Planner	% of Projects completed during financial year within contractual completion period (with EOT)
	4.Regular Contractual Correspondence for Progress , Claims , Order amendment , EOT etc.	Project Manager	
Lapses in safety	5. Safety Management Plan. Safety Awareness and Training to the entire Project Team. Weekly Safety Review	Safety Officer/PM	Review in safety parameters & reduction in hazardous condition.
	6.Periodic Safety Review by Project Manager , Safety Audit	Safety Officer/PM	
	7.Use of proper PPE & scaffoldings, etc.	Safety Officer/PM	

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PROJECT PROCESS FLOW CHART

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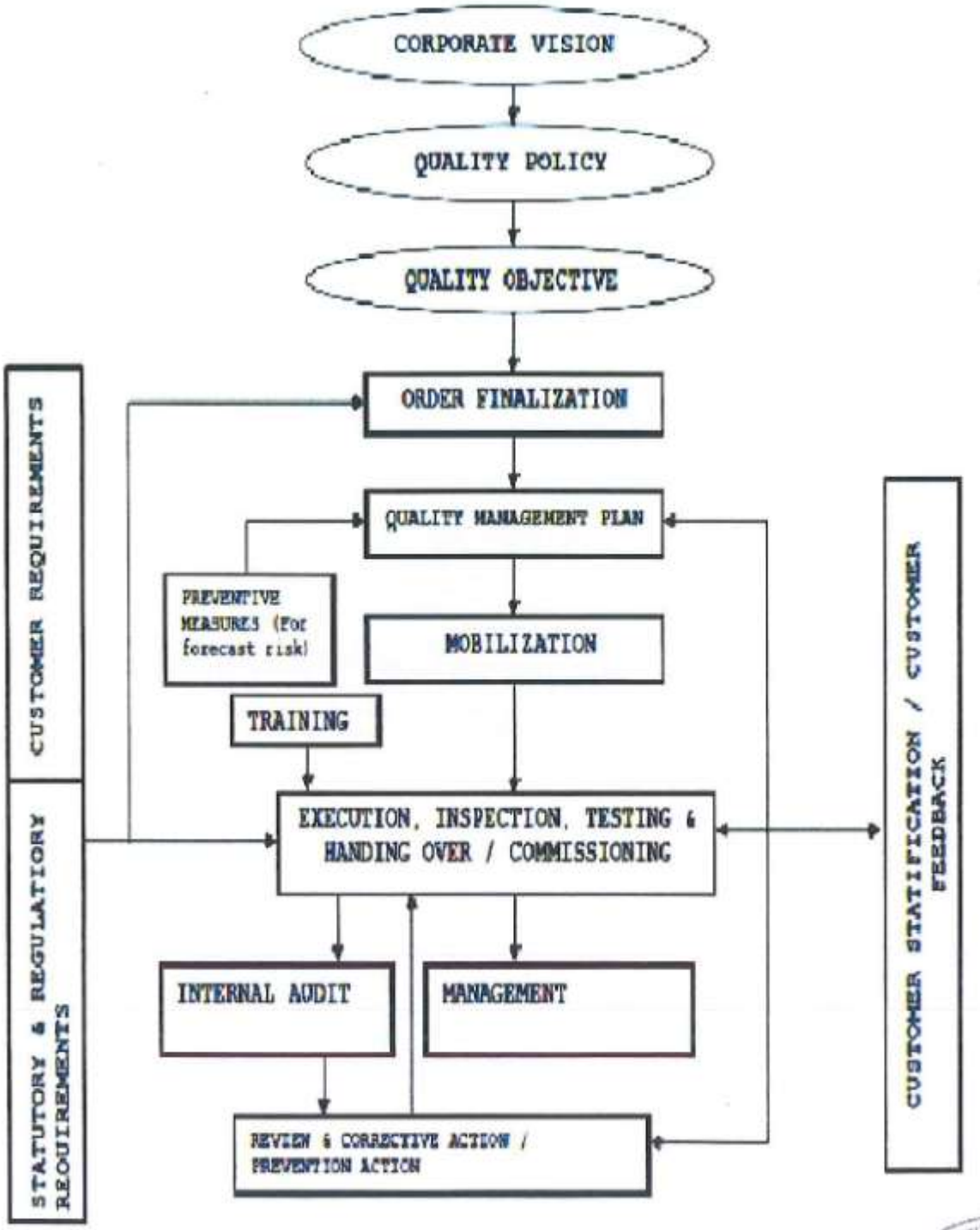

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Technical Proposal

Form SOG

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Form SoG: Schedule of Guarantee

Items/Parts of the Works for which Guarantees/ Warranties are Required	Scope and Conditions of Guarantee/Warranty Required	Guarantor/Warrantor (Manufacturer/Supplier) proposed in the Bid
1. Total Solution of Toll Management System as per the Employer's Requirement.	Period of warranty: two (2) years after the date of the Taking-Over Certificate (DLP) and 3 years of AMC after the DLP	Efkon India Pvt. Ltd.
2. Total Solution of Highway Traffic Management System as per the Employer's Requirement	Period of warranty: two (2) years after the date of the Taking-Over Certificate (DLP) and 3 years of AMC after the DLP	Efkon India Pvt. Ltd.

STRABAG Infrastructure & Safety Solutions GmbH
Ignaz-Koeck-Str. 19
1210 Wien/Österreich
www.strabag-iss.com

Tel +43 1 90199-0
Fax +43 1 90199-19
siss-office@strabag.com

Raiffeisenlandesbank Oberösterr. AG
IBAN AT91 3400 0000 0014 1317
BIC/SWIFT RZOOAT2LXXX

Sitz: Wien Handelsgericht Wien, FN 79688p UID Nr. ATU14764502

Technical Proposal

Form SPA – Spare Parts

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Form SPA: Spare Parts

- **For Toll Management System and Advanced Traffic Management System**

Required items of Spare Parts	Proposed items of Spare Parts
Minimum 1 lane spare parts, only critical spares for items like, boom barrier, profiler, WIM, SWB & IT infra.	As per proposed solution (detailed list will be shared during implementation)

- **For Construction and Electrical Works - Spares required for the smooth working of the system during DLP period are included in our bid as per the tender requirement. Detailed list of spares shall be submitted during detail engineering stage after award.**

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STRABAG Infrastructure & Safety Solutions GmbH
Ignaz-Koeck-Str. 19
1210 Wien/Österreich
www.strabag-iss.com

Tel +43 [illegible]-0
Fax +43 [illegible]-19
iss-office@[illegible].com

Raiffeisenlandesbank Oberösterr. AG
IBAN AT91 3400 0000 0014 1317
BIC/SWIFT RZOOAT2LXXX

Sitz: Wien, Handelsgericht Wien, FN 79688p, UID Nr. ATU14764502

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Technical Proposal

Form SUB

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Form SUB : Proposed Subcontractors for Major Items of the Works

The following Subcontractors are proposed for carrying out the item of the Works indicated.

Major Items of the Works/Services to be subcontracted	Proposed Subcontractors	Nationality
1. Subcontractors		
Planning, design and construction of Intelligent Transport System (ITS), Toll Management System(TMS) and Advanced Traffic Management System(ATMS)	**EFKON India Pvt. Ltd.** 1115, 11th Floor, Rupa Solitaire, Building No. A-1, Sector 1, Millennium Business Park, Mahape, Navi Mumbai 400710	India
Design and Construction of Administrative/Commercial Buildings having built up area of about 4000 sqm, including Complete Architectural, Structural, Mechanical, Electrical, Plumbing & Fire Fighting (ASMEP&F) works.	**N A Construction Pvt Ltd** 701, Headquarters, Sant Dnyaneshwar Marg, Opp. Chetana College, Bandra East, Mumbai 400 051	India
Design and Construction of 8 Nos. of toll gates including complete Architectural, Structural, Mechanical, Electrical, Plumbing and Fire Fighting (ASMEP&F) works.	**GAJRA INFRA PRIVATE LIMITED.** Plot no. 13+26, Gajra Chambers, Kamod Nagar, Mumbai Agra Road, Nashik - 422009	India
Design and Construction of 8 Nos. of toll gates including complete Architectural, Structural, Mechanical, Electrical, Plumbing and Fire Fighting (ASMEP&F) works.	**ASCENT ENGINEERS & INFRASTRUCTURES INDIA PVT LTD.** 12, 46th Street, 9th Avenue, Ashok Nagar, Chennai – 600 083	India

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