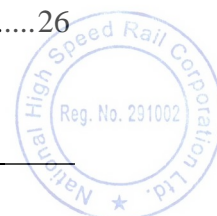


**Attachment No. 2 of Addendum No. 6**

**Appendix 08000-1: Safety, Occupational Health and  
Environment Management Manual**

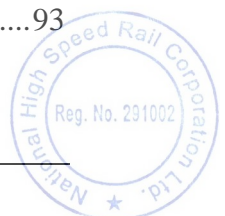
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## 1. SHE FRAME WORK

### 1.1. General

1.1.1. The Contractor shall be responsible for Safety, Health and Environment (SHE) on the Site and any other areas being used by him for the purposes of the Contract. Each Contractor shall develop his own contract specific SHE Management Plan, which will represent his approach to the management of safety on his work, sites under the Contract with the Employer.

1.1.2. The Contractor shall ensure that all appropriate SHE protection measures are implemented throughout the execution of the Works.

### 1.2. Scope

1.2.1. The Safety, Occupational Health and Environmental Management Manual defines the principal requirement of the Employer and forms an essential part of the overall Safety, Occupational Health and Environment Management System proposed to be employed by the Employer for the construction of the Project.

### 1.3. Definition

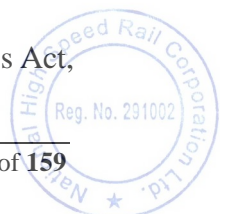
- 1) OCCUPATIONAL HEALTH & SAFETY – Conditions and factors that affect the well-being of employees, temporary workers, contractor personnel, visitors and any other person at the workplace;
- 2) ENVIRONMENT – Surroundings in which an organization operates, including air, water, land, natural resources, flora, fauna, humans, and their interaction;
- 3) ENVIRONMENT ASPECT – Element of an organization’s activities or products or services that can interact with the environment;
- 4) ENVIRONMENT IMPACT – Any change to the environment, whether adverse or beneficial, wholly or partially resulting from an organization’s environmental aspects;
- 5) HAZARD – Source, situation, or act with a potential for harm in terms of human injury or ill health or a combination of these;
- 6) Ill Health – Identifiable, adverse physical or mental condition arising from and/or made worse by a work activity and/or work-related situation;
- 7) Incident – Work related event (s) in which an injury or ill health (regardless of severity) or fatality occurred, or could have occurred:
  - “Accident” is an incident which has given rise to injury, ill health or fatality;
  - “Emergency” is an incident having potential to affect many persons or severe

property damage;

- “Near Miss” is an incident or a situation with clear potential for an undesirable outcome to occur, even though no actual negative consequences happened. In other words, it is an event with potential to cause injury, property damage, environmental release or an adverse community reaction; and
  - “Dangerous Occurrence” is an unplanned and undesired occurrence (incident) which has the potential to cause injury and which may or may not cause damage to property, equipment or the environment.
- 8) **AUDIT** – Systematic examination to determine whether activities planned are implemented effectively and related results are suitable for achieving the organization policy and objectives;
  - 9) **INTERESTED PARTIES** – Individual or group concerned with or affected by the SHE Management Performance of an Organization;
  - 10) **NON-CONFORMITY** – Any deviation from work standards, practices, procedures, regulations, management system performance, etc. that could either directly or indirectly lead to injury or illness, property damage, damage to workplace environment, or a combination of these;
  - 11) **OBJECTIVES** – Goals in terms of SHE Management Performance that an organization sets itself to achieve;
  - 12) **SHE MANAGEMENT SYSTEM** – Parts of overall management system that facilitates the management of the SHE risks associated with the business of the organization. This includes the organizational structure, planning activities, responsibilities, practices, procedures, processes and resources for developing, implementing, achieving, reviewing and maintaining the organization’s SHE Management Policy;
  - 13) **ORGANIZATION** – Company, operation, firm enterprise, institution or association, or part thereof, whether incorporated or not, public or private, that has its own functions and administration;
  - 14) **PERFORMANCE** – Measurable results of the SHE Management System, related to the organization’s control on environment, health and safety risks, based on its SHE Management Policy and objectives;
  - 15) **RISK** – Combination of the likelihood and consequences of a hazardous event occurring;
  - 16) **RISK ASSESSMENT** – Overall process of establishing the magnitude of risk and deciding whether the risk is tolerable;
  - 17) **ACCEPTABLE RISK** – Risk that has been reduced to a level that can be tolerated by the organization having regard to its legal obligations and its own SHE Policy;
  - 18) **DEVIATION** – Is defined as something not in compliance with quality standard, specification or measuring requirements, or as deviations from specified procedures or way of working within production, environment, working environment (safety) or security;



- 19) CORRECTIVE ACTION – Action taken to eliminate the causes of an existing non-conformity, defect or other undesirable situation;
- 20) PREVENTIVE ACTION – Action taken to eliminate the causes of a potential non-conformity, defect or other undesirable situation to prevent occurrence or recurrences;
- 21) ENGINEER – Employer’s Representative
- 22) ENVIRONMENT RELATED DEFINITIONS:
- “Waste” is unwanted surplus substance arising from the application of all construction operations and any substance or article, which is required to be disposed;
- 23) Abbreviation
- “Suspended Particulate Matter” is abbreviated as SPM;
  - “Environmental Quality Management Manual” is abbreviated as EQM;
  - “Air Monitoring and Control Plan” is abbreviated as AMCP;
  - “Noise Monitoring and Control Plan” is abbreviated as NMCP;
  - “Ministry of Env. And Forests, Government of India” is abbreviated as MOEF;
  - “Central Pollution Control Board” is abbreviated as CPCB;
  - “SHE” means Safety, Occupational Health and Environment;
  - “National High Speed Railway Corporation Limited” is the Employer abbreviated as NHSRCL;
  - “Chief SHE Officer” is an officer approved by the Engineer who is overall responsible for monitoring all SHE functions prescribed in this document on behalf of the Contractor;
  - “BOCWA” is Building and Other Construction Workers (Regulation of Employment and Conditions of Service) Act, 1996 and amendment done thereafter;
  - “BOCWR” is Building and Other Construction Workers (Regulation of Employment and Conditions of Service) Central Rules, 1998 and amendment done thereafter or The Gujarat Building and Other Construction Workers (Regulation of Employment and Conditions of Service) Rules, 2003 or The Maharashtra Building and Other Construction Workers (Regulation of Employment and Conditions of Service) Rules and amendment done thereafter, which ever is applicable.
  - “BOCWWCA” is Building and Other Construction Workers’ Welfare Cess Act,



1996;

- “BOCWWCR” is Building and Other Construction Workers’ Welfare Cess Rules, 1998;
- “CIIBOC” is the Chief Inspector of Inspection of Building and Other Constructions of Government of Gujarat/Maharashtra;
- “HIRA” is Hazard Identification and Risk Assessment; and
- “The Worker” is the Building and Other Construction Worker defined by BOCW.

#### **1.4. Application and Purpose of This Document**

- 1.4.1. This document applies to all aspects of the Contractor’s Scope of Work including all aspects conducted by the Subcontractors and all other agencies. There shall be no activity associated to the Contract, which is exempted from the purview of this document.

### **2. SHE MANAGEMENT**

#### **2.1. General**

- 2.1.1. This document defines the principal requirements to be practiced at the Site at all times. The Contractor’s project manager shall hold the ultimate responsibility in ensuring implementation of SHE Management system during the construction work.

#### **2.2. SHE Targets and Goals**

- 2.2.1. SHE Targets and Goals to be set and achieved by the Contractor/Subcontractor based on time bound work plan:

- 1) Zero total recordable injuries;
- 2) Zero reportable environmental incidents;
- 3) Total compliance of conducting inspections and audits as per approved SHE Management Plan;
- 4) 100% incident recording and reporting;
- 5) 100% adherence to usage of appropriate PPEs at work; and
- 6) Executing construction work with least disturbance to the environment, adjoining road users and traffic.

#### **2.3. Contractors Obligation to Abide by Mandatory Standard**





- 2.3.1. The construction works shall be undertaken in accordance with the Employer's SHE Management Policy and Management Systems as amended from time to time provided in SHE Management Manual.
- 2.3.2. Contractor shall prepare safe work method statement for every critical activity and get it approved by Engineer prior to the construction work. The list of critical activity shall be submitted by the Contractor and approved by the Engineer. The method statement shall contain work description, resource required, roles and responsibility of personal, HIRA, emergency response etc.
- 2.3.3. Every contractor shall refer to ISO Literature listed below during the currency of the Contract:
- 1) ISO 9001:2015: Quality Management System;
  - 2) ISO 45001:2018: Occupational Health and Safety Management System; and
  - 3) ISO 14001:2015: Environmental Management System.

#### **2.4. Contractors SHE Management Policy and Plan**

- 2.4.1. The Contractor as per BOCWR, shall formulate SHE management policy and plan and get it approved by Engineer and Director relevant authorities. The Contractor shall display approved SHE Policy at conspicuous places at the Site in Hindi and languages understood by most of the Workers.
- 2.4.2. The Contractor shall revise and submit the SHE Management Plan if at any time the SHE Management Plans is insufficient in the Engineer's opinion. The Contractor shall within 7 days submit the revised SHE Management Plan to the Engineer for review.
- 2.4.3. Any omissions, inconsistencies and errors in the SHE Management Plan or the Engineer's acceptance or rejection of the SHE Management Plan and/or supplements thereto shall be without prejudice to the Contractor's obligations with respect to site safety, industrial health and environment and shall not be excused for any failure by the Contractor to adopt proper and recognized safety practices throughout the execution of the Work. The Contractor shall adhere to the SHE Management Plan and shall ensure, as far as practically possible, that all supervisors and subcontractors of all tiers each have a copy of the SHE Management Plan on the Site and comply with its provisions.
- 2.4.4. The details of contents to be covered in the SHE Management Plans are given in Attachment -1[Contents of SHE Management Plan] of this document.

#### **2.5. Designers Role**

- 2.5.1. The Designer's primary role includes to minimize the risk to safety and health of those who are going to construct, maintain, clean, repair, dismantle or demolish the

structures and anyone else like adjoining road users/public, who might be affected by the work.

- 2.5.2. Every temporary structure like scaffold, temporary deck, launching girders, earth retaining structures etc. shall be properly designed and shall have its design calculations proof checked by third party and submitted to Engineer along with the relevant certificate.

## **2.6. Site SHE Organisation**

- 2.6.1. The Contractor shall appoint the required SHE Management Personnel as prescribed in Clause 8. Attachment-3[General Instruction: SHE/GI/001].

- 2.6.2. The Contractor shall provide all SHE Management Personnel with such facilities, equipment and information that are necessary to enable him to discharge his duties effectively. The minimum Employer's Requirements of such facilities/equipment to be provided for SHE Management Personnel are given in Attachment-3[General Instruction: SHE/GI/003].

## **2.7. Responsibility of SHE Personnel**

- 2.7.1. PICOW (Person In-Charge of Work)

- 2.7.1.1. "Person in Charge of Work" under whose supervision, the Workers operate as per approved method statement and SHE Management Manual.

- 2.7.1.2. PICOW shall lead/supervise and direct the Workers to undertake the work in a safe manner.

- 2.7.1.3. Each Request for Inspection (RFI) must indicate the name of PICOW for that work.

- 2.7.2. Responsibility of a PICOW

PICOW shall ensure that:

- 1) A safe system of work is adopted;
- 2) Everyone in the group is briefed and understand the system of work before work starts;
- 3) The current system of work is altered whenever there is any change in conditions or circumstances makes it necessary and ensure that everyone understands the new arrangements; and
- 4) The work is stopped, and everyone moved to a position of safety immediately if there is any doubt whether the work may safely continue.



2.7.3. All SHE Management Personnel are to report to the Chief SHE Officer who shall always report directly to the Contractor's project manager. Their primary role is to oversee safety at work site. The Engineer shall monitor adherence to this procedure always. In case of non-adherence penalty shall be levied.

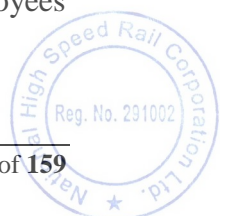
## 2.8. SHE Committee

2.8.1. The Contractor shall form Project SHE Committee and Site SHE Committee and conduct Monthly Meetings for both.

2.8.2. The Terms of Reference for both the committee shall be as follows:

- 1) To oversee implementation of company safety policies and practices;
- 2) To monitor the adequacy of the contractor's SHE management plan and ensure its implementation;
- 3) To review SHE training;
- 4) To review the monthly contractor SHE reports;
- 5) To identify probable causes of accident and unsafe practices in construction work and to suggest remedial measures;
- 6) To stimulate interest of the employer and the workers in safety by organizing safety week, safety competition, talks and film-shows on safety, preparing posters or taking similar other measures as and when required or as necessary;
- 7) To go around the site with a view to check unsafe practices and detect unsafe conditions and to recommend remedial measures for their rectifications including first-aid medical and welfare facilities;
- 8) Committee team members shall perform a site inspection before every committee meeting and to monitor SHE inspection reports;
- 9) To bring to the notice of the employer regarding the hazards associated with use, handling and maintenance of the equipment used during the course of construction work;
- 10) To suggest measures for improving welfare amenities in the site and other miscellaneous aspect of safety, health and welfare in construction work;
- 11) To investigate the health hazards associated with handling different types of explosives, chemicals and other construction materials and to suggest remedial measures including personal protective equipment; and
- 12) To review the last safety committee meeting minutes and to act against the subcontractors for non-compliance if any.

2.8.3. Within 60 days of award of the Contract, the SHE Committee shall be constituted and notification regarding the same shall be communicated to the members and employees as per the format.



2.8.4. Project SHE Committee meeting shall be conducted at least once in a month with the minimum members listed below:

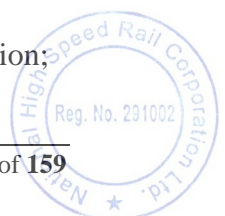
Chairman	Project Director
Secretary	Chief SHE Officer (In-charge)
Members	i) Labour Welfare Officer; ii) In charge of Plant and Machinery & Site Electricals; iii) In charge of Special Work Operations (e.g. bridge, viaduct, and building, etc.); iv) In charge of Stores; v) Senior Managers/Engineers heading different sub functions; vi) Subcontractor’s representative; vii) Labour contractor’s representative; viii) Workers’ representative; and ix) Co-contractor representative SHE staffs.
Employer’s Representatives	The Engineer SHE in charge and other representatives

2.8.5. Site SHE Committee meeting shall be conducted at least once in a month with the minimum members listed below:

Chairman	Project Manager
Secretary	Sr. SHE Manager (In-charge)
Members	i) Labour Welfare Officer; ii) In charge of Plant and Machinery & Site Electricals; iii) In charge of Special Work Operations (e.g. bridge, viaduct, and building, etc.); iv) In charge of Stores; v) Senior Managers/Engineers heading different sub functions; vi) Subcontractor’s representative; vii) Labour contractor’s representative; viii) Workers’ representative; and ix) Co-contractor representative SHE staffs.
Employer’s Representatives	The Engineer SHE in charge and other representatives

2.8.6. The agenda shall broadly cover the following:

- 1) Confirmation of minutes;
- 2) Chairman’s review/overview of site SHE Management Performance/condition;



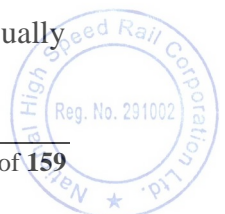
- 3) Previous month SHE statistics;
  - 4) Incident and accident investigation/Dangerous occurrence/Near miss report;
  - 5) Site SHE inspection;
  - 6) The Subcontractors' SHE issues;
  - 7) Safety presentation by members; and
  - 8) Report from the Employer and Engineer.
- 2.8.7. In case of depot, station and other contiguous areas where more than one main contractor is working together, the Employer shall instruct the other contractors to join for the monthly SHE committee meeting of the main civil contractor, to discuss and decide about the common provision of safety, security, lighting, toilet, drinking water etc. and sharing the maintenance cost of the same etc.
- 2.8.8. The Minutes of the Meeting shall be prepared as per the format provided and sent to all members within 2 working days preferably by mail/fax followed by hardcopy. Safety Committee Meeting Minutes shall also be displayed in the notice board for wider publicity to all concerned.
- 2.8.9. The chairman shall inform the members of any outstanding issues in the meeting and in case of repeated offence/ non-compliance by some members or other Subcontractors and propose suitable disciplinary action including provisions of monetary penalty as per Clause 7. [Financial Deduction/Withholding].
- 2.9. ID Card and Safety Induction**
- 2.9.1. The Contractor shall ensure that all personnel working at the Site receive an induction SHE training explaining the nature of the work and likely hazards. The training shall cover the relevant contents as given in Attachment-3[General Instruction: SHE/GI/006].
- 2.9.2. All personnel shall be issued a photo identity card as per the format given in Attachment-3[General Instruction: SHE/GI/005].
- 2.9.3. The Contractor shall also issue a SHE Booklet in a language known to the Workers, which provides information on SHE and emergency procedures.
- 2.10. Other SHE Training**
- 2.10.1. Guideline Manual: Final Report on the Study of Safety Management for Construction Work in Japanese ODA Project -Workers' Training Materials for Hazard Protection, February 2012, a JICA publication-Link: [https://www.jica.go.jp/english/our\\_work/types\\_of\\_assistance/c8h0vm00008zx0m8-att/guidance\\_en.pdf](https://www.jica.go.jp/english/our_work/types_of_assistance/c8h0vm00008zx0m8-att/guidance_en.pdf).



- 2.10.2. The Contractor shall organize the SHE training to engage managers, supervisors and other personnel in behavioural change and improve safety performance. The contents of SHE training to manager/supervisors as given in the attachment-3[General instruction: SHE/GI 004 and SHE/GI/006].
- 2.10.3. The Contractor shall provide a training/workshop on SHE to all its workers/staff/employees/subcontractors of at least 2 days. It shall be completed in various modules and each employee/worker shall have a record of completing all modules.
- 2.10.4. On-the spot practical skill development training on height safety including scaffold safety, crane safety, welding safety, electrical safety, and traffic safety for marshals shall also be conducted.
- 2.10.5. Every employee including workman shall take a safety oath followed by tool box talk every day.
- 2.10.6. All vehicles and machine drivers including heavy work vehicle and machine operators shall be trained on defensive driving with necessary certificate or license.

## **2.11. SHE Inspection**

- 2.11.1. The purpose of SHE inspection is to identify any deviation in construction activities and operations, machineries, plant and equipment and processes against the SHE Management Plan and its supplementary procedures and programs.
- 2.11.2. The Contractor shall initiate a weekly joint site SHE Management inspection with the Engineer and report shall be generated on the same day with the corrective action and accepted target date (within a week) by the Engineer.
- 2.11.3. The Compliance of the joint inspection “Non- Conformances” shall be witnessed/accepted by the Engineer.
- 2.11.4. The Contractor shall evolve and administer a system of conducting SHE inspection and other risk management analysis on a periodical basis.
- 2.11.5. Following SHE inspections program shall be adopted:
- 1) Planned general inspection;
  - 2) Routine inspection;
  - 3) Specific inspection; and
  - 4) Other inspection.
- 2.11.6. Planned general inspections are performed at predetermined intervals and it usually



involves the representation from both the Contractor and the Engineer.

Inspections that will be classified under this inspection program are:

- 1) Monthly contractor and subcontractor's site safety committee inspection;
- 2) Weekly safety inspection by construction supervisors (the Contractor and the Subcontractor); and
- 3) Daily safety inspection by the Contractor site SHE team.

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

Inspections that will be classified under this inspection program are:

- 1) Daily inspection of plant and equipment by operators;
- 2) Weekly inspection of scaffold by scaffolding supervisors;
- 3) Monthly Inspection of electrical hand tools by competent electrical supervisors;
- 4) Quarterly inspection of temporary electrical systems by competent electrical supervisors; and
- 5) Half-yearly inspection of lifting machinery, lifting appliances, equipment and gears by Govt. approved competent persons.

2.11.8. The list mentioned above is not exhaustive. The Contractor may add additional categories. The Chief SHE Officer will ensure that a system of routine inspections is carried out periodically to all plants, equipment, powered tools and any other temporary structures that will pose a hazard to operators and workmen.

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

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

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

2.11.10. The list mentioned above is not exhaustive. The Contractor shall ensure that a competent supervisor inspects all high-risk processes and activities.

2.11.11. Other inspections include the following:





- 1) Mandatory inspections by Labour Department of Government; and
  - 2) NHSRCL site SHE management team.
- 2.11.12. The Contractor shall prepare all required safety inspection checklist for all activity operations and equipment. Checklists will be prepared based on the Indian Safety Standards, Rules and Regulations and the Employer's requirements.
- 2.11.13. All inspection records and reports will be properly kept and filed for audit purpose. Inspection reports of planned general inspection and routine inspection will be used for discussion during safety committee meetings.

## **2.12. SHE Audit**

### **2.12.1. General**

2.12.1.1. The purpose and scope of SHE Audit is to assess potential risk, liabilities and the degree of compliance of the SHE Management Plan and its supplementary procedures and programs against applicable and current SHE legislation regulations and the Employer's requirements.

2.12.1.2. The Contactor's project manager shall hold the ultimate responsibility in ensuring implementation of SHE audit program during the construction work.

### **2.12.2. Monthly Audit Rating Score (MARS)**

2.12.2.1. Monthly Audit Rating Score (MARS) will be performed once in a month. A team consisting of the Contractor's project manager and the Engineer's representative based on the pre-designed score-rating format will conduct it. The details of the pre-designed monthly audit score rating formats are given in the SHE Management Manual.

2.12.2.2. This Monthly SHE Audit Rating Score (MARS) report will enable the Engineer to evaluate the general compliance by the Contractor with the Conditions of Contract, and the SHE Management Plan.

2.12.2.3. The Contractor's project manager accompanied by the Engineer's representatives shall carry out the Audit. The Contractor's senior manager and the SHE In-Charge shall also be invited to attend.

### **2.12.2.4. Timing**

The Monthly Audit Rating Score (MARS) shall be conducted at least 7 days prior to the scheduled date of monthly SHE Committee Meeting.

### **2.12.2.5. Evaluation**





The numerical scoring has been weighed on a 1-10 scale. The audit team will use their observations noted in evaluating the points to be awarded against each of the elements of the audited section. Wherever some topics and sub-topics are not applicable the score rating need not be given. The overall audit ratings shall be achieved by:

$$\text{Overall Audit rating} = \frac{\text{Actual Score Achieved}}{\text{Maximum Possible Score}} \times 100$$

The criticality of the required actions for the respective sections of the Audit will be classified as:

Sl.No.	Score	Description	Action
1	< 60%	Immediate	Require the Contractor to rectify within 24 hours
2	< 75%	Improvement Necessary	The Contractor rectification within 7 days and confirmed in writing to the Engineer
3	< 90%	Improvement Desirable	The Contractor rectification within 1 month and confirmed in writing to the Engineer

#### 2.12.2.6. Report

A copy of each Audit Report will be sent to the Engineer and to all subcontractors, with whom it will then be discussed in detail at the monthly SHE Committee Meeting to ensure that any corrective actions are agreed upon.

#### 2.12.3. Monthly Electrical Safety Audit

A team comprising of contractor's senior SHE (Electrical) engineer and the Engineer's representative shall conduct Monthly Electrical Safety Audit covering the following and submit the report to the Engineer:

- 1) Electrical accidents investigation findings and remedy;
- 2) Adequacy of power generation and power requirements;
- 3) Power distribution and transmission system in place;
- 4) Updated electrical single line diagram showing the current condition of power source and distribution including the IP44 DBs arrangement;
- 5) Electrical protection devices – selection, installation and maintenance;
- 6) Earth or ground connection and earth pit maintenance details;
- 7) Education and training of electrical personnel undertaken;
- 8) Routine electrical inspection details;
- 9) Electrical maintenance system and register;



- 10) Name plate details of major electrical equipment; and
- 11) Classified zones in the site, if any.

#### 2.12.4. External SHE Audit

External SHE Audit is to be conducted by the external agencies that are competent with ISO qualified auditors with the prior approval of the Engineer.

##### 2.12.4.1. Areas of Competence of Audit Team

Practical understanding of BOCWR/A statutory requirements on health/medical and welfare of workmen, construction hazards and its prevention and control, traffic management, electrical safety, rigging, safety of construction equipment and environment management:

- 1) Audit shall be conducted as per the guidelines of ISO, ILO, and national standards. Audit report shall also be presented as per the above formats; and
- 2) External SHE Audit shall be conducted on a quarterly basis throughout the currency of the Contract.

##### 2.12.4.2. Targets of SHE Audit:

The contents and coverage of the audit shall include the following items.

##### 2.12.4.3. SHE Management:

- 1) Organization;
- 2) Communication and motivation;
- 3) Office hour;
- 4) Inspection;
- 5) Emergency preparedness;
- 6) Budget allocation;
- 7) Education and training; and
- 8) Work permit system.

##### 2.12.4.4. Technical:

- 1) Building and structure;
- 2) Construction operational safety;
- 3) Material safety;



- 4) Hand tools and power tools;
- 5) Electrical system;
- 6) Safety appliances;
- 7) Fire prevention and control;
- 8) Housekeeping;
- 9) Maintenance and machinery safety;
- 10) First-aid and medical facilities;
- 11) Welfare measures; and
- 12) Environmental management.

#### 2.12.4.5. Audit Documents:

The Contractor shall make the below itemized documents available for the review by the Audit team;

- 1) SHE Policy;
- 2) SHE Management Manual;
- 3) SHE rules and regulation;
- 4) SHE organization chart;
- 5) Annual SHE objectives/programs;
- 6) Accident/near miss statistics and analysis;
- 7) SHE training program/records for all personnel;
- 8) Operating manuals and maintenance manual of all equipment;
- 9) Safe worthiness certificates of all lifting appliances and gears;
- 10) Medical fitness record for all personnel;
- 11) Risk identification, Assessment and Control details;
- 12) Environmental management reports; and
- 13) Emergency management records including mock drill.

#### 2.12.4.6. Reporting

Audit report shall be prepared and directly sent to the Engineer within 7 days of conducting the audit.

#### 2.12.4.7. Report Contents:



- 1) Executing Summary - based on the finalized checklists as written the findings to the Engineer by the audit team members, the audit leader will compile a concise and accurate summary of observations and findings;
- 2) Introduction - this will contain basic information regarding the facilities or organization audited, the specific audit dates (inclusion of those for preparation and post-audit activities);
- 3) Principal Positive Findings - This will contain the summary of positive aspects as observed by the auditors. It will also contain highlights of those issue, which may warrant dissemination as best practice regarding methodology used or achievement;
- 4) Audit Findings - All audit findings as detailed in the audit checklists shall be grouped together as priority 1 and 2 as detailed below in a separate listing:
  - a) Priority 1: Actions to rectify gaps or weakness shall generally be implemented within two-week time if risk potential is high or unacceptable; and
  - b) Priority 2: Actions shall be generally implemented or rectified with a maximum of three to four weeks, if not rectified would create a likelihood of minor injury or business loss.

#### 2.12.4.8. Conformity Report Action by the Engineer:

- 1) The auditor shall inspect the site after 14 days of conducting initial audit for checking the adequacy of implementation of items maintained under priority 1 by the Contractor and shall submit a Conformity/Non-conformity Report to the Engineer;
- 2) The auditor shall again inspect after 28 days of conducting initial audit for checking the adequacy of implementation of items mentioned under priority 2 by the Contractor and shall submit a Conformity/Non-conformity Report to the Engineer; and
- 3) In case of non-conformity of items mentioned by auditor, the Engineer shall take necessary steps including stoppage of work and or imposing any penalty for getting the item implemented.

2.12.4.9. If the Contractor fails to conduct the External SHE Audit in time, the Engineer shall get it done and penalty shall be imposed as per Clause 7.2/ Table 2/ SI No.7.

2.12.4.10. All expenses related to the external SHE audits shall be borne by the Employer.

### 2.13. SHE Communication

- 2.13.1. The Contractor shall take every effort to communicate the SHE Management measures through posters campaigns/billboards/banners/glow signs being displayed around the Site as part of the effort to rise safety awareness amongst to the work force. Posters shall be in Hindi, English and other suitable language deemed appropriate.

Posters/billboards/ banners/glow signs shall be changed at least once in a month to maintain the impact.

2.13.2. The Contractor shall also observe important days as listed in Attachment-3[General Instruction: SHE/GI/007] and printing and displaying safety signage and posters as listed in Attachment-3[General Instruction: SHE/GI/008].

## 2.14. SHE Submittals

2.14.1. The Contractor's SHE Management shall send the following reports to the Engineer periodically:

- 1) Daily reporting of total number of workmen;
- 2) Monthly SHE reports;
- 3) SHE committee meeting minutes;
- 4) SHE inspection reports;
- 5) SHE audits reports;
  - Monthly Audit Rating Score (MARS) reports;
  - External SHE audits;
  - Electrical Safety audits; and
- 6) Environment Quality Monitoring (EQM) reports.

2.14.2. The Contractor shall report to the Engineer the total number of workmen engaged by all including any Subcontractor within 2 hours of starting of any shift in any day. This daily reporting shall be the primary duty of the Chief SHE Officer and reporting shall be through tele-fax/email.

2.14.3. The Contractor shall prepare a Monthly SHE Report consisting of the following and submit 3 copies within 7th of next month to the Engineer as specified in the SHE Management Manual:

- 1) Monthly man-hour details as specified in the SHE Management Plan;
- 2) Monthly accident/incident details as specified in the SHE Management Plan;
- 3) SHE committee details;
- 4) Details of SHE training conducted in the month;
- 5) SHE inspection;
- 6) SHE internal audit details like electrical audit etc.;
- 7) SHE communication activities under taken in the month indicating the number of posters displayed and balance availability in stock;

- 8) Air quality/Noise monitoring details;
- 9) Toolbox talks details;
- 10) PPE details: Quantity purchased, issued to the workmen and stock available;
- 11) Details on IP 44 panel boards, lighting poles, welding and cutting equipment, Ladders, Hoists, Tools & Tackles;
- 12) Monthly lux meter study results;
- 13) Housekeeping;
- 14) Barricade maintenance details;
- 15) No of critical excavations;
- 16) Health and welfare activities;
- 17) Safety patrol conducted by the Contractors' project manager in the month; and
- 18) SHE activities planned for next month.

## **2.15. Accident Reporting and Investigation**

- 2.15.1. All accidents and dangerous occurrences shall immediately be informed through message to the Engineer and the Employer. This will enable the Engineer to reach to the scene of accident/dangerous occurrences to monitor/assist any rescue work and/or start conducting the investigation process so that the evidences are not lost.
- 2.15.2. Reports of all accidents (fatal/injury) and dangerous occurrences shall also be sent within 24 hours by the Contractor.
- 2.15.3. No accident/dangerous occurrences are exempted from reporting to the Employer.
- 2.15.4. Any wilful delay in verbal and written reporting to the Employer and Engineer shall be penalized as per Clause 7. [Financial Deduction/Withholding].
- 2.15.5. In addition to the above verbal and written reporting to the Employer and Engineer, as per BOCWR, notice of any accident at the Site that:
  - 1) Causes loss of life; or;
  - 2) Disables a worker from working for a period of 48 hours or more immediately following the accident;
  - 3) Shall forthwith be sent by telegram, telephone, fax, or similar other means including special messenger within 4 hours in case of fatal accidents 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; and
- The Director General of Government of Gujarat/Maharashtra and the next of kin or other relative of the Worker involved in the accident.

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

- 1) Causes loss of life; or;
- 2) Disables the injured worker from work (for a period of more than 10 Days) to;
  - The Officer-in-charge of the nearest police station;
  - The District Magistrate or, if the District Magistrate by order so desires; to
  - The Sub-Divisional Magistrate.

2.15.7. 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.

2.15.8. Where any accident causing disablement that subsequently results in death, notice in writing of such death, shall be sent to the authorities within 72 hours of such death.

2.15.9. The following classes of dangerous occurrences shall be reported to the inspector having jurisdiction, whether any disablement or death caused to the Worker, namely:

- 1) 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;
- 2) Falling of objects from height;
- 3) Collapse or subsidence of soil, tunnel, pipe lines, any wall, floor, gallery, roof or any other part of any structure, launching girder, platform, staging, scaffolding or means of access including formwork;
- 4) Explosion of receiver or vessel used for storage of pressure greater than atmospheric pressure of any gas or any liquid or solid used as building material;
- 5) Fire and explosion causing damage to any place on the Site where the Workers are employed;
- 6) Spillage or leakage of any hazardous substance and damage to their container;
- 7) Collapse, capsizing, toppling or collision of transport equipment; and



8) Leakage or release of harmful toxic gases at the Site.

2.15.10. In case of failure of launching girder, lifting appliance, loose gear, hoist machinery and transport equipment at the Site, such appliances, gear, hoist, machinery or equipment and the site of such occurrence shall, as far as practicable, be kept undisturbed until inspected by the authorities.

2.15.11. 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 of Government of Gujarat/Maharashtra in the specified Forms of BOCWR.

2.15.12. Accident Investigation:

- 1) Investigations shall 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;
- 2) Accidents and dangerous occurrences which result in death, serious injury or serious damage must be investigated by the Contractor immediately to find out the cause of the accident/occurrence so that measures can be formulated to prevent any recurrence; and
- 3) Near misses and minor accidents shall also be investigated by the Contractor as soon as possible as they are signals that there are inadequacies in the SHE Management System.

2.15.13. Procedure of Incident Investigation

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:

- 1) Take photographs and make sketches;
- 2) Examine involved equipment, work place or material and the environmental conditions;
- 3) Interview the injured, eye-witnesses and other involved parties;
- 4) Consult expert opinion where necessary; and
- 5) Identify the specific contractor or subcontractor involved.

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

- 1) Establish the chain of events leading to the accident or incident;
- 2) Find out at what stage the accident took place;
- 3) Considering 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 shall



never be classified as carelessness; and

- 4) The specific act or omission that caused the accident must be identified.

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

- 1) Report on the findings and conclusions;
- 2) Formulate preventive measures to avoid recurrence; and
- 3) Publicize the findings and the remedial actions taken.

2.15.16. The Engineers' Independent Incident Investigation

In case of fatal/dangerous occurrence, the Engineer shall also conduct independent investigation. The Contractor and his staff shall extend necessary co-operation and testify about the accident.

2.15.17. The Contractor shall take every effort to preserve the scene of accident till the Engineer completes the investigation.

2.15.18. All persons summoned by the Engineer in connection to witness recording shall obey the instructions without delay. Any wilful suppression of information by any person shall be removed from the site immediately and/or punishable as per Clause 7. [Financial Deduction/Withholding].

## **2.16. Emergency Preparedness Plan**

2.16.1. The Contractor shall prepare as required under BOCW Act & Rules, an Emergency Response Plan for all Sites as a part of the Contractor SHE Management Plan. The plan shall integrate the emergency response plans of the Contractor and all other subcontractors. The Emergency Response Plan shall detail the Contractor's procedures, including detailed communication arrangements, for dealing with all emergencies that could affect the Site. This include where is applicable, such as injury, sickness, evacuation, fire, chemical spillage, severe weather and rescue.

2.16.2. The Contractor shall ensure that the Emergency Response Plan is prepared to deal with emergencies arising out of but not limited to:

- 1) Fire and explosion;
- 2) Collapse of lifting appliances and transport equipment;
- 3) Collapse of building, sheds or structure etc.;
- 4) Gas leakage or spillage of dangerous goods or chemicals;
- 5) Bomb threatening, Criminal or Terrorist attack;
- 6) Drowning of workers; and



- 7) Landslides getting workers buried floods, earthquake, storms and other natural calamities etc.
- 2.16.3. Arrangement shall be made for emergency medical treatment and evacuation of the victim in the event of an accident or dangerous incident occurring, the chain of command and the responsible persons of the Contractor with their telephone numbers and addresses for quick communication shall be adequately publicized and conspicuously displayed in the workplace.
- 2.16.4. The Contractor shall require to tie-up with the hospitals and fire stations located in the neighbourhood for attending to the casualties promptly and emergency vehicle kept on standby duty during the working hours for the purpose.
- 2.16.5. The Contractor shall conduct an onsite emergency mock drill once in every month for all his workers and his sub-contractor's workers.
- 2.16.6. It shall be the responsibility of the Contractor to keep the Local Law and Order Authorities informed and seek urgent help to mitigate the consequences of an emergency. Prompt communication to the Employer and Engineer, through telephonically initially and followed by a written report, shall be made by the Contractor.

### **3. LABOUR PROTECTION**

#### **3.1. General**

- 3.1.1. The Contractor shall comply in full of the project Workplace Policy as described in Attachment-2[Work Place Policy (on HIV/AIDS Prevention & Control)].

#### **3.2. Engagement of Staff and Labour**

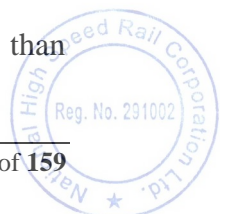
- 3.2.1. The Contractor shall ensure that the employees deployed by him in the premises of the Employer are physically and mentally fit and do not have any criminal record.

#### **3.3. Payment of Wages**

- 3.3.1. The Contractor shall ensure payment of at least the minimum wages as prescribed and applicable from time to time under the Minimum Wages Act, 1948 in the presence of an authorised representative of the Engineer and shall maintain proper records of their timely disbursement. These records shall be preserved for a period of at least 3 years and made available even after the Contract is over for any verification by the statutory authorities.

#### **3.4. Conditions of Labour**

- 3.4.1. The Contractor shall observe conditions of labour that are no less favourable than



those established for the relevant trade or industry, and which at least comply with model standing orders provided under the Industrial Employment (Standing Orders) Act, 1946.

- 3.4.2. During the work, the Contractor shall afford all employees all basic rights enumerated in the conventions of the International Labour Organisation, including freedom of association, right to freedom from forced labour, and right to freedom from discrimination based on race, colour, sex, religion, political opinion and social origin.
- 3.4.3. The Contractor shall ensure coverage of his employees under the Employees Provident Fund and Miscellaneous Provisions Act, 1952 and the Employees State Insurance Act, 1948 via independent code numbers allotted to him by the Central Provident Fund Organisation and Employees State Insurance Corporation respectively.
- 3.4.4. The Contractor shall insure all his employees under Group Personal Accident Insurance scheme through a recognised and registered insurance company.

### **3.5. Labour Laws**

- 3.5.1. The Contractor shall ensure that all his employees and the Subcontractors obey applicable the following laws and regulations, including those concerning safety at work.
- 1) Minimum Wages Act, 1948;
  - 2) Payment of Wages Act, 1936;
  - 3) Equal Remuneration Act, 1976;
  - 4) Employees Provident Fund and Miscellaneous Provisions Act, 1952;
  - 5) Payment of Gratuity Act, 1972;
  - 6) Employees State Insurance Act, 1948;
  - 7) Payment of Bonus Act, 1965;
  - 8) Maternity Benefit Act, 1951;
  - 9) Industrial Disputes Act, 1947;
  - 10) Industrial Employment (Standing Orders) Act, 1946;
  - 11) Trade Unions Act, 1926;
  - 12) Child Labour (Prohibition and Regulation) Act, 1986;
  - 13) Building and Other Construction Workers (Regulation of Employment of Service) Act 1996;
  - 14) Building and Other Construction Workers Cess Act of 1996;



- 15) The Contract Labour (Regulation and Abolition) Act, 1970;
  - 16) Inter State Migrant Workmen's (Regulation of Employment and Conditions of Service) Act, 1979;
  - 17) Workmen Compensation Act. 1923;
  - 18) Factories Act, 1948;
  - 19) Mines Act, 1952; and
  - 20) Safety Code for Plant Railways Part II Locomotives, Wagons and Their Movement (IS 8218).
- 3.5.2. The Contractor shall comply with all other statutory requirements, rules, regulations and notifications in relation to employment of his staff and workers that may be issued from time to time by the concerned government authorities.

### **3.6. Working Hours**

- 3.6.1. No work shall be carried out beyond the statutory limit given under BOCWA, 1996.
- 3.6.2. No work shall be carried out outside the normal working hours stated in contract unless otherwise
- 1) The Engineer gives his consent in writing for additional work; and
  - 2) The work is unavoidable or necessary for the protection of life or property or for the safety of the works, in which case the Contractor shall immediately inform the Engineer.

## **4. SAFETY GENERAL**

### **4.1. General**

- 4.1.1. The following standards whichever is more stringent shall be applicable:
- 1) The Maharashtra & The Gujarat State BOCW Acts and Rules framed there under;
  - 2) The Guidance for the Management of Safety for Construction Works in Japanese ODA Projects, issued by Japan International Cooperation Agency (JICA) on September 2014; and
  - 3) Other relevant National Legislations & IS Codes.

### **4.2. Housekeeping**

- 4.2.1. General Housekeeping shall be carried out by the Contractor and ensured always at the Site, Construction Depot, Batching Plant, Labour Camp, Stores, Offices and Toilets/Urinals.

- 4.2.2. Full height fence, barriers, barricades etc. shall be erected around the Site to prevent the surrounding from excavated soil, rubbish etc., which may cause inconvenience to and endanger the public. The barricade especially those exposed to public shall be aesthetically maintained by regular cleaning and painting as directed by the Engineer. These shall be maintained in one line and level.
- 4.2.3. All surplus earth and debris are removed/disposed of from the working areas to officially designated dumpsites. Trucks carrying sand, earth and any pulverized materials etc. to avoid dust or odour impact shall be covered while moving. The tyres of the trucks leaving the site shall be cleaned with water, wherever the possibility of spillage on carriageways meant for regular road traffic exists.
- 4.2.4. Water logging or bentonite/polymer spillage on roads shall not be allowed. If bentonite/polymer spillage is observed on road endangering the safety of road users, the Contractor shall be penalized as per Clause 7. [Financial Deduction/Withholding].
- 4.2.5. No parking of trucks/trolleys, cranes and trailers etc. shall be allowed on roads, which may obstruct the traffic movement.
- 4.2.6. Roads shall be kept clear and materials like: pipes, steel, sand boulders, concrete, chips and brick etc. shall not be allowed on the roads to obstruct free movement of road traffic.
- 4.2.7. 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.

### **4.3. Working at Height**

- 4.3.1. Working at height means work in any place, including a place at or below ground level or 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.
- 4.3.2. The Contractor shall ensure that work at height is properly planned, appropriately supervised and carried out in a safe manner and without any appreciable risk. Appropriate care shall be taken during bad weather.
- 4.3.3. Adequate protection in the form of working platform with railing, toe board, safe access, safety net, roof ladder etc. shall be provided. No person is required to work at height only depending on a full body harness. Where fall hazards cannot be eliminated, use fall-arrest systems while erecting, modifying, and dismantling scaffolds.
- 4.3.4. A trained and certified person shall check working platform, railing, toe board, safe access, safety net, roof ladder etc. after erection and once in a week. A certificate shall be tagged on this equipment.



- 4.3.5. Employees involved in the erection, dismantling, moving, repairing, etc., of scaffolding and also workers who perform work on a scaffold shall receive training from a competent person. The purpose of the training is to recognize any hazards associated with the work.
- 4.3.6. When the height of a scaffold exceeds three times of the smallest width of the base, secure it to the building or structure at every other lift and every 9.0 m horizontally. The scaffold and scaffold working platform with handrails approximately 1.0 m high, mid rails, and toe boards, all secured rigidly by both ties and braces to prevent movement. Working Platforms shall be completely decked with Safety Planks, Manufactured Scaffold Decking, or Metallic Planks.
- 4.3.7. Metal frame working scaffold is permitted only. As a means of raising and lowering the metal frame working scaffold, steel stairs are used, except for special cases, it is prohibited to directly raise and lower the framework with limbs or to use only ladder.
- 4.3.8. 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, every contractor 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.
- 4.3.9. 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
- 4.3.10. The contractor shall ensure that:
- Where a workplace contains an area in which, owing to the nature of the work, there is a risk to any person at work;
- a) Falling a distance; or
- b) Being struck by a falling object:
- Such area is clearly indicated.
- 4.3.11. The Contractor shall ensure that work equipment exposed to conditions causing deterioration, which is liable to result in dangerous situations, is inspected at suitable intervals and after any exception occurrence jeopardizing the safety of work/equipment.
- 4.3.12. 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 mm above the edge from which any person is liable to fall;



- b) 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
- c) 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 mm.

4.3.13. Requirements for all Working Platforms:

- 1) Every working platform requires a firm & stable supporting structure for holding it;
- 2) A working platform shall possess a suitable surface and be so constructed that the surface of the working platform has no gap through which a person/material/object could fall;
- 3) A working platform and any supporting structure shall not be loaded to give rise to a risk of collapse or to any deformation, which could affect its safe use
- 4) When altered or modified, be so altered or modified as to ensure that it remains stable;
- 5) A working platform shall be of sufficient dimension to permit the safe passage of persons and the safe use of any plant or materials required to be used and to provide a safe working area having regard to the work being carried out there;
- 6) Depending on the complexity of the scaffolding selected, a responsible person shall draw up an assembly, use and dismantling plan;
- 7) A copy of the plan, including any instructions it may contain, shall be kept available for the use of persons concerned in the assembly, use, dismantling or alteration of scaffolding until it has been dismantled; and
- 8) While a scaffold is not available for use, including during its assembly, dismantling or alteration, it shall be marked with general warning signs in accordance with and be suitably delineated by physical means preventing access to the danger zone.

4.3.14. Requirements for collective safeguards for arresting falls:

- 1) Collective safeguard is a safety net, airbag or other collective safeguard for arresting falls;
- 2) A safeguard shall be used only if:
  - a. A risk assessment has demonstrated that the work activity can (so far as is reasonably practicable) be performed safely while using it and without affecting its effectiveness;
  - b. The use of other safer work equipment is not reasonably practicable; and
  - c. A sufficient number of available persons have received adequate training specific to the safeguard, including rescue procedures.



4.3.15. Requirements for personal fall protection systems:

- 1) A personal fall protection system shall be used only if;
- 2) A risk assessment has demonstrated that;
  - i) The work can (so far as be reasonably practicable) be performed safely while using that system; and
  - ii) The use of other safer work equipment is not reasonably practicable.

The user and a sufficient number of available persons have received adequate training specific to the operations envisaged, including rescue procedures; and

- 3) 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 to supporting any foreseeable loading.

4.3.16. Requirements for Ladders:

- 1) Every contractor shall ensure that a ladder is used for work at height only if a risk assessment has demonstrated that the use of more suitable work equipment is not justified because of the low risk;
- 2) The short duration of use;
- 3) Existing features on the Site, which he cannot alter;
- 4) Only metal ladders shall be allowed. Bamboo ladders are prohibited;
- 5) Any surface upon which a ladder rests shall be stable, firm, of sufficient strength and of suitable composition safely to support the ladder so that its rungs or steps remain horizontal, and any loading intended to be placed on it;
- 6) A ladder shall be so positioned as to ensure its stability during use;
- 7) No interlocking or extension ladder shall be used unless its sections are prevented from moving relative to each other while in use;
- 8) Where a ladder or run of ladders raises a vertical distance of 9.0 m or more above its base, there shall, where reasonably practicable, be provided at suitable intervals sufficient safe landing areas or rest platforms;

**4.4. Overhead Protection**

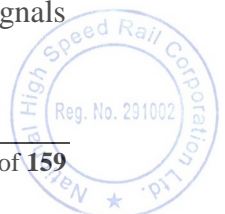
- 4.4.1. All contractors shall provide overhead protections as per BOCW Act & Rules.

**4.5. Lifting Appliances including cranes/tower cranes**

- 4.5.1. Lifting appliances means a crane, hoist hydra, derrick, winch, gin pole, sheer legs, jack, hoist drum, slewing machinery, slewing bearing fasteners, lifting machinery sheaves, pulley blocks, hooks or other equipment used for lifting materials, objects or



- the Workers and lifting gears means ropes, chain slings, shackles, hooks, lifting lugs, wire ropes, Mac-alloy bars, lifting eyebolts and eye nuts and other accessories of a lifting appliance.
- 4.5.2. Each of the lifting appliances and lifting gear including all parts thereof, whether fixed or moveable shall be thoroughly tested and examined by a competent person once at least in every 6 months or after it has undergone any alterations or repairs liable to affect its strength or stability.
  - 4.5.3. The Contractors shall utilize the services of any competent person as defined in Factories Act, 1948 with the permission of the Engineer.
  - 4.5.4. No machine shall be selected to do any lifting on a specific job until its size and characteristics are considered adequate:
  - 4.5.5. The Contractor shall ensure that a valid certificate of fitness issued is available for all lifting appliances including synchronized mobile jacks, pre-stressing hydraulic jacks, jacks fitted with launching girders etc. and the Engineer approval needs before inducting to the site. Only after obtaining the approval from the Engineer any lifting appliances and gear shall be used.
  - 4.5.6. The laminated photocopies of fitness certificate issued by competent person, the Engineer's approval letter, the operators' photo, manufacturer's load chart and competency certificate shall always be either kept in the operator cabin or pasted on the visible surface of the lifting appliances.
  - 4.5.7. All lifting appliances and loose gears shall be clearly marked for its safe working load and identification by stamping or other suitable means.
  - 4.5.8. The Contractor shall do quarterly colour coding of lifting tools and tackles and also maintain a register containing a system of identification of all tools and tackles, its date of purchase, safe working load, competent person date of examination etc.
  - 4.5.9. Every lifting appliances and gears like cranes, hoist, 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 Safe Load Indicator (ASLI) approved by Bureau of Indian Standard/International Certifying Body which gives a warning to the operator and arrests further movements of the lifting parts. These ASLI shall be calibrated by the manufacturer or its authorized representative every 6 months or after repair of the lifting equipment. All such lifting equipment shall match the age criteria and mechanically and electrically sound.
  - 4.5.10. Minimum lighting is to be ensured at all lifting operations.
  - 4.5.11. The Contractor 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 an operator of a rigger or derricks unless he:



- 1) Is above 21 years of age and possesses a valid heavy transport vehicle driving license as per Motor Vehicle Act and Rules;
  - 2) Is competent and reliable;
  - 3) Possesses the knowledge of the inherent risks involved in the operation of lifting appliances by undergoing a formal training at any institution of national importance acceptable to the Engineer; and
  - 4) Is medically examined periodically as specified in schedule VII of BOCW Rules.
- 4.5.12. All hydraulic piping and fittings shall be maintained leak proof.
- 4.5.13. 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.
- 4.5.14. Hand spliced slings up to 32mm diameter shall not be used at site for any lifting purpose. The slings used shall confirm to IS 2762: 2009 Wire rope slings and sling leg specification.
- 4.5.15. No load shall be slewed over public areas without stopping the road traffic first.
- 4.5.16. Failure to do any of the above shall attract penalty from the Employer as per Clause 7. [Financial Deduction/Withholding].
- 4.5.17. Automatic Safe Load Indicator (ASLI) to be provided in crane with audible and visible warning system and made functional and calibrated by the recognized authority (manufacture/authorised representative of the ASLI).
- 4.5.18. The crane shall have a substantial/durable safe working load chart which has clearly legible characters in English and Hindi and figures displayed inside the crane and is easily visible to the crane operator.
- 4.5.19. Every tower crane must have the following specific requirement:
- 1) A hook height limit switch that causes the hoist drum to stop whenever the load hook reaches a predetermined maximum height position;
  - 2) Lifting jib limit switches that cause the jib hoist drum to stop whenever the jib is raised to too high an angle or lowered to too low an angle.
  - 3) A trolley travel limit switch that causes trolley motion to stop whenever the trolley reaches a predetermined maximum out or maximum in position;
  - 4) An overload limit switch that causes the hoist drum to stop whenever the load being hoisted exceeds the maximum rated load for any radius or jib angle.
  - 5) Travel limit switches for rail mounted cranes that apply the carriage brake whenever the crane comes near the ends of the track.

#### **4.6. Launching Operation**

4.6.1. As launching operation is one of the riskiest jobs, the Contractor shall take utmost precaution at all stages like; planning, establishing casting yard, casting segments, transporting segments, fabrication and erection of launching girders, launching of tunnel boring machines, erection of tunnel segments, launching of segments, pre-stressing, auto launching of girders and dismantling of launching girders.

4.6.2. The Contractor shall prepare a comprehensive Method Statement for the launching operation, adhering to the SHE conditions laid down in conditions of contract on the SHE Management Manual. Reference shall be made to the provisions on working at height. As the entire process of launching must be undertaken at an elevated level the safety of workers and the girder is paramount important. In addition to general precautions, such as trained personnel, PPE, etc. listed in earlier clauses, the following general guidelines shall be adhered to throughout the launching operation:

- 1) The segments shall rigidly secure to the truck with necessary wooden wedges and necessary red indicators/safety tapes provided so that the vehicle is clearly seen by other road users both in day/night time;
- 2) Every launching operation shall have a responsible engineer on duty all the time;
- 3) All the time from erection to dismantling the area between the two piers wherein launching is in progress shall always be barricaded;
- 4) Auto launching shall be done only after approval from the Engineer. After every auto launching the stability of launching girder shall be ensured;
- 5) The vertical deflection of launching girder shall be monitored at all critical stages like with/without loads and after every auto launching;
- 6) A register containing all important operational details from erection to dismantling of launching girders shall be maintained and made available to the Engineer whenever called for;
- 7) Driver shall also have undergone proper medical examination as per sub-Clause-5.2 (Medical Facilities) and checked for influence of alcohol before any kind of lifting operation; and
- 8) Test certificate for all lifting gears including Macalloy Bars shall be maintained at a location closer to the launching girder itself so that it can be referred during all inspections.

4.6.3. Failure to do any of the above shall attract penalty as per Clause 7. [Financial Deduction/Withholding].

#### **4.7. Construction Machinery**

4.7.1. Construction machineries may include dumpers and dump trucks, lift trucks and telescopic handlers piling rigs, vibration hammers, rail welding equipment, mobile elevating work platforms, cranes, tipper lorries, lorry loaders, skip wagons, 360° excavators, 180° backhoe loaders, crawler tractors, scrapers, graders, loading shovels,

trenchers, side booms, pavers, planers, chippers, road rollers, locomotives, tankers and bowsers, trailers, Compressor, locomotives and wagons, tunnel boring machines, concrete pumps, boom placers, transit mixers, hydraulic and mechanical breakers etc.

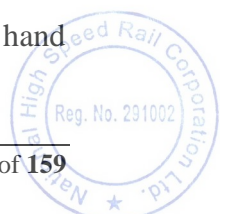
- 4.7.2. Every construction equipment shall be in sound mechanical working condition and certified by either competent person under Factories Act or manufacturers' warranty in case of brand new equipment or authorized persons/firms approved by the Engineer before induction to any site and same shall be verified by P&M in-charge of Contractor and approved by the Engineer.
- 4.7.3. 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.
- 4.7.4. Drivers entering site shall be instructed to follow the safe system of work adopted on site. These shall be verbal instructions or, preferably, written instructions showing the relevant site rules, the site layout, delivery areas, speed limits, etc.
- 4.7.5. All wood working machines shall be fitted with suitable guards and devices such as top guard, riving knife, push stick, guards for drive belts and chains, and emergency stop switch easily accessible by the operator.
- 4.7.6. Failure to do any of the above shall attract penalty as per Clause 7. [Financial Deduction/Withholding].
- 4.7.7. The contractor shall mobilise truck transmission type pick and carry hydra cranes second generation model only or higher model.

#### **4.8. Machine Guarding**

- 4.8.1. The contractor shall ensure at the site all motors, cog wheels, chains and friction gearing, fly wheels, shafting, dangerous and moving parts of machinery are securely fenced or legged. The fencing of dangerous parts of machinery is not removed while such machine is in motion or in use.
- 4.8.2. All gears, revolving shafts, couplings and all other dangerous parts of machinery shall be effectively guarded unless they are so constructed, installed or placed as to be as safe as if they were guarded.
- 4.8.3. Fencing of dangerous parts of machinery shall not be removed while the machinery is in use or in motion and when removed, it shall be replaced as soon as practicable and in any case before the machinery is again brought into use.

#### **4.9. Manual Lifting**

- 4.9.1. Contractor shall ensure at the Site of a construction work that no worker lifts by hand



or carries overhead or over his back or shoulders any material, article, tool or appliances exceeding in weight as per BOCWR, unless aided by another worker or device.

#### **4.10. Site Electricity**

4.10.1. The Contractor shall refer to the applicable guideline “Indian Electricity Rules, 1956” and any amendment thereafter. SHE requirements are:

- 1) Graduate Electrical Engineer having Electrical Supervisory Competency Certificate;
- 2) Diploma Electrical Engineer having Electrical Supervisory Competency Certificate;
- 3) ITI Certificate Holder Electrician with Wiremen Permit; and
- 4) Assessment of Electrical Load and properly designed power distribution system

4.10.2. The Contractor shall assess the size and location of the electrical loads and the manner in which they vary with time during the currency of the Contract.

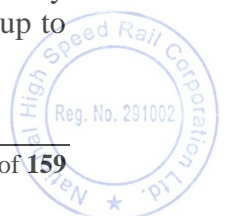
4.10.3. The Contractor shall elaborate as to how the total supply is to be obtained/generated. The details of the source of electricity, earthing requirement, substation/panel boards, distribution system shall be prepared and necessary approval from the Engineer obtained before proceeding of the execution of the job.

4.10.4. The main contractor shall take consideration, the requirements of the Subcontractors’ electric power supply and arrive at the capacity of main source of power supply from diesel generators.

4.10.5. 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.

4.10.6. Adverse or Hazardous Environments:

- 1) Power supply from public utility service provider is preferable;
- 2) The Contractor shall provide sufficient ELCBs (maintain sensitivity 30 mA)/ Residual Current Circuit Breakers (RCCBs) for all the equipment (including Potable equipment), electrical switchboards, distribution panels etc. to prevent electrical shocks to the Workers;
- 3) Lightening Protection for all structures, gantry, metal portable cabins, silos etc;
- 4) No single insulation cable shall be used;
- 5) Cables shall be selected after full consideration of the condition to which they shall be exposed and the duties for which they are required. Supply cable up to 3.3 kV shall be in accordance with BS 6346:1997;



- 6) Cables buried directly in the ground shall be of a type incorporating armour or metal sheath or both;
  - 7) Cabling passing under the walk way and across way for transport and mobile equipment shall be laid in ducts at a minimum depth of 0.6 m;
  - 8) The Contractor shall ensure plugs, socket-outlets, and couplers available in the Site as “splash EM proof” type. The minimum degree of Ingress Protection shall be of IP44 in accordance with BS EN 60529;
  - 9) No loose connections or tapped joints shall be allowed anywhere in the Site, office area, stores and other areas. Penalty as per Clause 7. [Financial Deduction/Withholding] shall be put in case of observation of any tapped joints;
  - 10) All equipment shall have the provision for major switch/cut-off switch in the equipment itself;
  - 11) Precautions shall be taken, either by earthing or by suitable means, to prevent danger arising when any conductor (other than circuit conductor) which may reasonably foreseeable become charged because of either the use of a system, or a fault in a system, becomes so charged; and
  - 12) All electrical equipment shall be permanently numbered, and a record kept of the date of issue, date of last inspection and recommended inspection period.
- 4.10.7. Appropriate electrical protection shall be provided for all circuits, against over load, short circuit and earth fault current.
- 4.10.8. For supplies to mobile or transportable equipment where operating of the equipment subjects the cable to flexing, the cable shall conform to any of these codes BS 6007/BS 6500/BS 7375.
- 4.10.9. Flexible cords with a conductor cross sectional area smaller than 1.5 mm<sup>2</sup> shall not be used and insulated flexible cable shall conform to BS 6500 and BS 7375.
- 4.10.10. Failure to do any of the above shall attract penalty as per Clause 7. [Financial Deduction/Withholding].
- 4.10.11. Power Tools:
- The Contractor shall ensure that:
- 1) Electric tools are properly grounded or/and double insulated;
  - 2) Ground Fault Circuit Interrupters (GFCIs)/Residual Current Circuit Breakers (RCCBs) shall be used with all portable electric tool operated especially outdoors or in wet condition;
  - 3) All power tools shall have guards at their nip points.
  - 4) Safety guards used on right angle head or vertical portable grinders must cover a minimum of 180 degree of the wheel and the spindle / wheel specifications shall



be checked.

- 5) When any work / operation need to be performed repeatedly or continuously, tools specifically designed for that work shall be used. The same is applicable to detachable tool bit also.
- 6) Leather aprons and gloves shall be used as an additional personal protection auxiliary to withstand kickback.

#### **4.11. Illumination**

4.11.1. The Contractor shall provide sufficient site lighting, of the right type and at the right place for it to be properly effective as per the guidelines of BOCW Act & Rules

#### **4.12. Welding, Cutting**

4.12.1. 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.

4.12.2. Test Certificate for cylinders and Vendor license shall be obtained. Gas Cylinder Act & Rules shall always be followed at workplace.

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

4.12.4. Non-return valve and flashback arrester shall be fixed at both end of cylinder and torch.

4.12.5. Domestic LPG cylinders shall not be used for gas welding and cutting purpose.

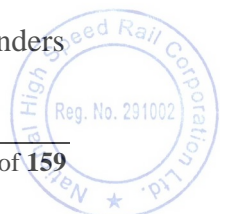
4.12.6. Dry Chemical Pressure (DCP) or CO<sub>2</sub> type Fire Extinguisher not less than 5 kg shall be fixed at or near to welding process zone in an easily accessible location. Fire extinguisher shall confirm to IS 2190:1992.

4.12.7. Oxygen cylinders and flammable gas cylinders shall be stored separately, at least 6.6 m (20 feet) apart or separated by a fire proof, 1.5 m (5 feet) high partition. Flammable substances shall not be stored within 15 m of cylinder storage areas.

4.12.8. Welding grounds and returns shall 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.

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

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



and torches.

- 4.12.11. Use firewatchers if there is a possibility of ignition unobserved by the operator (e.g. on the other side of bulkheads).
- 4.12.12. Transformer used for electrical arc welding shall be fixed with ammeter and voltmeter and fixed with separate main power switch.
- 4.12.13. Use a low voltage open circuit relay device if welding with alternating current in constricted or damp places.
- 4.12.14. The contractor shall ensure that all welding sets used are of adequate capacity and of suitable type approved by CIIBOCC.
- 4.12.15. Competency Certificate as specified by Engineer shall be ensured for the Welders & Gas cutters.

#### **4.13. Excavation General**

##### 4.13.1. References:

- 1) The Gujarat / Maharashtra BOCW Acts and Rules;
- 2) IS: 3764 -1992 (Re-affirmed 1996): Excavation Work Code of Safety;
- 3) IS: 4756 -1978 (Reaffirmed 1996): Safety Code for Tunnelling Work;
- 4) BS 6164: 2011 (Code of practice for health and safety in tunnelling in the construction industry);
- 5) BS EN 16191: 2014 (Tunnelling Machinery-Safety requirements);
- 6) Technical Guideline for Safety Construction of Public Works, 2009 (Ministry of Land, Infrastructure and Transport) JAPAN;
- 7) Industrial Safety and Health Law -The Second Section-Works for Tunnel Construction, Japan;
- 8) Guideline for Accident Preventive Measures by fall of Rocks at Tunnel Face under Rock Tunnelling Works, 2016, the Ministry of Health, Labour and Welfare, Japan;
- 9) Guideline for Dust Measure under Tunnel Work Condition, 2008, the Ministry of Health, Labour and Welfare, Japan;
- 10) Guideline for Safety Measure for Shield Tunnelling, 2017, the Ministry of Health, Labour and Welfare, Japan;
- 11) High Pressure Air Act Rev.2016, Japan; and
- 12) IS 4081:2013 Blasting and related drilling operations-code of safety.





#### 4.13.2. Notification of Intention of carry out Excavation.

The Contractor carrying out any excavation work or tunnelling work shall, within 30 days, prior to the commencement of such excavation work, inform in writing the detailed layout plans, method of construction and schedule of such excavation work to the Chief Inspector as per the Gujarat BOCW Rules, 2003 Maharashtra BOCW rules 2007 in concurrence with the Engineer.

#### 4.13.3. Warning Signs and Notices:

The Contractor shall ensure that suitable warning signs or notices, required for the safety of workers carrying out the work of an excavation, shall be displayed or erected at conspicuous places in Hindi, Gujarati, Marathi and in a language understood by most of such workers at such excavation work;

#### 4.13.4. Register of Employment etc.:

The Contractor shall ensure that at the Site, where an excavation is being carried on, a register of employment of the Workers carrying out such excavation work, is maintained and produced on demand to the Engineer's inspector having jurisdiction.

#### 4.13.5. Stability of Structure

The Contractor shall ensure that:

- 1) Where any worker engaged in excavation is exposed to hazard of falling or sliding material or article from any bank or side of such excavation which is more than 1.50 m above his footing, such worker is protected by adequate piling and bracing against such bank or side;
- 2) The excavation and its vicinity are checked by a responsible person referred in BOCW rule after every rain, storm or other occurrences carrying hazards and in case a hazard is noticed at such checking, adequate protection against slides and cave in to prevent such hazard;
- 3) Temporary sheet piling installed for the construction of a retaining wall after excavation is not removed except on the advice of the responsible person referred to in BOCW after an inspection carried out by such responsible person;
- 4) Excavated material is not stored at least 0.65 m from the edge of an open excavation or trench and the banks of such excavation or trench are stripped of loose rocks and other materials which may slide, roll or fall upon a worker operating below such bank;

### 4.14. Mechanized Excavation

4.14.1. Apart from general precautions, the Contractor shall ensure that:



- 1) Continuous and proper supervision is arranged if the excavation work is more than 2.0m deep;
- 2) The installation of a head guard on the driver's seat in case of risk for rock falling;
- 3) The arrangement of a conductor when working at following location:
  - a) Near roads, Buildings, and Other facilities;
  - b) Cliff top;
  - c) Place with risk for rock falling and collapse;
  - d) Place where machine works with other workers at the same time;
  - e) Working on the road;

4.14.2. The Contractor shall follow the safe excavation gradient according to kinds of soil and excavation height mentioned below.

Kind of Soil	Bank Height	Excavation Surface Gradient (Degree)
- Rock and Hard Clay	Less than 5m high	90
	More than 5m high	75
- Others	Less than 2m high	90
	More than 2m high, Less than 5m high	75
	More than 5m high	60
- Sand	Less than 5m high, or Less than 35deg.	
- Condition of Easy Ground Collapse by Blasting	Less than 2m high, or Less than 45deg.	

\*) Select the moderate excavation gradient in case of soft soil condition.

4.14.3. Piling, Shoring and Bracing

The Contractor shall ensure that:

- 1) Shores and braces used in excavation are of adequate dimensions and are so placed as to be effective for their intended purposes; and
- 2) Earth support shores or braces used in excavation bear against a footing of sufficient area and stability to prevent the shifting of such shores and braces.

4.14.4. Safe Access

The Contractor shall ensure at the Site that ladders, stair cases or ramps are provided

for safe access to and egress from excavation where the depth of such excavation exceeds 1.5 m and such ladders, stair cases or ramps comply with the relevant national standards.

#### 4.14.5. Trenches

The Contractor shall ensure that a trench or excavation is protected against falling of a person by suitable measures if the depth of such trench or excavation exceeds 1.5 m and such protection is an improved protection in accordance with the design and drawing of a responsible person, where such depth exceeds 4.0 m.

#### 4.14.6. Depth of Trenches

The Contractor shall ensure at the Site of a construction work that:

- 1) Where the depth of a trench requires two length of sheet piling, one above the other, the lower piling is set inside the bottom strings or wales of the upper piling and such sheet piling is driven down and braced as the excavation continues; and
- 2) All metal sheet piles used in excavation or a trench are welded end to end and secured by other similar means.

#### 4.14.7. Positioning and Use of Machinery

The Contractor shall ensure that any machinery used in excavation work is positioned and operated in such a way that such machinery does not endanger the operator of such machinery or any other person in the vicinity.

#### 4.14.8. Breathing Apparatus

The Contractor shall ensure that:

- 1) Suitable breathing apparatus is provided to a worker wherever there is a risk of oxygen deficiency or presence of harmful gases; and
- 2) Such breathing apparatus is maintained in good working condition always.

#### 4.14.9. Pneumatic Tools

- 1) The Contractor shall ensure at the Site that supply lines to pneumatic tools used are fitted with water trap or safety chain or safety wire.
- 2) Cylinders shall be tested and certified by competent person as per the national guidelines.

#### 4.14.10. Signals

The contractor shall ensure at the Site that the standard audio or video signals are used

in excavation work and are conspicuously located or displayed near entrance to the workplace and in such other locations as may be necessary to bring such signals to notice of all workers employed in such excavation work.

#### 4.14.11. Clearances

The contractor shall ensure that:

- 1) The minimum adequate clearance shall be maintained between any part of the vehicle and any fixture or any equipment used in an excavation work after allowing the throw or swing of such fixture or equipment; and
- 2) For a locomotive drive at excavation or tunnelling work, adequate overhead clearance or of any other dimension in accordance with the relevant national standard above the seat of the and above the platform where such driver stands shall be maintained.

#### 4.14.12. Storing of Oil and Fuel

The Contractor shall ensure that:

- 1) All oils, greases or fuels stored in the Site are kept in tightly sealed containers and in fire resistant areas at safe distance away from explosive and other flammable chemicals, as per the legal standard and all permissions from relevant authority shall be obtained.
- 2) Appropriate flame proof installation is used in such storage areas as specified in above clause; and
- 3) The instructions regarding steps to be followed to fight outbreak of fire, at the Site, written in Hindi, local language and understood by most of the Workers employed on such area, are displayed at conspicuous and vulnerable places of such excavation work.

#### 4.14.13. Diaphragms

The Contractor shall ensure that all diaphragms which are in the form of horizontal decks across a shaft used at excavation work are securely anchored.

#### 4.14.14. Portable Electrical Hand Tool

The Contractor shall ensure that all portable electrical hand tools and inspection lamps used underground or in a confined space at an excavation work are operated at a voltage not exceeding 24 V.

#### 4.14.15. Live Wire

The Contractor shall ensure that there is no exposed live wire in working areas-at the excavation work which is accessible to the Workers other than those authorized to work on such live lines.

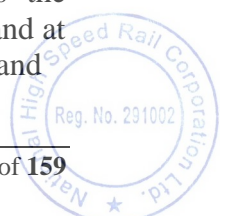
#### **4.15. Tunnelling Works**

4.15.1. The Contractor shall inform in writing to the Director General of Government of Gujarat/Maharashtra within 30 days, prior to the commencement of any tunnelling work.

4.15.2. The Contractor shall appoint a Project Engineer and responsible person for safe operation for tunnelling work and who shall perform duties as mentined in BOCW Act and Rules.

4.15.3. In addition to general precaution such as display of warning sign/notices, deployment of trained staff, housekeeping, etc., the Contractor shall ensure that:

- 1) Every compressed air system in a tunnel is provided with emergency power supply for maintaining continued supply of compressed air as per BOCWR;
- 2) Watertight bulkhead doors are installed at the entrance of a tunnel to prevent flooding;
- 3) All portable electrical hand tools and inspection lamp used in underground and confined space at an excavation or tunnelling work is operated at a voltage not exceeding 24V;
- 4) Only flame proof equipment of appropriate type as per IS: 5571:2000 and or another relevant national standard is used inside the tunnel;
- 5) Petrol or LPG of any other flammable substances are not used, stored inside the tunnel except with prior approval from the Engineer, and no oxy-acetylene gas is used in a compressed air environment in excavation or tunnelling;
- 6) Adequate number of water outlets provided for firefighting purpose, an audible fire alarm and adequate number and types of fire extinguishers are provided and maintained;
- 7) Temperature in any working chamber in an excavation or tunnelling work where workers employed does not exceed 29°C as per BOCWR; and
- 8) All working areas in a free air tunnel are provided with ventilation system as approved by the Director General of Government of Gujarat/Maharashtra and the fresh air supplied in such tunnel is not less than 6 m<sup>3</sup>/min for each worker employed in tunnel as per BOCWR.
- 9) The excavated areas are made safe by use of suitably designed and installed steel sets, rock bolts or similar other means;
- 10) The responsible person referred to in BOCW examines and inspects the workplaces in a tunnel before the commencement of work in such tunnel, and at regular intervals thereafter, to ensure safety of the Workers in such tunnel; and



- 11) The portal areas of a tunnel with loose soil, or rock, likely to cause injury to a person are adequately protected with supports.
- 12) Surroundings of a shaft used in excavation or tunnel work are protected from being washed away;
- 13) The Contractor shall ensure safe means of access to enter a shaft. A lift is provided for transport of the Workers and materials of articles at an excavation or tunnelling work required to descent more than 40 m in a shaft.

#### 4.15.4. Means of Communication

The Contractor shall ensure that:

- 1) Reliable and effective means of communication such as telephone or walkie-talkie is provided and are maintained in working order for arranging better and effective communication at an excavation or tunnelling work at the following locations, namely:
  - a) Working chamber at the face of an excavation;
  - b) Intervals of 100 m along the tunnel;
  - c) Working chamber side of a man lock near the door of such man lock;
  - d) Interior of each chamber of a man lock;
  - e) Location conspicuous a lock attendant's station;
  - f) A compressor plant;
  - g) A first aid station; and
  - h) Outside the portal and the top of the shaft.
- 2) Such number of bells and whistles are made available always at the locations referred to in Sub-Clauses a) to h) above as are necessary for the safety of persons at such locations.

#### 4.15.5. Fire Resistant Hoses

The Contractor shall ensure that no fire hydraulic hoses other than fire resistant hydraulic hoses are used when hydraulically activated machinery and equipment is employed in tunnels.

#### 4.15.6. Water for Firefighting

The Contractor shall ensure that:

- 1) Adequate number of water outlets are provided on excavation or tunnelling work and are readily made accessible throughout the tunnel for firefighting purposes and such water outlets are maintained for effective firefighting;
- 2) All air locks are equipped with firefighting facilities at excavation or tunnelling work;

- 3) An audible fire alarm is provided to warn the Workers whenever a fire breaks out on an excavation or tunnelling work;
- 4) Adequate number and types of fire extinguishers in accordance with relevant national standards are provided and made readily available to fight any outbreak of fire at an excavation or tunnelling work;
- 5) Fire extinguishers with vaporizing liquids and high-pressure carbon dioxide are not used in tunnels or other confined spaces; and
- 6) The instructions regarding steps to be followed to fight outbreak of fire, at an excavation or tunnelling work, written in Hindi, local language and understood by most of the Workers employed on such excavation or tunnelling work, are displayed at conspicuous and vulnerable places of such excavation or tunnelling work.

#### 4.15.7. Flooding

The Contractor shall ensure that:

- 1) Water tight bulkhead doors are installed at the entrance of a tunnel to prevent flooding during a tunnelling work, where more than one tunnel is driven from a shaft;
- 2) All necessary measures are taken to ensure that no worker is trapped in any isolated section of a tunnel when any bulkhead door of such tunnel is closed; and
- 3) Where there is likelihood of flooding or water rushing into a tunnel during a tunnelling work, arrangements are made for immediate starting of water pumps to take out water of such flooding or water rushing and for giving alert signals to the Workers and other persons to keep them away from danger.

#### 4.15.8. Steel Curtains

The Contractor shall ensure that air tight steel curtains are provided in areas liable to flooding at tunnelling work and in case of descending tunnel such curtains are provided in the top half of such tunnels to ensure the retention of pockets of air for rescue purpose.

#### 4.15.9. Rest Shelters

The Contractor shall ensure that:

- 1) Where workers employed in a compressed air environment in a tunnelling work are required to remain at the Site for one hour or more after decompression from pressure exceeding 1.0 bar, adequate and suitable facilities are provided for such workers to rest;
- 2) A first aid room is provided and is readily available at the Site of a tunnelling work.



#### 4.15.10. Permissible Limit of Exposure of Chemicals

The Contractor shall ensure that the responsible person referred to in BOCW conducts necessary test before the commencement of a tunnelling work for the day and at suitable intervals as fixed by CIIBOC to ensure that the permissible limits of exposure are not exceeded, and a record of such test is maintained and is made available for inspection to CIIBOCC, on demand.

#### 4.15.11. Ventilation

The Contractor shall ensure that all working areas in a free air tunnel are provided with ventilation system as approved by CIIBOC and the fresh air supplied in such tunnel is not less than 6.0 m<sup>3</sup>/min for each worker employed underground in such tunnel and the free air flow movement inside such tunnel is not less than 9.0 m/min.

#### 4.15.12. Rock Fall Prevention (NATM)

The Contractor shall:

- 1) Draw up a method statement that includes preventive measure to fall of rock, tunnel face watching, evacuation methods from the face, and the construction sequence etc. to ensure that workers are informed.

#### 4.15.13. Dust Emission Control (NATM)

Dust control plan shall be prepared and followed by the Contractor against dust emission in the tunnel

- 1) Monitoring regularly every month for dusts concentration, wind velocity, air capacity of ventilation system;
- 2) Direct air flow with the upper limit of dust concentration less than 3mg/m<sup>3</sup>;
- 3) Keep monitoring record including date, method, location, condition, results, and evaluation of results, measurer's name; and
- 4) The effective and good quality respiratory protective devices shall be provided for all workers and ensured constant monitoring of their usage.

#### 4.15.14. Tunnel Boring Machine Works (TBM)

Bored tunnelling by using Tunnel Boring Machine, hereafter called "TBM" sometimes causes serious industrial accident due to extraordinary flooding or collapse of segmental linings at a face of tunnels. The Contractor shall take adequate measures for TBM operation in terms of not only observance of laws and rules, but also the latest case study to eradicate such industrial accident and as per good industrial practices to maintain safety at all times.

#### 4.15.15. Method Statement shall be prepared based on adequate risk assessment.

#### 4.15.16. Evacuation and Training

The Contractor shall ensure that:

- 1) Implementation of the training for evacuation and firefighting immediately before the distance reaches about 100m from the portal to the tunnel face; and
- 2) Implementation of evacuation training by a responsible person appointed in terms of dealing with technical matters.

#### 4.16. Blasting and Drilling

4.16.1. The following standards whichever is more stringent shall be applicable:

- 1) Safety Code for Blasting and Drilling IS 4081:2013;
- 2) Safety Code for tunnelling Work IS 4756-1978;
- 3) Code of practice for construction of tunnels IS 5878; and
- 4) Other Relevant National Legislations & IS Codes.

4.16.2. The Contractor shall:

- 1) Appoint the manager, the deputy manager and officer in charge of handling explosives to prevent handling accidents;
- 2) When doing blasting work, the Contractor shall appoint a work supervisor from among those who can take on the blasting work;
- 3) Blast workers shall be able to distinguish themselves from other workers by signs of armbands, protective caps, etc.; and
- 4) The Contractor shall establish a danger zone, with the warning signs displayed like, clearing card, red flag, etc. and make the restricted entry zone.

4.16.3. Storage in Gunpowder:

- 1) Storage of explosives is regulated by the Indian Explosives Act, 1884 and provision thereunder shall be strictly observed;
- 2) Permissions shall be taken by the relevant authority when the explosive amount is more than the prescribed amount mentioned in the act;
- 3) Explosive of a prescribed volume or less are to be stored in a safe place and as per prescribed precautions with the approval of the authority by "the Provision of the Storage Facility outside the Gunpowder";
- 4) If the estimated number of explosives to be consumed per day is more than the prescribed amount, it is necessary to prepare explosives handling stations to prepare for explosives management and blasting (excluding the production of a

master dynamite and handling works); and

- 5) Adequate precautions shall be taken for storing the gunpowder as per the relevant applicable laws.

#### 4.16.4. Manage Quantity

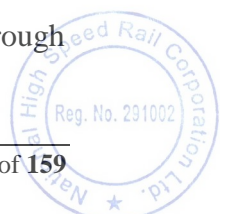
Records shall be maintained related to explosives requirements, consumption and remaining quantity.

#### 4.16.5. Precautions:

- 1) When there is a danger of lightning strikes then blasting works shall be stopped;
- 2) Before blasting, sufficient warning shall be given to enable the people working in the blasting area to get off the danger zone;
- 3) All persons, other than the blaster, shall leave the danger area at least 10 minutes before the blasting starts;
- 4) The danger zone shall be suitably cordoned off and flag men posted at important points;
- 5) No loose materials, such as tools, drilling implements, etc., shall be left on the rock surfaces to be blasted;
- 6) Blasting in the open shall be carried out during fixed hours every day or on fixed days in the week. This information shall be amply publicized, and the following precautions observed:
  - a) All approaches to the Site, where regular blasting operations are undertaken, shall be sign-posted for warning the public and indicating the days and timings when blasting is to be carried out;
  - b) All approaches to the Site, shall be closed by barriers at not less than 400 m, 10 min before firing is to take place; and
  - c) Loud wailing note of not less than 1 min duration shall be sounded on sirens to warn the public before commencement of firing; and
  - d) The end of firing operations shall be followed by sounding an all clear signal on the sirens as a continuous long note of not less than 1-minute duration etc.

#### 4.16.6. Drilling and Loading:

- 1) No drilling shall be started until previous holes in the blasted area are flushed with air and water;
- 2) Use of short pieces of fuse shall be prohibited for detonation purposes;
- 3) Loading and drilling shall not be carried out at the same time in the same area;
- 4) Drilling shall not be resumed after blasts have been fired until a thorough



examination has been made to make sure that there is no unexploded charge in the remaining butts of old holes or otherwise, which the drills may strike;

- 5) Rock drillers shall be equipped with approved respirators for use in siliceous dusty atmosphere arising out of drilling operations. Wet drilling may be used for arresting generation of silica and other harmful dust; and
- 6) In tunnelling work, welding/cutting of metal shall not be done, inside the tunnel at the time of loading at the face, until the blast has been fired.

#### 4.16.7. Connection Work of the Electric Wire of the Electric Detonator:

- 1) Be sure to inspect the bus before connecting it to the leg line so that there is no disconnection, connection leakage, connection difference etc.;
- 2) Considerations on Ignition Work of Electric Blasting:
  - a) The ignition position shall be a safe place isolated according to the degree of blast; and
  - b) The connection between the blasting machine and the bus bar shall be done just before ignition.

4.16.8. In deciding the sizes of wire, fuses, circuits, exploders, blasting switches, etc. instructions issued by the manufacturers of these articles shall be followed.

4.16.9. All electric blasting caps shall be tested singly and when connected in a circuit in series using only an approved type of circuit continuity tester or ohmmeter.

4.16.10. As far as possible, blasting shall be carried out using suitable exploder with 2.5 percent excess capacity. Electric power from the mains shall be used only when it is necessary.

#### 4.16.11. Transportation of Explosive:

- 1) Transportation of explosive shall be done in properly labelled, non-metallic and leak proof container and covered with the waterproof and fire-resistant tarpaulin;
- 2) Adequate number of fire extinguishers shall be carried in the explosive van;
- 3) Permission from local authority shall be taken for transportation of explosive;
- 4) Vehicle shall not be refuelled if explosive is loaded in it, except emergency even then only when the motor has been stopped; and
- 5) When transporting an electric detonator, make sure that the legs are not drawn out.

#### 4.16.12. Blasting with Safety Fuse

The minimum length of fuse shall not be less than that required by state laws; in any case, it shall not be less than 750 mm. The burning rate of the fuse shall be not more

than 600 mm/min.

#### 4.16.13. Disposal of Explosive

No explosive shall be abandoned. These shall be disposed of strictly as per approved method.

#### 4.17. Compressed Air Works

In case compressed air is used in such excavation or tunnelling work or any work incidental to or required for such excavation or tunnelling work, the technical details and drawings of all man-locks and medical locks together with names and addresses of all construction medical officers having qualification as laid down in Schedule XI annexed to Maharashtra/Gujarat BOCW Rules and so appointed by the Contractor for the purpose of such excavation or tunnelling work shall be sent to CIIBOC.

##### 4.17.1. Air Supply Intake Point

The Contractor shall ensure that the air intake points for all air compressors are located at places where such intake air does not get contaminated with dust, fumes, vapor and exhaust gases or other contaminants.

##### 4.17.2. Emergency Generators

The Contractor shall ensure that:

- 1) Every compressed air system in a tunnel is provided with emergency power supply system for maintaining continued supply of compressed air.
- 2) The emergency power supply system is maintained and is readily available always at an excavation or tunnelling work.

##### 4.17.3. Bulk Head and Air Locks

The Contractor shall ensure that:

- 1) A bulk head or air tight diaphragms retaining compressed air, when used within a tunnel or a shaft, is constructed to withstand the maximum pressure at 1.25 times of the maximum working pressure of such bulk head or diaphragm and such bulk head or diaphragm is tested before its each use by a responsible person referred to in BOCW rule to ensure that such bulk head or diaphragm is in proper working order; and
- 2) Such responsible person keeps the record of each test referred to in Clause 1) and such record is produced for inspection to the inspector having jurisdiction on demand.

##### 4.17.4. Transformer

The Contractor shall ensure that no transformer is used in any section of a tunnel under compressed air unless such transformer is of the dry type and conforms to the relevant national standards.

#### 4.17.5. Quality and Quantity of Air

The Contractor shall ensure that:

- 1) Every working chamber at an excavation or tunnelling work where compressed air is used, the supply of such air is maintained not less than 0.3 m<sup>3</sup>/min per person working therein; and
- 2) A reserve supply of compressed air is made available always for man-locks and medical-locks used at a tunnelling work.
- 3) The air supplied in a compressed air environment at a tunnelling work is as far as practicable free from odour and other contaminants, namely dust, fumes and other toxic substances

#### 4.17.6. Man-Locks and Working in Compressed Air Environment

The Contractor shall ensure that:

- 1) Man-locks used at a tunnelling work are of adequate strength, made of sound material and designed to withstand any air pressure, internal or external, to which it may be subjected to in the normal use or in an emergency;
  - a) Man-locks used at a tunnelling work are airtight and devices are provided for sealing the doors when such locks are under pressure;
  - b) There is adequate room available for the Worker for operating in the man lock used at tunnelling work; and
  - c) Where work is carried out in any compressed air tunnel, a man lock in accordance with the relevant national standards is used for such tunnel.
- 2) In addition:
  - a) Where a man-lock is used at tunnelling work, safety instructions in Hindi or Gujarati and in language understood by majority of the Workers employed therein are displayed at conspicuous place at such tunnelling work;
  - b) Except in an emergency, compression and de-compression operations are carried out in a man-lock used at tunnelling work;
  - c) The Worker and who had previously received training with a trained worker to work in a compressed air environment at tunnelling work is employed to work independently in such a compressed air environment;
  - d) The Worker who had undergone three de-compressions from a pressure exceeding 1.0 bar in a period of 8.0 hours at tunnelling work is not allowed to enter a compressed air environment except for the purpose of carrying out rescue work;
  - e) The Worker employed in a compressed air environment for a period of 8.0

hours in a day at tunnelling work is not employed again in such environment unless he has spent not less than 12.0 consecutive hours of rest at atmospheric pressure;

- f) No worker is engaged in a compressed air environment at a pressure which exceeds 3.0 bars at tunnelling work unless prior permission, in writing, has been obtained from CIIBOC for such engagement;
- g) No worker is employed in a compressed air environment for more than 14.0 consecutive days in a month at tunnelling work;
- h) A register of employment of all the Workers employed in compressed air environment at tunnelling work is maintained;
- i) An identification badge is supplied to the Worker employed in compressed air environment work. The badge contains his name, location of the medical lock allotted to him for work, the telephone number of the construction medical officer concerned for his treatment and the instructions in case of his illness of unknown and doubtful causes;
- j) Record of all identification badges supplied to the Workers;
- k) Every worker whose name appears in the register wears the badge supplied to him at all times during his duty hours at tunnelling work; and
- l) Suitable warning signs are displayed, in the compressed air environment at tunnelling work, for the prohibition of followings.

#### 4.17.7. Use of Alcoholic Drinks:

Use and carrying of lighters, matches or other sources of ignition, smoking and entry to person who has consumed alcoholic drinks are strictly prohibited.

#### 4.17.8. Medical Lock

The Contractor shall ensure that:

- 1) A suitably constructed medical lock is maintained at tunnelling work where the Workers are employed in a working chamber at a pressure exceeding 1.0 bar; and
- 2) Where more than 100 workers are employed in a compressed air working environment exceeding 1.0 bar at tunnelling work, one medical lock is provided for every 100 workers or part thereof and such medical lock is situated as near as possible to the man lock used at such tunnelling work.

### 4.18. Material Transportation

4.18.1. The Contractor shall develop the System Procedure/Methods Statement for heavy/big material/machinery transportation such as Rolling Stock, Transformer, and Bridge Main Girder, etc.

4.18.2. The Contractor shall ensure that the person in charge shall inspect the safety implementation like properly fixing of wire with vehicle slab bed, condition of vehicle





breaks etc. before starting the job and record the accidents and records.

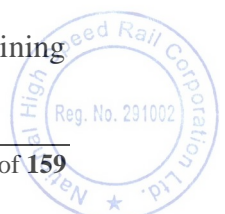
- 4.18.3. The Contractor shall ensure that every vehicle/moving machinery shall have a signal man who has a whistle, a flag or a signal light (in the night) with striking clothes and stands at a safe visible place from a machine operator by means of the proper signal and way determined.
- 4.18.4. The induction related to moving and parking safely shall be given to driver/operator like parking construction vehicles at a specified place with a parking brake and making sure to put a drag.
- 4.18.5. The driver /operator shall follow the guidelines while transporting materials as per The Rules of Road Regulations, 1989.

#### **4.19. Foundation Works (Piling & open caisson)**

- 4.19.1. The Contractor is required to evaluate the risk in each activity and suggest a control measures of piling works:
- 1) Covering of bore holes with adequate warning signs;
  - 2) Cage to be lowered by using crane;
  - 3) The auxiliary hook of the rig shall not be used to pull or lower the cage in bore hole;
  - 4) The tremie pipe lowering and lifting after concreting shall be done by using crane;
  - 5) Control measure to arrest polymer spillage from the Site to avoid contaminating the surface drains;
  - 6) An entry restraining fence shall be provided around the pier excavation completion;
  - 7) No man suffering from any chronic disease, alcoholic excess, ear or heart troubles or having a sluggish blood circulation or who has excess of fat shall be employed as a diver;
  - 8) After underwater concrete working, ventilation inside the caisson shall be prepared sufficiently; and
  - 9) When using the Pneumatic Caisson Construction Method (PCCM), refer to 4.17 Compressed Air Works.

#### **4.20. Batching Plant and Casting Yard**

- 4.20.1. The Contractor is required to evaluate the risk in each activity and suggest Control Measures:
- 1) Adequate space between the casting bed, segment storage area and the adjoining



road shall be maintained so that a steel railing could be installed to segregate the gantry crane movement area from the road;

- 2) LOTO (Lock Out Tag Out) system shall be installed.
- 3) The aggregate/sand storage area shall be kept under the full coverage of effective water sprinkler to avoid dust generation;
- 4) The entire batching plant/aggregate storage Area shall be adequately walled of sufficient height, above which the Contractor is required to erect green dust protective net. This is a mandatory requirement to avoid dust in surrounding environment;
- 5) The batching plant and casting yard required to obtain “Consent to Establish” and “Consent to Operate” certificate from State Pollution Control Board;
- 6) The batching plant/casting yard shall be barricaded and made as a compulsory Personal Protective Equipment (PPE) zone;
- 7) Time office, canteen, drinking water, toilet and rest place shall be suitably located for the easy access to workers. All the facilities shall be properly cleaned and maintained during the entire period of operation;
- 8) Drainage shall be effectively provided, and waste water shall be disposed after proper treatment; and
- 9) Manual handling of cement shall be avoided. Whenever it is necessary the workmen shall be given full body protection, hand protection and respiratory protection as a basic measure of ensuring better health.

#### **4.21. Form Works**

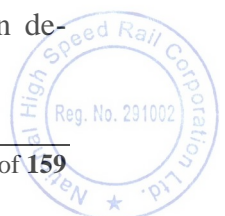
- 1) Ensure the inspection of the formwork assembly before and during the placement of concrete; and
- 2) Ensure no attaching equipment to the formwork assembly unless specifically designed for this purpose; and not using a stripping process which may cause damage to the permanent structure

#### **4.22. Concrete Works**

- 1) Concrete pumping equipment, trucks etc. are not to be washed down on site and any waste-water, concrete slurry or other contaminants are to be contained; and
- 2) These contaminants are not to be discharged into or onto roadways, footpaths, gutters, drainage systems, watercourses or any other surface area that will result in damage to the environment or contravenes environmental legislation.

#### **4.23. Pier Casting Works**

- 1) Using crane to hold the pier reinforcement during the time gap between de-staging and placement of shutter; and



- 2) Vertically placed re-bar rods shall be properly tied.

#### **4.24. Bridge Erection Works**

##### 4.24.1. References:

- 1) The Gujarat BOCW Acts and Rules;
- 2) The Maharashtra BOCW Acts and Rules;
- 3) Bridge Manual Indian Railways;
- 4) Safety Management Guideline for Prestressed Concrete Bridge Works (Revised Edition 2015), Japan Prestressed Concrete Engineering Association;
- 5) Safety Assessment with regard to Steel Bridge Erection Works 1985, Ministry of Health, Labour and Welfare;
- 6) Safety Precautions at the Site Adjacent to Track 2015, Indian Railways; and
- 7) Standard Specifications of Construction Works about Safety Track Open for Traffic 2005, East Japan Railway Company.

##### 4.24.2. General

As bridge erection works are one of the riskiest jobs, the Contractor shall take utmost precaution at all stages like; planning, establishing temporary yard, casting segments, transporting segments, fabrication and operation of erection machinery, if any, launching of segments/lifting of segments, pre-stressing, cutting and welding, auto (or manual) launching and dismantling of erection machineries.

For pre-stressed concrete bridges, the Contractor shall further ensure that:

- 1) A responsible person shall be appointed for post-tensioning works testing and inspection of tendon tensioning devices and using material;
- 2) Installation of protective board behind a tensioning jack and keep out behind a jack during tensioning;
- 3) Use of protective glasses, laver gloves, and masks during grouting for safety of the Workers; and
- 4) Fall prevention installation of overall boarding at the bottom of a bridge and installation of funnel type boarding at the side of a bridge during construction in case of RFO (Railway Flyover) or ROB (Road over Bridge) for preventing the flying and fall of materials and tools by safety net, shall be ensured.

##### 4.24.3. The Contractor's Obligation

The Contractor shall prepare a comprehensive method statement for the bridge erection works, adhering to the SHE conditions laid down herein. Particular reference shall be made to the provisions on working at height. As the entire process of

launching/lifting has to be undertaken at the Site especially during night time, the safety of workers is of paramount important. Daily inspection of scaffold structure and mechanical equipment for the traveller crane shall be done.

4.24.4. Basic Consideration under Site Condition:

- 1) Erection works over or adjacent roads or highways:
  - a) The work area shall be demarcated properly, and route map and traffic management plan shall be developed and implemented with proper sign ages and cautions;
  - b) The Contractor shall ensure the implementation of proper stop traffic and detour plan;
  - c) The Contractor shall arrange the proper guide and signs to be followed while working on highway or adjacent roads, railways; and
  - d) The Contractor shall plan and establish all the required measures for the protection of overhead wires and buried utilities.
    - i) The regular inspection is done for all the installed protection equipment's;
    - ii) The movement restriction site plan to be developed with defined operation path for safe working at site;
    - iii) watchmen shall be appointed who are given training related to all type of traffic management and all signals used for smooth traffic flow and site transportation and works;
    - iv) The railway schedule is taken in consideration while planning the site works and ensures the safe management system with the details given regarding the kind of works suspended while a train is passing and clarifying the way of opening or closing railway in case of track closure works.
  - e) For steel truss bridges;
    - I. The Contractor must install the protective net just after erecting truss upper chord material; and
    - II. The Contractor must install safety operation path to an end of erected member and a cross point of lateral bracing.
  - f) The Contractor may use any of the erection methods. However, following general points will be kept in view and ensured as applicable-
    - i) The Contractor shall develop and confirm the Engineer his Method Statement with details of position of bearing, jacking operation, roller passing etc.;
    - ii) Detailed inspection report related to the movement and condition of superstructure from the place of launching equipment and rollers shall be given to the Engineer;
    - iii) The Contractor shall give confirmation of binding situation such as a bolting erection member;
    - iv) The Contractor shall give confirmation of displacement per

every erection phase;

- v) The Contractor shall give confirmation of fixing situation for bearings;
- vi) The Contractor must take measures to avoid a fall and lateral buckling of member; and
- vii) The Contractor shall take measures of fall prevention for main superstructure.

#### **4.25. Building and Roof Erection Works**

4.25.1. The Contractor shall plan erection sequence and work procedures properly under competent and experienced personnel to ensure the safety of workers and prevent structure failure during erection:

- 1) Contractor shall develop and confirm with the Engineer his method statement with details;
- 2) The stability of structural members is to be ensured by means of ties, braces, anchor/fixing bolts, or other suitable means before releasing lifting gear, slings, chains etc;
- 3) Tag lines must be attached to the ends of components/loads to maintain control during crane lifting operations; and
- 4) Structure stability is to be ensured always. Unattended and incomplete buildings/structures are NOT to be left in an unsafe and hazardous condition, to pose a risk to the safety and health of site personnel or the public.

#### **4.26. Roof Erection Works**

- 1) The Workers placing and securing roof battens are to be protected and are to work from an enclosed environment (e.g. scaffolding, deck guardrail or equivalent) and work up from the bottom of the truss/rafter towards and finish at the ridge /peak of the roof framing;
- 2) The Workers are having at least one secured batten to stand on and one secured batten in front of them as a fall protection/rest while they are securing the third or subsequent battens in place and/or they can work from an approved work platform;
- 3) When the spacing of trusses and roof battens exceed 600mm the appropriate procedures are to be considered and applied after conducting a risk assessment to provide the optimum fall protection directly under the Workers during placement of roofing battens and/or roof sheeting.
- 4) The Workers are not to work in the areas that are not protected by edge protection, scaffolding, fall barriers etc. unless a risk assessment has been conducted and they have other means of protection such as a travel restraint system; and
- 5) If the roof pitch exceeds 26 degrees a further risk assessment must be undertaken



to assess if extra precautions shall be put in place. Any extra measures identified/implemented can also be put in place for roof pitches less than 26 degrees especially if the risk is assessed at medium or high or the nature of the project warrants their use.

#### **4.27. Overhead Contact Wire Works**

4.27.1. Before starting of works using rack vehicle/moving scaffold/ladder/insulation tower/step ladder, etc., the Contractor's operation in charge shall confirm as follows:

- 1) The work sequence shall be determined while using Ariel Track vehicle. Communication system between drivers and conductors shall be developed and adopted;
- 2) A deck which must be used by workers, shall have enough capacity of carry necessary loads for work at a high place with a pre-operation inspection; and
- 3) The Workers shall be given the safety protection equipment which has enough capacity to hold necessary loads to prevent any accidental fall with a pre-operation inspection.

4.27.2. During working, the Contractor's operation in charge shall confirm as follows:

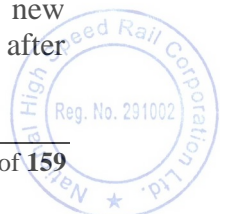
- 1) State of electrical equipment installation and a route of going up and down from ground;
- 2) The Worker is given required training for electrical works at height and the Worker must use a safety rope, an auxiliary rope, a fall prevention equipment such as a rolip which is a fall arrest device for a fixed rope when they work at high place;
- 3) The Worker shall fix the grip of an auxiliary ropes at the upper position of their safety ropes;
- 4) The Worker uses special wires or a lift when delivering materials and tools from ground to high place;
- 5) The Contractor shall ensure that no one lean out of the rail of the track vehicles, or take a foot on the rail;
- 6) Shall take all the precautions for self-propellant or roll prevention when bringing the track vehicle to a stop;
- 7) Making sure that the regular connection and signal is maintained when moving the track vehicle;
- 8) The installation of medium rail at the place where handrail is more than 85cm high;
- 9) The training is given to all, for putting on a foot brake when bringing the rolling tower to a stop or working on the deck of the rolling tower suspended;



- 10) The rolling tower is moved after checking that no one is on the deck;
  - 11) Fixing the ladder by an assistant constantly when using;
  - 12) Putting on a foot brake and fixing the insulation tower by an assistant when bringing the insulation tower to a stop or working on its suspension;
  - 13) Moving the insulation tower after contacting workers on the insulation tower and making the signal in advance when moving. and
  - 14) Not to work on the top of the stepladder.
- 4.27.3. While going up and down along an Electric Pole, the Contractor shall ensure the safety precautions mentioned below:
- 1) Use of a safety rope, an auxiliary rope and a fall prevention equipment with using an exclusive scaffold when going up and down along the electric pole;
  - 2) Conformation of corrosion of a root of the electric pole in advance when going up and down along the electric pole made of steel or the illumination post;
- 4.27.4. While going up and down along a Power Pylon or a High Steel Structure or working above it, the Contractor shall ensure the safety precautions mentioned below:
- 1) Use of an escort rail, or both a Full Body Harness and an auxiliary rope when going up and down along the power pylon or the high steel structure;
  - 2) While working on a Beam, the Contractor shall ensure the safety precautions mentioned below:
    - a) Use of a horizontal rope on working consecutively on the beam or painting the beam surface without an auxiliary rope; and
    - b) Use of a safety rope and an auxiliary rope when moving on the beam under unavoidable circumstances.
- 4.27.5. Others:
- 1) Let workers operate on a beam or a stage plank more than 30 cm wide when working on the roof or attic; and
  - 2) Use of an auxiliary rope, a rolip, and main rope when moving or working on the slope more than 2m high, or the upper part of exterior wall or a truss bridge.
- 4.28. Locomotives and Wagons**
- 4.28.1. Speed limit is determined and traffic signs of speed limits, lights and related hazards signage and cautions shall be installed at work place.
- 4.28.2. Person in charge shall be nominated as maintenance officer to inspect and repair temporary rails or track surface situation regularly.



- 4.28.3. Overrun prevention equipment is installed on vehicles.
- 4.28.4. Ensure the installation of an alarm device such as a horn and a buzzer, a head light, and a flood light for the driver's seat.
- 4.28.5. Ensure the installation of fences, an entrance, seats, and hand hold for a man car.
- 4.28.6. Every driver of locomotive shall have the Valid Driving License.
- 4.28.7. Training and education shall be given to the driver and the signal man regarding how to send standard signal and operate vehicle diagram and turning off and putting on the brakes while the driver leaves his seat. And making sure to set wheel stoppers when stopping or parking at the slope track.
- 4.28.8. The driver shall be educated regarding following measures when pushing by locomotive driving or keeping out the area: - Arrangement of a conductor must be ensured.; - Installation of a head light required; - Installation of communication equipment between a conductor and a driver is required.
- 4.28.9. Inspection shall be done according to each vehicles function. Monthly and yearly self-inspection system for fixed matters shall be implemented and records shall be kept for three years.
- 4.28.10. Explosive gases are easily ignited by flames or sparks from fuel-fired locomotives. Where such gases may be present, electric, compressed air, or storage battery locomotive shall be used.
- 4.28.11. A major hazard with electric locomotive, in addition to that of sparking in explosives atmospheres, is the possibility of employees contact with the trolley.
- 4.28.12. The trolley shall be guarded at all points where employees may pass under it and shall be high enough to prevent contact at all places. Deck walks shall have hand rails around the outside.
- 4.28.13. Each locomotive shall carry an extinguisher for oil fires.
- 4.29. Driving and Operation of Track Motor Vehicle etc.**
- 4.29.1. The Contractor shall prepare a work procedure relating to operation such as track bound motor vehicles etc. or the like by referring to Appendix-4 " Instruction Manual for the Usage of Track Bound Motor Cars, etc." before the start of track works/electrical works to obtain the approval of the Engineer.
- 4.29.2. Based on the work procedure relating to operations such as track motor vehicles etc., the Contractor shall carry out general training courses one after another for new supervisors, operations leaders and drivers and safety training courses one after



another for new workers entering into track works area for various construction works.

- 4.29.3. The Contractor shall deliver work specific safety trainings and distribute a sticker to be affixed on their helmets to those who have completed courses and those who have certificates of completion would be allowed to work at site.

#### **4.30. Rolling Stock Works**

##### **4.30.1. General**

The Contractor shall ensure that:

- 1) All the compliances related to logistic of the rolling stocks according to the relevant local laws and regulations;
- 2) To comply with all the traffic rules and regulation and obtain all the permissions from the concern's local authority well in advance;
- 3) The Contractor will develop Risk assessment of each individual activity with the Safe operating procedure;
- 4) The Rolling Stock shall be prohibited to move while the Rolling Stock is not planned to move and signage to this effect put on the rolling stock;
- 5) The Contractor shall indicate the energizing or de-energizing condition of the Rolling Stock by means of any way;
- 6) To inform/confirm a caution to all Workers in advance prior to energize or de-energize the Rolling Stock or the OHE;
- 7) Prior to energize or de-energize the OHE, the Rolling Stock shall be de-energized, and the pantographs shall be locked at housed position; and
- 8) The driver of vehicle such as shunter shall have enough knowledge and experience of driving skill and shall be sufficiently trained.

##### **4.30.2. Transportation on Public Road**

The Contractor Shall ensure that:

- 1) The vehicle fitness and safety gears shall be tested, and inspection report will be submitted to engineer prior to loading the rolling stock on the vehicle;
- 2) The Contractor shall ensure that the rolling stock has tied up properly on the transporting vehicle to avoid falling while moving on road; and
- 3) All the relevant safety forms and inspections done to ensure the safety while moving in traffic, loading, unloading and assembly at Depot.

##### **4.30.3. Testing and Commissioning and Trial Run Requirements**



The Contractor shall ensure:

- 1) The electrical isolation at the time of commissioning of the rolling stock;
- 2) Proper earthing system is provided at site;
- 3) The permit system duly approved by the Engineer while working with the various interface contractors; and
- 4) To follow all the system developed by the Engineer to ensure the safety in interfacing various contractors.

#### 4.30.4. Electrical Precautions;

The Contractor shall ensure to discharge electrical energy from high voltage circuit prior to work on the roof.

### 4.31. Confined Space Entry

4.31.1. The Contractor must ensure all confined spaces are identified and managed using documented site confined space management methods.

4.31.2. When internal combustion engines are to be used into confined space or excavation or any other workplace where natural or artificial ventilation system is inadequate to keep carbon monoxide below 50ppm, exposure of workers shall be avoided unless suitable measures are taken and provided by the Contractor.

4.31.3. No worker shall be allowed into any confined space or tank or trench or excavation wherein there is given off any dust, fumes/vapours or other impurities which is likely to be injurious or offensive, explosive or poisonous or noxious or gaseous material or other harmful articles unless steps are carried out by the Contractor and certified by the responsible person to be safe.

### 4.32. Fire Protection

4.32.1. The Contractor shall ensure that the Site is provided with fire extinguishing equipment sufficient to extinguish any probable fire at the Site.

4.32.2. The extinguishers shall be chosen as per type of fire load and surrounding location.

4.32.3. An adequate water supply is provided at ample pressure as per national standard.

4.32.4. All construction machinery including crane shall carry a portable fire extinguisher in operator's cabin.

4.32.5. Emergency plan and Fire Evacuation plan in SHE Management Plan shall be prepared and issued by the Contractor. Mock drills shall 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 shall be prominently displayed near each telephone on site.

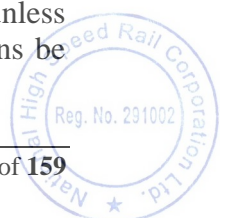
- 4.32.6. Recharging of fire extinguishers and their proper maintenance shall be ensured and as a minimum shall meet Indian National Standards.
- 4.32.7. All drivers of vehicles, foreman, supervisors and managers shall be trained on operating the fire extinguishers and firefighting equipment.
- 4.32.8. The Contractor shall also consider the provision of adequate firefighting arrangements within the underground and tunnelling operations including the provision of Fire Service compatible hose connections and emergency lighting.
- 4.32.9. Combustible scrap and other construction debris shall be disposed of site on a regular basis. If scrap is to be burnt on site, the burning site shall be specified and located at a distance no less than 12 m from any construction work or any other combustible material.
- 4.32.10. Every fire, including those extinguished by the Contractor shall be reported to the Engineer.

#### **4.33. Corrosive Substance**

- 4.33.1. As per BOCWR, corrosive substances including alkalis and acids shall be stored and used by a person dealing with such substances at the Site in a manner that it does not endanger the Workers and suitable PPE shall be provided by the Contractor to the Workers during such handling and work.
- 4.33.2. In case of spillage of such substances on the Workers, the Contractor shall take immediate remedial measures.

#### **4.34. Demolition**

- 4.34.1. All demolition works be carried out in a controlled manner under the management of experienced and competent supervision.
- 4.34.2. The concerned department of the Government or local authority is informed, and permission obtained wherever required. Media shall also be informed regarding this concern.
- 4.34.3. All glass or similar materials or articles in exterior openings are removed before commencing any demolition work and all water, steam, electric; gas and other similar supply lines are disconnected.
- 4.34.4. No demolition work be performed if the adjacent structure seems to be unsafe unless and until remedial measures life sheet piling, shoring, bracing or similar means be



ensured for safety and stability for adjacent structure from collapsing.

- 4.34.5. Debris/bricks and other materials or articles shall be removed by means of chute, bucket or other safe method.
- 4.34.6. No person other than the Workers or other persons essential to the operation of demolition work shall be permitted to enter a zone of demolition and the area be provided with substantial barricades.

#### **4.35. Permit to Work**

4.35.1. The Contractor shall develop work permit system, which is 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.

4.35.2. Examples of high-risk activities include but are not limited to:

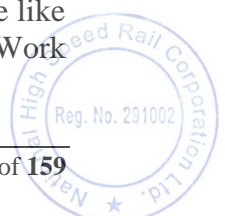
- 1) Entry into confined spaces;
- 2) Work at height;
- 3) Hot work;
- 4) Excavation;
- 5) Work with heavy moving machinery;
- 6) Heavy lifting operations and lifting operations closer to live electric power line;
- 7) Work with using track motor vehicles etc;
- 8) Work under electric facility and overhead electric (OHE) line energized; and
- 9) Blasting.
- 10) Piling.

4.35.3. The Contractor shall prepare operation manuals above mention and implement training course at any time based on such manuals to the Workers and given completion certificates before the commencement of works.

4.35.4. A work permit authorization form shall be completed with the maximum duration period not exceeding 12 hours or end of shift, which is earlier.

4.35.5. A copy of each permit to work shall be displayed at work place and the permit shall be completed with Clearance of Man and Material declaration by permit holder.

4.35.6. The Contractor shall prepare a work control procedure relating to electrical and other works during the period when the overhead electrical facility is energized or the like by referring to Appendix-5 " Instruction Manual for the Control of Electrical Work

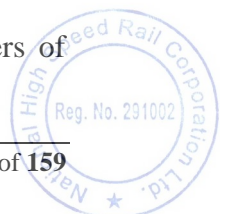


during the Period when the Overhead Contact System is Energized" and Appendix-6 " Instruction Manual for the Control of Other Work during the Period when the Overhead Contact System is Energized" before the start of energizing such electric facilities to obtain the approval of the Engineer.

- 4.35.7. Based on the work control procedure relating to electrical and other works during the period when the overhead electrical facility is energized, the Contractor shall appoint control managers concerning both electrical construction and surrounding construction within their organization to decide whether to grant permission for the work application from the Subcontractors during the energisation period of electrical facilities such as substation and overhead electric power lines.
- 4.35.8. Based on the work control procedure relating to electrical and other works during the period when the overhead electrical facility is energized, the Contractor shall carry out general training courses one after another for new operations team leaders of the Subcontractors. In addition, the Contractor shall deliver the certificate of completion to them and distribute the armband to oblige to wear it during their works.

#### **4.36. Traffic Management and Site Barricading**

- 4.36.1. The guiding principles to be adopted for safety in construction zone are to:
- 1) Warn the road user clearly and sufficiently in advance;
  - 2) Provide safe and clearly marked lanes for guiding road users;
  - 3) Provide safe and clearly marked buffer and work zones; and
  - 4) Provide adequate measures that control driver behaviour through construction zones.
- 4.36.2. In all cases, the Contractor shall employ proper precautions. Wherever operations undertaken are likely to interfere with public traffic, Specific Traffic Management Plans shall be drawn up and implemented by the Contractor in consultation with the approval of Local Police Authorities and/or the concerned politburo/Civil Authorities.
- 4.36.3. All workers shall be provided with high visibility jackets with reflective tapes as most of viaduct/tunnelling and station works or either above or under right-of way. Conspicuity of workmen always shall be increased to protect from speeding vehicular traffic.
- 4.36.4. The primary traffic control devices used in work zones shall include signs, delineators, barricades, cones, pylons, pavement markings and flashing lights.
- 4.36.5. Regulatory signs impose legal restriction on all traffic. It is essential, therefore, that they are used only after consulting the local police and traffic authorities.
- 4.36.6. Warning signs in the traffic control zone shall be utilized to warn the drivers of



specific hazards that may be encountered.

- 4.36.7. The Contractor shall place detour signage at strategic locations and install appropriate warning signs. To minimize disruption of access to residences and business, the Contractor shall maintain at least one entrance to a property where multiple entrances exist.
- 4.36.8. A warning sign shall be installed on all secondary road which merges with the primary road where the construction work is in progress at sufficient distance before it merges with the primary road so as to alert the road users regarding the ‘Work in Progress’.
- 4.36.9. Materials hanging over/protruded from the chassis/body of any vehicle especially during material handling shall be indicated by red indicator (red light/flag) to indicate the caution to the road users.
- 4.36.10. The delineators are the elements of a total system of traffic control and have two distinct purposes:
- 1) To delineate and guide the driver to and along a safe path; and
  - 2) As a taper to move traffic from one lane to another.
- 4.36.11. These channelizing devices such as cones, traffic cylinders, tapes and drums shall be placed in or adjacent to the roadway to control the flow of traffic. These shall normally be retro-reflectors complying to Section 79 of Indian Road Congress (IRC) - Recommended Practice for Road Delineators.
- 4.36.12. Traffic cones of 500mm, 750mm and 1000mm high and 300mm to 500mm in diameter or in square shape at base and are often made of plastic or rubber and normally have retro-reflectorized red and white band shall be used wherever required.
- 4.36.13. Drums about 800mm to 1000mm high and 300mm in diameter can be used either as channelizing or warning devices. These are highly visible, give the appearance of being formidable objects and therefore command the respect of drivers.
- 4.36.14. Such traffic management plans shall include provision for traffic diversion and selection of alternative routes for transport of equipment. If necessary, the Contractor shall carry out road widening before commencement of works to accommodate the extra load.
- 4.36.15. The road construction and maintenance signs which fall into the same three major categories as do other traffic signs, that are regulatory signs, warning signs and direction (or guidelines) signs shall only be used. The IRC: 67 (Code of Practice for Road Signs) provide a list of traffic signs. The size, colours and placement of sign shall conform to IRC: 67.





- 4.36.16. Same the way barricades protect the road users, public and Animals from the danger due to construction activities, equipment and other temporary structures. The road barricades need to be as per the IRC\_SP\_55, IRC 67 but not limit to the same.
- 4.36.17. The barricades shall be erected around the Site to prevent the surrounding area from excavated soil, rubbish etc., which may cause inconvenience to and endanger the public. The barricade especially those exposed to public shall be aesthetically maintained by regular cleaning and painting as directed by the Engineer. These shall be maintained in one line and level.
- 4.36.18. The structure dimension of the barricade, material and composition, its colour scheme, the Employer's logo and other details shall be in accordance with specifications laid down by Engineer/Employer.
- 4.36.19. All barricades shall be erected as per the design requirements of the contract, numbered, painted and maintained in good condition and barricade in-charge maintains a barricade register in the Site.
- 4.36.20. All barricades shall be conspicuously seen in the dark/night time by the road users so that no vehicle hits the barricade. Conspicuity shall be ensured by affixing retro reflective stripes of required size and shape at appropriate angle at the bottom and middle portion of the barricade at a minimum gap of 1,000 mm. In addition, minimum one red light or red-light blinker shall be placed at the top of each barricade.
- 4.36.21. Site barricades maintenance inspection shall be done regularly.
- 4.36.22. The Contractor shall decide keeping van/manpower to tow away any breakdown vehicle in the traffic flow without losing any time at his cost.
- 4.36.23. The Contractor shall ensure the cleanliness of roads and footpaths by deploying proper manpower for the same. The Contractor shall have to ensure proper blooming, cleaning washing of roads and footpaths on all the time throughout the entire stretch till the currency of the Contract including disposal of seepage.
- 4.36.24. The Contractor shall ensure that all his construction vehicles plying on public roads (like dump trucks, trailers, etc.) have proper license to ply on public roads from the State Transport Authority. Drivers holding proper valid license as per the requirements of Motor Vehicles Act shall drive these vehicles.
- 4.36.25. The Contractor shall not undertake loading and unloading at carriageways obstructing the free flow of vehicular traffic and encroachment of existing roads by the Contractor applying the excuse of work execution.

#### **4.37. Working near Railway**

##### **4.37.1. Operational Safety**



Where the Schedule of Dimensions of Indian Railways (IR) for the running tracks is likely to be infringed by the Contractor, the following safety measures for the basis of “Indian Railways: Safety Precautions at the Worksite Adjacent to Track (SEP2015)” shall be ensured.

4.37.1.1. Measures Prior to Start of the Work:

- 1) The Contractor to provide necessary training to their supervisors and staff and shall ensure that they know about the safety norms to be followed for working in the premises of IR and near running tracks and electrified territories;
- 2) To inform the Engineer about:
  - a) Name and address of the Contractor’s suppliers/Subcontractors assigned to execute the work;
  - b) Name of the vehicle drivers/equipment operators identified for the work; and
  - c) Location, duration and timings during which the Schedule of Diameter (SOD) of IR is to be infringed.
- 3) To provide the Engineer with:
  - a) Copy of detailed planning of work including protection of IR track and safety measures proposed (duly approved by the Engineer); and
  - b) Copy of the competency certificate of the Contractor’s supervisor in charge of the work (to be issued by the Engineer).
- 4) To demarcate the working area at site in consultation with the Engineer;
- 5) Barricade/temporary fencing along the stretch of the concentration of the work area along the IR track as approved by the Engineer; and
- 6) To provide adequate watch and ward, flagmen, lighting etc. including signage boards.

4.37.1.2. Before starting of work, Specific Method Statement for the works near railway shall be prepared by the Contractor and shall be submitted to the Engineer and to the Employer for further submission to IR for discussion, approval and permission.

4.37.1.3. Measures during Execution of Work:

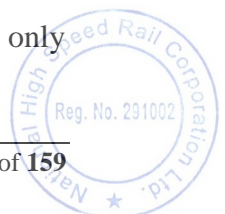
- 1) It shall be ensured that no workmen and staff is working on line/trackside unless proper ‘Permit to Work’ is issued for those lines by Indian Railways (IR) and the Engineer;
- 2) It shall be ensured that the moving dimensions of IR shall not be infringed. In case of track crossing, the work is required; the same shall not be carried out without permission from IR and the Engineer. Safety of all the existing fixed structures near the vicinity of the Site shall also be ensured;
- 3) No vehicles shall be plied within 6m of centre of the IR track without the specific

approval from IR and the Engineer. Individual vehicle/construction equipment shall not be left un-attended. No vehicle shall ply from sun-set to sunrise and during the period when the visibility is impaired, except in case of emergency and with the consent of IR and the Engineer;

- 4) Where the construction vehicles are required to ply along the existing running tracks of IR, the Contractor shall deploy the adequate patrolmen to prevent tendency of the vehicle drivers to come close to the tracks and infringe;
- 5) All the drivers of the road vehicles/machines plying near the running tracks of IR shall be provided with a red flag/red lamp so that in the event of any obstruction, they can stop the incoming train;
- 6) It shall be ensured that the line of demarcation shall not be infringed by the road vehicles/ construction equipment;
- 7) It shall be ensured that only eligible and competent staff shall be employed for the work and they must wear identity card while working near running tracks of IR;
- 8) For working during night, sufficient illumination shall be provided for the entire work area for safety of the workmen and public;
- 9) Temporary engineering signals as required shall be provided;
- 10) Existing engineering indicator boards shall be lit as per Permanent Way Manual (PWM) of IR;
- 11) Lookout man with red and green flags/hand signals and whistle shall be deployed wherever required;
- 12) No part of the stacked material shall infringe the moving dimensions of IR. Material shall be stacked to such a height that it does not lead to infringement of Schedule of Diameter (SOD) in case of accidental toll off;
- 13) Any temporary arrangement shall not infringe with the moving dimensions of IR;
- 14) Where the work is planned to be done within 3.5m from the centre of the IR tracks, it shall require traffic block and all the necessary safety precautions shall be ensured as per the requirements of Para No. 806 and 807 of PWM of Indian Railways;
- 15) First aid kit shall be readily available at the site;
- 16) In case any cable/utility is found while working, the Contractor shall inform IR and the Engineer immediately. In case many cables/utilities are found during excavation; the work shall be carried out in the presence of representative from the concerned owning agency of the utility/cable; and
- 17) It shall be ensured that the existing emergency sockets of IR are not damaged.

#### 4.37.1.4. Additional Measures Required during Traffic Block:

- 1) Any work when infringing the moving dimensions of IR shall be started only



after traffic block has been imposed and IR track is protected;

- 2) All the work intended to be completed during traffic block shall be completed within the duration of the traffic block and the duration of the traffic block shall not be exceeded; and
- 3) Traffic block shall be considered as cleared only when all the temporary arrangements/machinery is cleared of the moving dimensions and the IR track is left with proper track geometry so that IR trains can run safely.

#### 4.37.1.5. Safety Measures while Working in Over Head Electrical Lines (OHE) Area:

- 1) While working near the OHE area, the safety guidelines as specified in para 20301, 20327, 20334, 20335, 20529, 20612, 20614, 20714, 20825, 20833, 21206 and 21207 of Volume II, Part 1 of AC Traction Manual of Indian Railways shall be followed;
- 2) No electric work close to the live OHE shall be carried out without power block and specific approval from IR and the Engineer;
- 3) A minimum distance of 2.0 m shall be maintained between live OHE wire and any body part of the workmen or tools or metallic support etc.; and
- 4) No electric connection shall be tapped from OHE.

#### 4.37.2. Excavation Affecting Existing Tracks

4.37.2.1. While doing excavation near the vicinity of the existing tracks including for bridges and other structures, special care must be taken to ensure that formation of the existing Railway line is not excavated, for that matter any activity involved in construction/execution of the project shall not endanger the safety of existing running line of IR.

4.37.2.2. If excavation or any other activity involving working and or modification and or alteration of the existing permanent way then, before execution of such work, the Contractor shall prepare a drawing clearly indicating such alternation/modification of the existing permanent way, and the protection measure intended to be taken by the Contractor to ensure safety of the existing running line. The effectiveness of design of such protection measures is the sole responsibility of the Contractor.

4.37.2.3. These protection measures duly indicating the extent of alternation/modification to the existing formation shall be incorporated in the design and drawing submitted during preliminary design submission as per the Contract. Such work shall not be undertaken unless and until these drawings are approved by IR and the Engineer.

4.37.2.4. The Contractor shall indemnify IR and the Engineer against any damage to the existing tracks/structures/utilities etc. caused by the actions of the Contractor or his subcontractors, and shall make good the same, as directed by the concerned authorities, at his own cost and shall also pay any penalty (is) /demurrages if levied by the concerned authorities.

#### 4.37.2.5. Safety Requirements for Electrical Works:

- 1) The Indian Electricity Rules 1956, as amended up to date, shall be followed. The detailed instructions on safety procedures given in IS code. and Indian Electricity Rules, respective State Electricity Authorities' regulation with up to date amendment shall be applicable;
- 2) The Low Tension (LT)/High Tension (HT) distribution diagrams of sub stations shall be prominently displayed. The substation premises, main switch rooms and Distribution Box (D.B.) enclosure shall be kept clean whenever works are carried either inside or outside;
- 3) No inflammable materials shall be stored in places other than the rooms specially constructed for this purpose in accordance with the provisions of Indian Explosives Act, 2008;
- 4) Rubber insulating mats of suitable size and thickness shall be provided in front of the main switch boards of sub-station or any other control equipment of medium voltage and above;
- 5) Protective and safety equipment such as rubber gauntlets or gloves, earthing rods, linemen's belt, portable artificial respiration apparatus, safety goggles etc., shall be provided as per the requirement of the works;
- 6) Necessary number of caution boards such as "Man working on line, don't switch on" shall be readily available near electrical installation;
- 7) Standard first aid boxes containing materials as prescribed by the St. John's Ambulance Brigade or Indian Red Cross shall be made available;
- 8) Charts displaying methods of giving artificial respiration to a recipient of electrical shock (one in English and another one in the regional language) shall be prominently displayed at appropriate places;
- 9) No work shall be undertaken on live installations, or on installation, which could be energized unless one another person is present to immediately isolate the electric supply in case of any accident and to render first aid, if necessary;
- 10) No work on live L.T. bus bar or pedestal switch board in the sub stations shall be handled by a person below the rank of a licensed wireman and such a work shall preferably be done in the presence of a qualified engineer;
- 11) When working on or near live installations, suitable insulated tool shall be used, and special care shall be taken to see that those tools accidentally do not drop on live terminals causing shock or dead short;
- 12) The electrical switch controls in distribution boards shall be clearly marked to indicate the areas being controlled by them;
- 13) Before starting any work on the existing installation, it shall be ensured that the electric supply to that portion is cut off. Precautions, like displaying "Men at Work" caution boards on the controlling switches, removing fuse carrier from these switches shall be taken against accidental operation. Caution boards shall be kept with the person working on the installation;

- 14) All electrical panels and switchgear shall conform to relevant IEC standard;
- 15) All external enclosures shall have degree of protection not less than IP-54;
- 16) All equipment/system shall conform to relevant IEC standard on Electromagnetic Compatibility (EMC); and
- 17) Cable routes of all the newly laid cables by the Contractor shall be identified with electronic or concrete markers.

#### **4.38. Working near Waterbody**

- 4.38.1. When any worker proceeds to or from any working place by water for purposes of carrying on a construction work, proper measures are taken to provide for his safe transportation and vessels used for such purpose are used in charge of a responsible person and are properly equipped for safe navigation and are maintained in good condition.
- 4.38.2. Maximum number of persons which can be safely carried in a vessel as certified under the relevant law in force is marked.
- 4.38.3. Adequate protection is provided to the Workers in such vessel from inclement weather.
- 4.38.4. In case the building of such vessel is lower than 60cm from the level of the deck of such vessel, the open edge of such bulwarks is fitted with suitable fencing to a height of at-least 1.0 m above such deck and the post and stanchions and similar parts used in such fencing are not spaced more than 2.0 m apart.
- 4.38.5. The number of life buoys on deck of such vessel is equal to the number of people on such vessel and is not less than two.
- 4.38.6. All life buoys on deck of such vessel are kept in good state of maintenance and are so placed that if such vessel sinks then they remain to float and one of such buoys is within the immediate reach of the Steer-man of such vessel and another is situated after part of such vessel.
- 4.38.7. The Engineer shall ensure at the Site of a construction work that where, on or adjacent to the work place of any site to which these rules apply, there is water into which a worker employed for work on such site is, in the course of his employment, may fall and has the risk of drowning, suitable rescue equipment is provided and kept in an efficient state for ready use and measures are taken to arrange for the prompt rescue of such worker from the danger of drowning and where there is a special risk of such fall from the edge of adjacent land or from a structure adjacent to or above the water or from floating stage on such water, secure fencing is provided near the edge of such land, structure or floating stage, as the case may be, to prevent such fall, and such fencing may be removed or allowed to remain un-erected for the time and to the extent necessary for the access of the Workers to such work or the movement of material of such work.



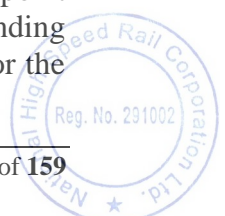


#### **4.39. Other Works to be Scrutinized**

- 4.39.1. Other works including, but not be limited to, the works in the Site (the ROW), the works in the Borrow Pit, the works in the Quarry and Works on road shall be included to be scrutinised with respect to the accident prevention.
- 4.39.2. If blasting is anticipated in excavation in rock, preventive measures against accidents and protective measures against environmental/social impacts shall be of paramount importance.
- 4.39.3. The Contractor shall include all those items as well as work elements to formulate the preventive and protective measures considering envisaged conditions, situations, and activities of the works which may induce accidents or hazard to environment and/or society.

#### **4.40. Working when overhead electrical facility is energised**

- 4.40.1. Driving and Operation of Track Motor Vehicle etc.
  - 4.40.1.1. The Contractor shall prepare a work procedure relating to operations of track bound motor vehicles etc. or the like by referring to Attachment-4 " Instruction Manual for the Usage of Track Bound Motor Cars, etc." before the start of track works/electrical works to obtain the approval of the Engineer.
  - 4.40.1.2. Based on the work procedure relating to operations of track motor vehicles etc., the Contractor shall carry out general training courses one after another for new supervisors, operations leaders and drivers and safety training courses one after another for new workers entering into track works area for various construction works.
  - 4.40.1.3. The Contractor shall deliver work specific safety trainings and distribute a sticker to be affixed on their helmet to those who have completed courses and those who have certificate of completion would only be allowed to work at site.
- 4.40.2. Permit to Work.
  - 4.40.2.1. The Contractor shall prepare a work control procedure relating to electrical and other works during the period when the overhead electrical facility is energized or the like by referring to Attachment-5 " Instruction Manual for the Control of Electrical Works during the Period when the Overhead Contact System is Energized" and Attachment-6 " Instruction Manual for the Control of Other Works during the Period when the Overhead Contact System is Energized" before the start of energizing such electric facilities to obtain the approval of the Engineer.
  - 4.40.2.2. Based on the work control procedure relating to electrical and other works during the period when the overhead electrical facility is energized, the Contractor shall appoint control managers concerning both electrical construction and surrounding construction within their organization to decide whether to grant permission for the





work application from the Subcontractors during the energisation period of electrical facilities such as substation and overhead electric power lines.

4.40.2.3. Based on the work control procedure relating to electrical and other works during the period when the overhead electrical facility is energized, the Contractor shall carry out general training courses one after another for new operations team leaders of the Subcontractors. In addition, the Contractor shall deliver the certificate of completion to them and distribute the armband to oblige to wear it during their works.

#### **4.41. Personal Protective Equipment**

4.41.1. The PPEs and safety appliances provided by the Contractor shall be of the standard as prescribed by Bureau of Indian Standards (BIS). If materials conforming to BIS standards are not available, the Contractor as approved by the Engineer shall procure PPE and safety appliances.

4.41.2. All workers shall be provided with high visibility jackets with reflective tapes conforming to the requirement specified under BS EN 471: 1994 as most of works are executed either above or under right-of-way. Conspicuity of workmen always shall be increased to protect them from speeding vehicular traffic.

4.41.3. The Contractor shall provide safety helmet, safety shoe and high visibility clothing for all employees including workmen, traffic marshal and other employees who are engaged for any work under this contract as per the following requirement.

4.41.4. The Contractor shall at all time maintain a minimum of 10% spare PPEs and safety appliances and properly record and show to the Engineer during the inspections. Failing to do so shall invite penalty as per Clause 7. [Financial Deduction/Withholding].

4.41.5. The Contractor shall provide required PPEs to workmen to protect against safety and/or health hazards. Primarily PPEs are required for the following protection:

- 1) Head protection (Safety helmet with a chin strap) ;
- 2) Foot protection (Safety footwear, Gumboot, etc.);
- 3) Body protection (High visibility clothing (Waistcoat/Jacket), Apron, etc.);
- 4) Personal fall protection (Full body harness, Rope-grip fall arrester, etc.);
- 5) Eye protection (Goggles, Welders Glasses, etc.);
- 6) Hand protection (Gloves, Finger coat, etc.);
- 7) Respiratory protection. (Nose mask, Self-contained breathing apparatus, etc.) ;  
and
- 8) Hearing protection (Ear plugs, Ear muffs, etc.).



<b>Safety Helmet Colour Code (Every Helmet shall have the LOGO* affixed/painted)</b>	<b>Person to use</b>
Hard hat with company Logo	Hard hat with reflective tape (Marshals)
White	The Employer/Engineer
Grey	All designers, Architect, Consultants, etc.
Violet	Main contractors (Engineers/Supervisors)
Blue	All subcontractors (Engineers/Supervisors)
Red	Electricians (Both Contractor and Subcontractor)
Green	Safety professionals (Both Contractor and Subcontractor)
Orange	Security guards/Traffic marshals
Yellow	All workmen
White (with “VISITOR” sticker)	Visitors
<b>Safety Shoes (Anyone at the Site incl. Marshals)</b>	
<b>Safety Jacket</b>	
All employees of the Contractor including workmen	Traffic marshals



<p>Hi-visibility waistcoat covering upper body and meeting the following requirements as per BS EN 471:1994:</p> <p>(a) Background in fluorescent Green (Engineers &amp; Supervisors ) and orange-red (Workmen) in colour</p> <p>(b) Two vertical green strips of 5cm wide on front side, covering the torso at least 500 cm<sup>2</sup></p> <p>(c) Two diagonal strips of 5 cm wide on back in an ‘X’ pattern covering at least 570cm<sup>2</sup></p> <p>(d) Horizontal strips not less than 5cm wide running around the bottom of the vertical strip in front and ‘X’ pattern at back.</p> <p>(e) The bottom strip shall be at a distance of 5cm from the bottom of the vest.</p> <p>(f) Strips must be retro reflective and fluorescent</p> <p>Waistcoat shall have a side adjustable fit and a side and front tear-away feature on vests made of nylon.</p>	<p>Hi-visibility jacket covering upper body and meeting the following requirements as per BS EN 471:1994:</p> <p>(a) Background in fluorescent orange-red in colour</p> <p>(b) 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.</p> <p>(c) Two vertical green strips of 5cm wide on front side, covering the torso at least 500 cm<sup>2</sup></p> <p>(d) Two diagonal strips of 5 cm wide on back in an ‘X’ pattern covering at least 570cm<sup>2</sup></p> <p>(e) Horizontal strips not less than 5cm wide running around the bottom of the vertical strip in front and ‘X’ pattern at back.</p> <p>(f) The bottom strip shall be at a distance of 5cm from the bottom of the vest.</p> <p>Strips must be retro reflective and fluorescent.</p>
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**4.42. Visitor at Site**

4.42.1. No visitor can enter the Site without the permission. All authorised visitors shall report at the site office. The Contractor shall 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. Entry of visitors in underground shall be suitably controlled.

4.42.2. The Contractor shall be fully responsible for safety and health of all visitors within the Site.

**4.43. Site Security**

4.43.1. The Contractor shall be wholly responsible for security on the Site and any other areas being used by him or the Subcontractors for the purposes of the Contract. The Contractor shall implement and cause the Subcontractors to implement proper security management procedures in accordance with the approved SHE Management Plan.



- 4.43.2. The Contractor shall assign on the Site a security officer (adequately trained person,) and his alternate(s), who shall be primarily responsible for the Contractor's security services and fully cooperate with the Engineer's security organization throughout the Time for Completion. Necessary approval of agency shall be obtained from the Engineer.
- 4.43.3. The security plan covered by the SHE Management Plan shall contain the following:
- 1) Security policy statement and objectives;
  - 2) The Contractor's security organization;
  - 3) Role, responsibility and authority of each member of the security organization;
  - 4) Procedure for enforcement of security regulations;
  - 5) Daily, weekly and monthly security meeting procedures;
  - 6) Sample forms for security reports;
  - 7) Personnel security control procedures;
  - 8) Goods security control procedures;
  - 9) On-site security patrol procedures;
  - 10) Liaison and coordination procedure with local fire/police and other authorities;
  - 11) Liaison and coordination procedure with the Employer and relevant other authorities; and
  - 12) Liaison, coordination and joint security inspection procedure with other contractors.
- 4.43.4. Where necessary, the Contractor shall install, modify, maintain and remove the temporary security fences, gates, posts, security lightings and other facilities required for proper security control, in addition to those to be constructed as part of the Works. The Contractor shall operate these facilities to properly control ingress to and egress from the areas under his control throughout the Time for Completion. This control shall apply to every person including the Employer's Personnel.

#### **4.44. Lock Out/ Tag Out (LOTO)**

- 4.44.1. The Contractor shall develop a procedure for LOTO system for performing maintenance or repair, wherever reasonability applicable and the same be ensured through work permit system.

### **5. OCCUPATIONAL HEALTH AND WELFARE**

#### **5.1. Physical Fitness of Workmen**

- 5.1.1. The Contractor shall ensure that his employees/workers subject themselves to such

medical examination as required under the law or under the contract provision and keep a record of the same.

- 5.1.2. The Contractor shall not permit any employee/workers to enter the work area under the influence of alcohol or any drugs.
- 5.1.3. The Contractor shall maintain the confidential records of medical examination or the physician authorized by the Engineer.
- 5.1.4. No worker is charged for the medical examination and the cost of such examination is borne by the Contractor employing such worker.
- 5.1.5. If the Contractor fails to get the medical examination conducted as mentioned above, the Engineer will have the right to get the same conducted through an agency with intimation to the Contractor and deduct the cost and overhead charges from his dues.

## **5.2. Medical Facilities**

### **5.2.1. Occupational Health Centre (First Aid Station)**

The Contractor shall provide at the Site an Occupational Health Centre (OHC) as a first aid station and maintain it in good order in terms of BOCWR. At least the one OHC shall be provided to serve a length of about 20 km along the alignment and shall have:

- 1) Minimum floor area of 15 m<sup>2</sup>, adequately illuminated and ventilated;
- 2) Two air-conditioned rooms with smooth walls and intern service; and
- 3) Adequate and necessary equipment for day-to-day requirement and to manage any medical emergency.

- 5.2.2. The Contractor shall appoint one construction medical officer in charge of the OHC where the total number of employees is up to 1,000 and one additional construction medical officers for every additional 1,000 employees or part thereof. The qualifications of such construction medical officer shall be as per BOCWR.
- 5.2.3. The Contractor shall appoint appropriate full-time staff including one nurse, one dresser-cum-compounder, one sweeper-cum-ward boy with each construction medical officer.
- 5.2.4. The Contractor shall communicate the complete including name, qualification and experience of the construction medical officer, to the inspector having jurisdiction under BOCWR.
- 5.2.5. Ambulance Room, Ambulance Van and Stretchers:



- 1) At the Sites where 500 or fewer workers are employed, the Contractor shall provide an ambulance room in terms of BOCWR. Alternatively, the Contractor shall arrange with a nearby hospital for providing suitable ambulance rooms. Such ambulance rooms shall have a qualified nurse in charge and its services are available to all workers during working hours;
- 2) In the Site where 500 or more workers are employed, the Contractor shall provide an ambulance room with a suitably qualified Construction Medical Officer in charge, provided with an effective communication system;
- 3) An ambulance room shall be equipped at least with the articles listed in Schedule IV, BOCWR; and
- 4) The Contractor shall provide an ambulance van at all Sites or arrange with a nearby hospital for providing such an ambulance van for prompt transportation of workers who meet with serious accident or who are sick. It is the Contractor's responsibility to ensure that all such ambulances are maintained in good repair and equipped with standard facilities specified in Schedule V of BOCWR.

5.2.6. The Contractor shall provide enough stretchers at each site for use in an emergency.

5.2.7. First Aid Boxes and Emergency Care:

- 1) The Contractor shall ensure at the Site one first-aid box for 100 workers provided and maintained for providing first-aid to the Workers. Every first-aid box shall be distinctly marked "First-Aid" and equipped with the articles specified in Schedule III of BOCWR;
- 2) At all Sites, the Contractor shall provide essential life-saving aids and appliances under the supervision of a construction medical officer, where he may be required to handle. Such lifesaving aids shall be provided to any worker who meets with an accident, before and during his transportation to a hospital and until he is attended by a doctor in such hospital; and
- 3) The Contractor shall also provide other equipment or facilities that may be required for emergency care or treatment of a worker arising from local conditions and specific construction processes.

5.2.8. HIV/AIDS Prevention and Control:

- 1) The Contractor shall adopt the Employer's "Workplace Policy on HIV/AIDS Prevention and Control for Workers Engaged by Contractors" and implement it. A copy of the policy is given in Attachment-4 [Workplace Policy on HIV/AIDS Prevention & Control]; and
- 2) The Contractor shall prepare and submit the Manual for HIV/AIDS Prevention and Control for his workers in terms of the aforesaid the Employer's Policy within 28 days of the date of notification of the Contract.

5.2.9. Prevention of Mosquito Breeding



Measures shall be taken to prevent mosquito breeding on the Site. The measures to be taken shall include:

- 1) 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;
  - 2) Stagnant water shall be treated at least once every week with oil to prevent mosquito breeding;
  - 3) The 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; and
  - 4) Water storage tanks shall be provided.
- 5.2.10. Posters in local language, Hindi and English, which draw attention to the dangers of permitting mosquito breeding, shall be displayed prominently on the Site.
- 5.2.11. The Contactor at periodic interval shall arrange to prevent mosquito breeding by fumigation/spraying of insecticides, and the ideal larvicide etc.
- 5.2.12. Alcohol, Smoking, and Drugs

The Contactor shall always ensure that no employee is working under the influence of alcohol/drugs which are punishable under BOCWR.

5.2.13. Smoking

Smoking at public places by any employee is also prohibited as per Government Regulations. The Contractor shall comply with the legal provisions in this regard, such as; Prohibition of Smoking in Public Places Rules, 2008. He shall be solely responsible for any penalty or punitive action by the government authorities because violations of the provisions contained in these rules by him or his representatives or his employees or his subcontractors. Requisite notice boards, posters, etc., shall be put by him, as per the Rules.

**5.3. Occupational Noise**

- 5.3.1. The Contractor shall comply with the codes, regulations and standards regarding noise pollution and control as notified and amended by Central Government and State Government from time to time on the Site including but not necessarily limited to:
- 1) Rule and Schedule VI of the Building and Other Construction Workers (Regulation of Employment of Service) Central Rules of 1998;
  - 2) Noise Pollution (Regulation and Control) Rules, 2000;
  - 3) Environment (Protection) Act, 1986;





- 4) Environment (Protection) Amendment Rules, 2000; and
- 5) Central Motor Vehicles Rules, 1989; VI) Notification on Control of Noise from DG Sets, 2002.

5.3.2. The Contractor shall always comply with any specific requirements of these and any other relevant statutes, including prescribed noise limits and standards as follows:

- 1) Permissible Exposure Levels of Impulse or Impact Noise for Work Zone Area [as per Model Rules of Factories Act, 1948]; and
- 2) Permissible Exposure in Case of Continuous Noise for Work Zone Area [as per Model Rules of Factories Act, 1948].

#### **5.4. Ventilation and Illumination**

5.4.1. The Contractor shall ensure at the Site of construction works that all working areas in a free tunnel are provided with ventilation system and the fresh air supply in such tunnel is not less than 6m<sup>3</sup>/min for each worker employed underground in such tunnel or underground workings and the free air flow movement inside such working area is not less than 9m/min.

5.4.2. The oxygen level shall not be less than 19.5% in the working environment.

5.4.3. The Contractor shall make every effort to illuminate the Site as mentioned in Clause 4. [Safety General], Sub-Clause 4.13. Illumination as well as that provided in the relevant national standards.

5.4.4. The Contractor shall conduct a weekly illumination monitoring by a Lux meter for all the locations and the report shall be sent to the Engineer within 7th of the next month and the same shall be reviewed during the Monthly SHE Committee Meeting.

#### **5.5. Radiation**

5.5.1. The use of radioactive substances and radiating apparatus shall comply with the Government Regulatory Requirements and all subsidiary legislations.

5.5.2. Operations involving risk of exposure to ionising radiation shall only be carried out after having been reviewed without objection by the Engineer and shall be carried out in accordance with the Contractor's Method Statement.

5.5.3. Each area containing irradiated apparatus shall have warning notices and barriers, as required by the regulations, conspicuously posted at or near the area.

5.5.4. Radioactive substances shall be stored, used or disposed, strictly in accordance with the Government Enactments.



5.5.5. The Contactor shall ensure that all sites personnel and members of the public are not exposed to radiation.

## 5.6. Welfare Measures for Workers

5.6.1. Latrine and Urinal Accommodation:

- 1) Latrine and urinals shall be provided as per Section 33 of BOCWA and maintained as per BOCWR and shall also comply with the requirements of public health authorities; and
- 2) When women are employed, separate latrine and urinals accommodation shall be provided.

5.6.2. Moving Sites:

- 1) In case of works like track laying, the zone of work is constantly moving at elevated level or at underground level. In such cases, mobile toilets with proper facility to drain the sludge shall be provided at reasonably accessible distance; and
- 2) In case the Contactor fail to provide required number of urinals and latrines or fail to maintain it as per the requirements of Public Health Laws, the Engineer shall have the right to provide/maintain through renowned external agencies at the cost of the Contactor.

5.6.3. Canteen

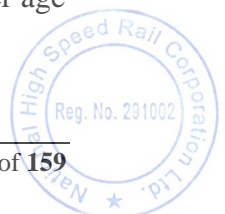
In every workplace wherein not less than 250 workers are employed, the Contractor shall provide an adequate canteen conforming to Section 37 of BOCWA, as stipulated in Rule 247 of BOCWR. Drinking Water.

As per Section 32 of BOCWA, the Contractor shall make in every site, effective arrangements to provide sufficient supply of wholesome drinking water. Quality of the drinking water shall conform to the requirements of national standards on Public Health Laws.

While locating these drinking water facilities due care shall be taken so that these are easily accessible within 200m from the place of work for all workers at all location of the Site. All such points shall be legible marked “Drinking Water” in a language understood by most of the workmen employed.

5.6.5. Crèche

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



#### 5.6.6. Labour Accommodation Camps

Labour camp management plan shall be prepared and approved by Engineer

Where workers are based some distance from their normal place of residence, the Contractor shall provide them with suitable and safe accommodation free of charge and shall take all necessary precautions to protect their health and welfare. The accommodation shall conform to the requirements of Section 34 of BOCWA and include but not be limited to the further measures specified hereunder.

5.6.7. All accommodation camps shall be provided always with a sufficient supply of clean drinking water (of potable quality according to national legal standards), in suitable and easily accessible locations:

1) The quality of drinking water shall be tested once a fortnight as prescribed in IS 1050:1991 and immediate remedial action shall be taken if quality falls below the standard. Test results shall be provided to the Engineer at least monthly.

5.6.8. The Contractor shall provide all accommodation camps with clean and properly equipped and staffed kitchen and canteen facilities to supply meals for workers.

5.6.9. The Contractor shall provide sufficient toilet and bathroom facilities for the numbers of workers accommodated in each camp. Separate accommodation and toilet/bathroom facilities shall be provided for men and women and all facilities shall be kept in full working order always and cleaned and re-equipped daily.

5.6.10. The Contractor shall provide a laundry facility for the Workers at the Labour Accommodation Camps.

#### 5.7. Heat Stress

5.7.1. The Contractor/Subcontractor will establish the necessary programs to ensure that project employees work safely in heat stress conditions.

5.7.2. The reduction of adverse health effects can be accomplished by engineering controls, work practices, training, acclimatization, monitoring, water and electrolyte balance and the recognition and treatment of heat stress emergencies.

### 6. ENVIRONMENT AND SOCIAL MANAGEMENT

#### 6.1. General Conduct of the Works

6.1.1. The Contractor shall review and comply with the environmental management plan (EMP) prepared in the Supplemental Environmental Impact Assessment (S-EIA) report available on the NHRCL information disclosure website (<https://www.nhrcl.in/environmental-impact-assessment-report>) and will note and implement any requirements therein, in addition to those found in this specification.

- 6.1.2. Before the start of construction, the Contractor will prepare a Construction Environmental Management Plan (CEMP) based on the CEMP Form to be reviewed and approved by the Engineer and implemented during the work. The CEMP shall sufficiently address the items contained in this specification.
- 6.1.3. The Contractor shall appoint Environment professionals as per the guidelines given in General Instructions: SHE/G1/002
- 6.1.4. The Contractor is required to build good public relations before the commencement of the Works particularly with the local level representatives such as the panchayat and village councillor, by informing the expected impacts by the Works and their schedule and dispute resolution mechanism known as GRM set by the Employer.
- 6.1.5. The Contractor shall post a public notice regarding the rationales of the Works, major impacts of the Works and schedule with the GRM information at the entrance to the Site and the Contractor's site offices. The notice shall be written in the dominant language of the project sites (Marathi or Gujarati), Hindi, and English.

## **6.2. Legislation**

- 6.2.1. The Contractor shall always comply with all relevant national and state legislation regarding environmental and social protection, pollution prevention and control, waste management and other relevant environmental and social matters, including but not necessarily limited to the following:
- 1) The Environment (Protection) Act, 1986 and Environment (Protection) Amendment Rules, 2002 (amended 2003, 2004, 2005, 2006, 2007 and 2008);
  - 2) The Indian Wildlife (Protection) Act, 1972;
  - 3) The Forest (Conservation) Act, 1980 & rules there under;
  - 4) The Tree Preservation and Felling Acts of respective States;
  - 5) The Coastal Regulation Zone (CRZ) Notification, 2011;
  - 6) The Noise Pollution (Regulation and Control) Rules, 2000;
  - 7) The Air (Prevention and Control of Pollution) Act, 1981 (amended 1987);
  - 8) The Water (Prevention and Control of Pollution) Act, 1974 (amended 1988);
  - 9) The Ground Water (Regulation, Development and Management) Rules 2007;
  - 10) The Solid Management Rules, 2016;
  - 11) The Construction and Demolition Waste Management Rules, 2016;
  - 12) The Hazardous and Other Wastes (Management and Transboundary Movement) Rules, 2016;
  - 13) The Bio-medical Waste (Management and Handling) Rules, 1998; and



14) The Batteries (Management and Handling) Rules, 2001.

6.2.2. Some guidance on the applicability and demands of these statutes is relevant below. This is not intended to be definitive and it is the Contractor's responsibility to obtain detailed guidance from the competent authorities regarding the specific requirements of all applicable legislation.

6.2.3. It is also the Contractor's responsibility to obtain all official approvals, consents or other authorizations as may be necessary to comply with the relevant statutes, and to pay all related fees and other costs. The Contractor shall obtain all authorizations in a timely manner and submit to the Engineer as the evidences for the regulatory obligations before commencement of any related construction activity.

### 6.3. Site Preparation

6.3.1. In addition to the legislations given in subsection 6.2.1 above, the Contractor shall comply with Guidance on Environmental Management of C&D Wastes (Central Pollution Control Board (CPCB) 2017), Specifications for Road and Bridge Works (Ministry of Road Transport and Highways 2000) and applicable road and bridge manuals and/or guidelines prepared by Indian Road Congress (IRC). Particularly for the following Works shall be carefully planned and conducted as per the given legislations, manual, guidelines and good practices in India.

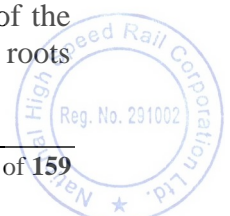
6.3.2. The contractor shall prepare a detailed Accommodation Camp Management plan (ACMP) which shall be submitted to the Engineer for review before constructions begins.

6.3.3. Preservation of Trees:

- 1) The Contractor shall not cut trees as per the regulations within or outside the Site without the explicit written approval of the competent authorities such as local Forest Department with the final instruction by the Engineer;
- 2) The Contractor shall design all the Temporary Works in such a way as to retain trees to the extent possible, without impeding operational requirements and safety; and
- 3) Before the commencement of the Works, the Contractor shall physically mark the permitted boundaries of all areas in which trees are removed and protect any area in which trees or vegetation are to be retained, by robust, readily visible fencing, with signs to prohibit entry of vehicles or personnel as well as cutting for any use.

6.3.4. Vegetation Removal and Tree Cutting:

- 1) The Contractor shall be responsible for clearing of Site including cutting and removal of shrubs, vegetation and trees wherever required for execution of the work after obtaining necessary approval from the Engineer. The studs and roots



as existing at site shall also be removed by the Contractor. The cut material is to be disposed of by the Contractor outside the ROW at his own cost. The permission for cutting the trees within the ROW shall be arranged by the Employer.

- 2) The Contractor is not permitted to remove any vegetation, cut trees or deliberately damage any vegetation and trees outside of the ROW without authorization by the competent authorities, including near accommodation camps; and shall ensure that prohibition of tree cutting and wood collection outside of the ROW for any use;
- 3) The Contractor shall keep appropriate records of the ROW boundaries and other measures and shall regularly monitor to ensure that no vegetation is damaged outside of the ROW without authorization by the competent authorities; and
- 4) The Contractor is responsible for obtaining necessary authorization from the competent authorities to remove vegetation and/or cut trees outside the ROW. Once the Contractor obtains the authorizations from the authorities, the Engineer shall confirm the authorization and gives the final approval for the vegetation removal and/or tree cutting.

#### 6.3.5. Soil Removal and Storage:

- 1) The Contractor shall prepare a detailed Topsoil Management Plan, as per the C&D Waste Management Rules (2016) and guidelines/manuals given in subsection 6.3.1 above, which shall be submitted to the Engineer for review and NONO before physical works. It shall include topsoil salvage, storage and utilization/placement, stockpile locations, prevention of runoff and dust control of fine particles;

#### 6.3.6. Sites of Temporary Works:

The Contractor shall reinstate the land as per the lease agreement(s) after use with the entire satisfaction of the legal owner(s).

#### 6.3.7. Flood Prevention:

- 1) The Contractor shall prepare a detailed Site Drainage and Flood Prevention Plan (SDFPP) to maintain natural drainage and avoid causing flooding of the Site or surrounding areas and shall submit these to the Engineer for information before construction begins; and
- 2) The Contractor shall not dispose of any material into rivers, streams, natural culverts or drains.

### 6.4. Borrow Pits and Quarry Sites

- 6.4.1. The Contractor shall prepare a detailed Borrow Pit and Quarry Site Management Plan (BPQSM) which shall be submitted to the Engineer for review before construction



begins. It shall include proposed location and transportation routes, and environmental and social impacts and its management and mitigation measures.

- 6.4.2. The Contractor is also solely responsible for obtaining all consents and approvals from government competent authorities as required by law and shall provide the Engineer with copies of all necessary approvals and landowner agreements (including confirmation of receipt of payments made as per the agreement with the legal land owner(s)), before commencing any work associated with the borrow operation.

## **6.5. Construction Water Management and Rain Water Harvesting**

- 6.5.1. In addition to the legislations given in subsection 6.2.1 above, the Contractor shall comply with Guidance on Environmental Management of C&D Wastes (CPCB, 2017) and Guidelines on Techno-Economic Feasibility of Zero Liquid Discharge (ZLD) for Water Polluting Industries (CPCB, 2015), applicable road and bridge manuals and/or guidelines prepared by Indian Road Congress (IRC). Particularly in the water scarce region, the Contractor shall carefully review the available water resources for the Work and plan the most effective water resource management with economically viable means as per the given legislations, manual, guidelines and good practices in India.
- 6.5.2. The Contractor shall prepare a detailed Construction Water and Rain Water Harvesting Plan which shall be submitted to the Engineer for review and NONO before the physical Works.
- 6.5.3. The Contractor shall not abstract water from existing ponds, without the consent of the local people/panchayat.
- 6.5.4. Where feasible as part of the construction works, the Contractor shall develop plans and implement rainwater harvesting schemes as per Central Ground Water Board (CGWB) guidelines. The Contractor shall be responsible for obtaining approval from the competent authority for any such proposals.

## **6.6. General Pollution Control**

- 6.6.1. The Contractor shall prepare a detailed Pollution Prevention and Control Plan (PPCP), which shall be submitted to the Engineer for review before construction begins. It shall describe pollution control measures relating to air, water, noise and vibration. Inter alia, this shall describe how compliance with the above legislation will be achieved, how liquid and solid emissions/wastes will be controlled. It shall also describe how clean-up any pollution occurs including operational procedure and monitoring methods.

## **6.7. Water Quality Management**

- 6.7.1. General:





- 1) The Contractor shall comply in full of all relevant requirements of national legislation governing water quality, including but not necessarily limited to The Environment (Protection) Act, 1986 and Environment (Protection) Amendment Rules, 2002 (amended 2003, 2004, 2005, 2006, 2007 and 2008), and the Water (Prevention and Control of Pollution) Act ,1974 (amended 1988);
- 2) The Contractor shall comply always with any specific requirements of these and any other relevant statutes, including prescribed water quality limits and standards as per the following IS codes/CPCB norms/EP rules, and any other relevant legislation, code or guidelines;
- 3) Drinking Water Quality Standards (as per IS: 10500);
- 4) Water Quality Criteria and Standards for Freshwater Classification (CPCB, 1979);
- 5) Tolerance Limits for Inland Surface Waters (as per IS:2296);
- 6) General Standards for Discharge of Effluents [as per Environment (Protection) Rules, 1986]; and
- 7) The Contractor is solely responsible for obtaining all consents and approvals from government competent authorities as required by national laws on water quality and shall provide the Engineer with copies of all necessary approvals.

6.7.2. Siltation Control:

- 1) The Contractor shall not obtain any construction materials from the beds of rivers, streams, lakes or other water bodies, except with prior approval of the competent authority. He shall bear related all costs and abide by the stipulated conditions, if any;
- 2) The Contractor shall install silt runoff prevention measures as consented by the Engineer at the base of embankments constructed near surface water bodies; and shall maintain such measures in place until embankment slopes are fully stabilized by grassing or other means as approved;
- 3) Stockpiled soil, sand and any other fine-grained construction materials shall be covered with secure tarpaulins or via an alternative method subject to the approval by the Engineer, and stored in fully waterproof enclosures, located more than 100 m from any surface water;
- 4) Where construction work is conducted in a natural waterway, the Contractor shall prepare and submit to the Engineer for information before such work begins, detailed plans to minimize and contain sediment disturbance;
- 5) During the construction period, the Contractor shall arrange for removal/cleaning of deposited silt from drainage channels and outlet points within the project influence area before the monsoon season. Rejuvenation of the drainage system by removing encroachments/congestions shall also be ensured; and
- 6) Return flows from hydraulic dredging will be contained within an earth sedimentation basin before release. No return flows from hydraulic dredging can

leave the property boundary with Suspended Solids Content (TSS) more than the DOE standard of 100 mg/L (ECR Schedule – 9: Standards for Sewage Discharge).

6.7.3. Erosion Control:

- 1) The Contractor shall provide adequate temporary or permanent drainage alongside all slope areas before excavation/cutting begins and shall provide adequate settlement lagoons/chambers to collect runoff and allow sediment to settle out before water is discharged to a natural waterway; and
- 2) Soil erosion shall be visually checked by the Contractor periodically on slopes and high embankment areas. In case soil erosion is found, suitable measures shall be taken to control soil erosion.

6.7.4. Wastewater Disposal:

- 1) Wastewater from toilets, washrooms and other sanitary facilities shall be treated to national legal standards and discharged as prescribed by consent conditions applied by the statutory authority;
- 2) Any oil and grease contents of waste water shall be trapped and recovered before discharge to drain or water body; and
- 3) Direct and untreated discharge of waste water into water bodies is prohibited as is the discharge of wash water from concrete trucks to waterways.

6.7.5. Transit Mixer Wastewater Disposal:

- 1) The Contractor shall be responsible for disposal of transit mixer wastewater (mixture of cleaning water and concrete residues) including the Subcontractors concrete mixers as per the applicable regulations. Disposal of the transit mixer wastewater is only allowed at the approved disposal sites, typically designated at the concrete suppliers' batching plants.

6.7.6. Accidental Spillage:

- 1) The Contractor shall comply in full of the requirements of all relevant legislation pertaining to the storage, handling and disposal of hazardous chemicals used in the construction process, including, but not necessarily limited to the Manufacture, Storage and Import of Hazardous Chemicals (Amendment) Rules, 2000, and the “The Hazardous and Other Wastes (Management and Transboundary Movement) Rules, 2016” and its amendment;
- 2) The Contractor shall locate all parking areas, vehicle/machinery or equipment maintenance yards, and storage areas for fuel, oil or any other potentially toxic materials within the ROW of construction areas, and more than 100 m from any water body;
- 3) Appropriate spill containment and clean-up equipment shall be provided at all

fuel storage, refuelling and vehicle maintenance areas; and operators shall be appropriately trained in their normal activities as well as pollution control and remediation;

- 4) Waste oil from vehicle maintenance shall be collected in sealed containers and stored safely in sealed damage-proof containers prior to collection and disposal;
- 5) All waste oil shall be disposed of as per the Central Pollution Control Board (CPCB) and/or State Pollution Control Board (SPCB) guidelines as applicable;
- 6) Fuel, oil and any other hazardous liquid shall be stored only in concrete floor and bonded areas; and the volume of the bonded areas must be sufficient to retain all the stored liquid in the event of leakage; and
- 7) Refuelling shall only be conducted in areas that are dedicated for this purpose and provided with floors of waterproof concrete from which all drainage is collected and passed through an oil/water separator before discharge.

## **6.8. Air Quality Control**

### **6.8.1. General**

- 1) The Contractor shall comply in full of all relevant requirements pertaining to all activities under scope of works as laid down in applicable regulations governing air quality; and
- 2) The Contractor is expected to maintain the highest standards of environmental performance throughout all his work and to take all necessary precautions to avoid causing any significant air pollution. Precautions shall include but not be limited to those specified below.

### **6.8.2. Dust Control:**

- 1) Vehicles transporting dirt, sand and construction materials capable of producing dust will be covered when traveling through community areas or along roadways in use by the public;
- 2) In and around residential and commercial area, the Contractor is required to install wheel washing area within ROW at the “Exit” points/gates of the construction area to ensure the removal of wheel/band dirt from construction vehicles and machines. As a part of the Contractor’s method statement for the site preparation plans, wheel washing area shall be proposed and approved by the Engineer before the commencement of the work; and
- 3) The contractor is responsible for spraying of roadway surfaces in use as haul routes and of sites under construction as well as temporary detours where these locations are accessed by the public.

## **6.9. Noise Control**



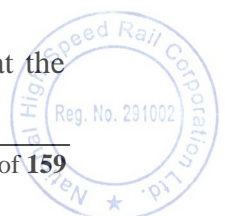
- 6.9.1. The Contractor is responsible for complying with the Noise Pollution (Regulation and Control) Rules (2000), particularly residential area and silence zone as per the rule.
- 6.9.2. The Contractor shall ensure that noise generated by work carried out by the Contractor and his subcontractors during daytime and night time shall not exceed the stipulated maximum permissible noise limits, whether continuously or intermittently. In the event of a breach of this requirement, the Contractor shall immediately re-deploy or adjust the relevant equipment or take other appropriate measures to reduce the noise levels and thereafter maintain them at levels which do not exceed the said limits. Such measures may include without limitation the temporary or permanent cessation of use of certain items of equipment.
- 6.9.3. The Contractor shall cease any activity likely to produce “Significant” noise at all locations that are less than 150 m from residential area and silence zone as per the Noise Pollution (Regulation and Control) Rules (2000), between the hours of 10.00 pm and 6.00 am, and on Sundays and public holidays. The Site near sensitive zone as per the Noise Pollution (Regulation and Control) Rules (2000) shall be surrounded by the temporary noise barriers if adjacent work is necessary.

#### **6.10. Vibration Control**

- 6.10.1. At the locations where the alignment is close to sensitive structures, historical/heritage structures, the Contractor shall control vibration at such locations. The control measures of vibration level at such sites shall be submitted to the Engineer for his review. The scheme shall include:
- 1) Monitoring requirements for vibrations at regular intervals throughout the construction period;
  - 2) Pre-construction structural integrity inspections of sensitive structures in project activity;
  - 3) Information dissemination about the construction methods, probable effects, quality control measures and precautions to be used; and
  - 4) The vibration level limits at the Site adjacent to the alignment shall conform to the permitted values of Peak Particle Velocity (PPV) as given in Directorate General Mining and Safety (DGMS) (Tech) S&T Circular Vo.7 of 1997.

#### **6.11. Waste Management**

- 6.11.1. The Contractor shall comply in full of the requirements of all relevant legislation pertaining to the management and disposal of solid waste, including, but not necessarily limited to the Environment (Protection) Act, 1986, Environment (Protection) Amendment Rules, 2002 (amended 2003, 2004, 2005, 2006, 2007 and 2008), the Solid Management Rules, 2016, and the Construction and Demolition Waste Management Rules, 2016.
- 6.11.2. No fuel, oil, or parts cleaning fluids shall be spilled, wasted or disposed of at the



project.

- 6.11.3. Drip pans shall be used under connecting hoses and at points of filling during fuel transfer and refuelling operations.
- 6.11.4. The Contractor will promptly collect, store, transport and dispose of solid waste generated at the Site. No solid wastes will be allowed uncollected at the jobsite or accumulated in storage for periods more than a month. Transport and disposal will be by recognized means approved by local authorities.
- 6.11.5. The Contractor will obtain necessary approval for disposal of concrete waste, scrap lube oil, domestic waste from the statutory authority. If hazardous materials are contained, the Contractor will handle them with special attention and properly disposed with consultation of the statutory authority.
- 6.11.6. As per the Construction and Demolition Waste Management Rules, 2016, the Contractor shall study the best practices and include in its respective method statement.
- 6.11.7. The method statement of any construction activity, which involves generation of waste, shall invariably include the details of contractor's plan for waste management.

## **6.12. Hazardous Waste Storage and Management**

- 6.12.1. The Contractor shall comply in full of the requirements of all relevant legislation pertaining to the storage, handling and disposal of hazardous chemicals and wastes used in the construction process, including, but not necessarily limited to the Environment (Protection) Act, 1986, Environment (Protection) Amendment Rules, 2002 (amended 2003, 2004, 2005, 2006, 2007 and 2008), the Hazardous and Other Wastes (Management and Transboundary Movement) Rules, 2016.
- 6.12.2. The Contractor will obtain necessary approval for disposal of concrete waste, scrap lube oil, domestic waste from the statutory authority. If hazardous materials are contained, the Contractor will handle them with special attention and properly disposed with consultation of the statutory authority.
- 6.12.3. All waste oil shall be disposed of as per the Central Pollution Control Board (CPCB) and/or State Pollution Control Board (SPCB) guidelines as applicable.
- 6.12.4. Special arrangements for hazardous waste shall be described, including the way such waste will be deposited to prevent escape of any material over the long term.
- 6.12.5. The asbestos waste from demolition debris, if any, shall be separated and disposed of as per the Hazardous Wastes Rules.

## **6.13. Use of Land for Construction Purposes**



- 6.13.1. The Contractor will not encroach upon vacant land, or damage forests, wildlife or fisheries in the project area. The Contractor will execute a plan for preventing resource harvesting in the project area and prohibit among workers possession of instruments or poisonous substances for killing or capturing fish or wildlife.
- 6.13.2. After completion of occupancy, all affected areas within the general project boundary shall be graded to their final elevation, providing continuous sloping grade that allows positive drainage. Machinery, equipment, structures, contaminated earth, plant matter and waste or unused materials shall be removed and disposed of at locations approved by the Engineer. Temporary pits and sumps installed on the premises shall be backfilled.

#### **6.14. Protection of Community Values**

- 6.14.1. The Contractor shall locate aggregate crushing and batch mix plants at sufficient distance (at least 1 km) from populated areas, houses, schools and hospitals to reduce air pollution and noise. The Contractor shall protect, conserve and maintain access to social and cultural properties in the project area including schools, mosques, hospitals, temples, shrines, graveyards, tourism sites and other public places.
- 6.14.2. The Contractor shall post flagmen at intersections of transit paths for construction vehicles and local traffic, and along traffic lanes where work is in progress. Traffic detours shall be clearly marked.
- 6.14.3. The Contractor shall designate a path for transit of pedestrians and vehicular traffic around the construction area; and barricade open excavations to prevent injury to the public.
- 6.14.4. The Contractor shall avoid blocking access to land, homes and businesses; where unavoidable, the Contractor shall provide temporary access to affected properties and reinstate permanent access on completion of work.
- 6.14.5. The Contractor shall install a gate, signs and lighting at the entrance to the site, and restrict access to the site by the public.
- 6.14.6. The Contractor shall promptly reinstate any services and reinstall any physical facilities that are cut, disconnected or damaged during construction activities, and shall maintain or provide temporary services that are interrupted by construction.

#### **6.15. Archaeology**

- 6.15.1. When the working near scheduled ancient monuments or sites, the Contractor shall follow the requirements according to ancient monuments and Archaeological Sites and Remains Act, 1958.
- 6.15.2. The Contractor shall commission archaeological expert(s), if required to conduct a detailed assessment of all work areas to estimate the risk of encountering previously



undiscovered historical remains during excavation and prepare a Physical Cultural Resources Management Plan (PCRMP). The PCRMP shall set out procedures to be adopted to minimise the risk of causing accidental damage during excavation work and other ground disturbance and to ensure that any material discovered is recognised and dealt with appropriately.

## **6.16. Monitoring and Reporting**

### **6.16.1. Audit and Inspection:**

- 1) The Contractor shall audit the activities described in his CEMP with approved forms of daily inspection, and weekly, monthly and quarterly intervals depending on the nature of the impacts or as otherwise instructed by regulatory authorities or the Engineer and shall keep appropriate records of such monitoring activities;
- 2) The Engineer shall inspect the Contractor's environmental and social performance during his normal supervision activities, and the Contractor shall cooperate by providing access to sites, equipment, staff, records, etc. as may be requested by the Engineer either in writing or verbally; and
- 3) At least three days' advanced notice shall be given to the Contractor by the Engineer of any formal audit of the Contractor's environmental and social performance, and the notice shall indicate the areas and activities to be audited and any special requirements, including records to be provided. The Contractor's Senior Environment Manager and other appropriate staff shall accompany the Engineer's staff throughout such an audit as may be requested by the Engineer.

### **6.16.2. Permissible Standards:**

The Contractor shall comply with permissible standards as per relevant law and regulations as well as special instructions from judicial orders, local authorities, the Engineer, and JICA.

### **6.16.3. Monitoring:**

- 1) **Baseline study:** Before commencement of actual construction work, all items and parameters specified by CEMP shall be monitored once as the baselines of the environmental condition prior to the construction and compared with the monitored values during the construction period;
- 2) **Qualification of monitoring agency:** Monitoring shall be conducted by the qualified agencies approved by the Engineer having capabilities of conducting environmental monitoring; and
- 3) **Enforcement of the Monitoring:** Monitoring plan shall be proposed in the Contractor's CEMP and must be approved by the Employer/Engineer before enforcement of the monitoring. The Contractor shall monitor the instructed environmental parameters and confirm the compliances of the permissible standards. Once the Contractor confirms the excess of the permissible standards



and baseline through the monitoring programmes, cause analyses and necessary counter measures shall be proposed to the Engineer in the monitoring reports specified in Sub-Clause 6.19.5 below.

a) Location, parameters, and frequency of the monitoring.

Monitoring Category	Types of the Works Packages			
	Civil, Bridge, Depot	Track	Electric	Rolling stock, Maintenance /Inspection car
Air	required	required	N/A	N/A
Noise	required	required	N/A	N/A
Vibration	required	required	N/A	N/A
Drinking Water Quality-Ground Water	required	required	required*	Required*
Water Quality-Surface Water	required	required	required*	required*
Waste	required	required	required	required
Hazardous waste	required	required	required	required
Complaints	required	required	required	required
Regulatory framework updates	required	required	required	required

\* only construction yards and camps and/or inspection yards

Frequency – Once in 3 months or as per regulations, whichever is earlier

Parameters for monitoring – The parameters to be monitored will be proposed by contractor (usually monitored as good industrial practice) and approved by Engineer.

Category	Sampling Standards	Location	Frequency
Air	CPCB (2011) Guidelines for the Measurement of Ambient Air Pollutants, Manual Sampling & Analyses	one representative location within each construction yard	Quarterly (April, July, October, January)
		the closest residential or commercial area (one location) within 100m from each active construction site or representative locations approved by the Engineer	Monthly

<b>Category</b>	<b>Sampling Standards</b>	<b>Location</b>	<b>Frequency</b>
<b>Noise</b>	CPCB (2015) Protocol for Ambient Level Noise Monitoring	the closest residential or commercial area (one location) or within 100m from each active construction site.	Weekly
<b>Vibration</b>	IS 14884 (2000)	the closest residential or commercial area (one location) or within 100m from each active construction site	Weekly
<b>Drinking Water Quality-Ground Water</b>	IS 3025 (2008) & IS 10500 (2012)	Drinking water: construction yards and labour camps	Quarterly (April, July, October, January)
		Groundwater: one representative tube/bore well in the adjacent residential area or within 100m from each active construction site	Quarterly
<b>Water Quality-Surface Water</b>	IS 3025 (2008) & IS 2296 (1982) & CPCB (2012) Guide Manual Water and Wastewater Analysis	Upstream and downstream of the river/stream and any natural water (ex. pond) course located or within 100 m of each construction yard, labour camp, and active construction site	Quarterly (April, July, October, January)
<b>Waste</b>	Not available but fully complying with monitoring the quantities of wastes specified by the Solid Management Rules 2016 & the Construction and Demolition Waste Management Rules 2016	Each construction yard and construction site	Quarterly



Category	Sampling Standards	Location	Frequency
<b>Hazardous waste</b>	Not available but typed reporting (not hand writing) fully complying with monitoring the quantities of wastes specified by the Hazardous and Other Wastes (Management and Transboundary Movement) Rules 2016,	Each construction yard and active construction site	Quarterly
<b>Complaints and PR activities if any</b>		All Works' related locations	weekly

#### 6.16.4. Environmental monitoring standards and guidelines

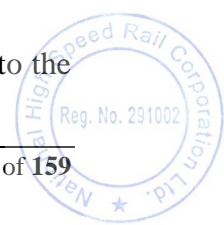
The table below lists the key standards and guidance manuals applicable for the monitoring, measurement, analysis and management of air, water, noise and associated environmental parameters. While an attempt has been made to populate the list based on the latest resources available from the regulatory authorities, contractors are advised to use updated and more recent guidance available at the time of execution of the Works.

Sr.No.	List of Environmental Monitoring Standards and Guidelines ( <i>not limited to the following</i> )
<b>Drinking Water</b>	
1.	Drinking Water Specification - IS 10500, 2012, Bureau of Indian Standards (BIS)
<b>Environmental Emission and Discharge Standards</b>	
2.	Environmental Emission / Discharge Standards, Schedules I, III, IV, VI and VII, Environmental Protection Rules, 1986 and Amendments thereof
<b>Waste Water</b>	
3.	Methods of Sampling and Test (physical and chemical) for water and wastewater, BIS 3025 (Part 1): Reprint 2008 Additional Parts under IS 3025 cover analytical methods of specific wastewater parameters. IS 2296 (1982) provides the water quality standards for surface water bodies as per CPCB
4.	Guidelines for Water Quality Monitoring, MINARS /27/2007-08
5.	Designated Best Uses of Water by Class of River, The Environment (Protection) Rules, 1986, Central Pollution Control Board
6.	Guidelines on Construction & Maintenance of Bore wells and Tube wells, Ministry

<b>Sr.No.</b>	<b>List of Environmental Monitoring Standards and Guidelines (<i>not limited to the following</i>)</b>
	of Railways, GoI, 2014
7.	Guide Manual: Water and Wastewater Analysis, Central Pollution Control Board (CPCB), 2012
8.	Manual on Sewerage and Sewage Treatment, Central Public Health and Environmental Engineering Organization, 2012
<b>Air, Noise and Vibration</b>	
9.	Guidelines for the Measurement of Ambient Air Pollutants, Manual Sampling & Analyses – Volume I, Central Pollution Control Board (CPCB), 2011
10.	Guidelines for the Measurement of Ambient Air Pollutants, Real Time Sampling & Analyses – Volume II, Central Pollution Control Board (CPCB), 2011
11.	Protocol for Ambient Level Noise Monitoring, Central Pollution Control Board (CPCB), 2015 Noise Pollution (Regulation and Control) Rules, 2000
12.	Stack Monitoring – Material and Methodology for Isokinetic Sampling, Central Pollution Control Board (CPCB)
13.	Monitoring Guidelines (Draft) of Indoor Air Pollution, Central Pollution Control Board (CPCB), 2014
14.	IS 14884 (2000): Mechanical Vibration and Shock – Vibration of Buildings - Guidelines for the Measurement of Vibrations and Evaluation of Their Effects on Buildings [MED 28: Mechanical Vibration and Shock]
<b>Waste</b>	
15.	Manual on Sampling, Analysis and Characterization of Hazardous Waste, Central Pollution Control Board (CPCB), 2014
16.	Guidelines on Implementing Liabilities for Environmental Damages due to Handling & Disposal of Hazardous Waste and Penalty, Central Pollution Control Board (CPCB), 2016
17.	Guidelines on Environmental Management of Construction & Demolition (C & D) Wastes, Central Pollution Control Board (CPCB), 2017

6.16.5. Reporting:

- 1) SAMPLE environmental daily site inspection record forms/Weekly/Monthly/Quarterly report forms shall be provided by The Employer after the award of contract. Then, the daily inspection forms shall be revised and proposed as per the Contractor's Works and its methods by the Contractor at the time of the Construction Environmental Management Plan submission first. Then, the Contractor is responsible to continuously improve the initial form(s) or propose other daily site inspection record form(s) to adapt the changes of construction activities and the daily inspection;
- 2) The Contractor shall submit reports with the Employer's reporting forms to the



Engineer as specified below; and

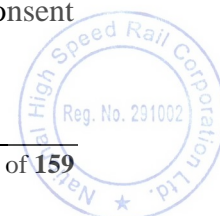
- 3) Non-compliance shall be recorded, and practical/realistic self-improvement measures including withholding of payments shall be proposed to comply with the conditions of the Contract.

Submission	Contents
<p><b>Weekly report</b>                      Submission: Monday of the next week</p>	<ul style="list-style-type: none"> <li>• Chainage-wise project activity summary</li> <li>• Chainage-wise activity plan for next two weeks</li> <li>• All applicable items specified in the table in the section 6.16.3. Monitoring (Weekly)</li> </ul>
<p><b>Monthly report</b>                      Submission: 10<sup>th</sup> of the next month</p>	<ul style="list-style-type: none"> <li>• Updates of relevant legal and policy framework</li> <li>• Chainage-wise project activity summary</li> <li>• All applicable monitoring items specified in the table in the section 6.16.3. Monitoring (Monthly)</li> <li>• Compliances of the monitoring items and counter measures if it is applicable within next month</li> </ul>
<p><b>Quarterly report</b>                      Submission: 20<sup>th</sup> of the next month after each three-months</p>	<ul style="list-style-type: none"> <li>• Updates of relevant legal framework</li> <li>• Chainage-wise project activity summary</li> <li>• All applicable items specified in the table in the section 6.16.3. Monitoring (Quarterly)</li> <li>• Compliances of the monitoring items and counter measures if it is applicable within next quarter</li> </ul>

## 7. FINANCIAL DEDUCTION/WITHHOLDING

### 7.1. Financial deductions from Contractor on occurrences of an incident.

- 7.1.1. Table No. 1 below indicates SHE incidents and the corresponding deductions to be made from the Contractor under Sub-Clauses 2.5 [Employer’s Claims], 14.3 (f) [Application for Interim Payment], 14.6 [Issue of Interim Payment Certificates] and 14.7 [Payment] of the Conditions of Contract.
- 7.1.2. The affected part of the Works shall remain suspended until all necessary investigations are completed as prescribed in Clause 2. [SHE Management], Sub-Clause 2.15 Accident Report and Investigation and as per the related local laws of the state.
- 7.1.3. Following a joint inspection of the affected part of the Works by the Employer, Engineer and the Contractor, upon the Contractor’s Request for Inspection (RFI) submission, the Contractor may resume work on receipt of the Engineer’s Consent (Notice of No Objection: NONO).



- 7.1.4. The Contractor shall not be entitled to any extension of time or to the payment of any cost or profit due to any suspension in accordance with this clause 7.1
- 7.1.5. The maximum amount of delay damages set out in Sub-Clause 8.7 [Delay Damages] of the Conditions of Contract shall not be applicable where the cause of delay to completion is suspension of part of the Works due to the Contractor’s non-compliance as described in this clause 7.1.

**Table No. 1: Incidents**

Sl. No.	Incident	Financial deductions from the Contractor in Indian Rupees
1.	Injury and Incidence reporting  i) Fatal accidents ii) Injury accident iii) Abnormal delay in reporting accidents or wilful suppression of information about any accidents / dangerous occurrence as per Clause 2.15.4. iv) Non-compliance of the Clause 2.15.16.,2.15.17., and 2.15.18.	i) Rs. 10,00,000 for first fatality and Rs.15,00,000 for every subsequent fatality. ii) Rs. 3,00,000 for first grievously injured person and Rs.5,00,000 for every subsequent grievously injured person (Grievous Injury as defined by Workmen Compensation Act) iii) Rs.1,00,000 for first violation and Rs.2,00,000 for subsequent violations iv) Rs.50,000 for first violation and Rs.1,00,000 for subsequent violations

**7.2. Withholding and deduction of payments from Contractor**

- 7.2.1. The Engineer may issue a notice to the Contractor in accordance with Sub-Clause 3.3 [Instructions of the Engineer] of the Conditions of Contract to rectify any unsafe act or condition (including but not limited to error, default or omission) upon discovery of same on the Site by the Engineer, in a form of Nonconformity Report.
- 7.2.2. Table No. 2 below indicates Contractor’s non-conformances from the SHE requirements of the Contract and the corresponding amounts to be withheld and deducted by the Engineer from payment due to the Contractor under Sub-Clauses 14.3 (f) [Application for Interim Payment], 14.6 [Issue of Interim Payment Certificates] and Sub-Clause 14.7 [Payment] of the Conditions of Contract.
- 7.2.3. The Engineer shall have the right to withhold and deduct charges for any other unsafe act and/or condition depending upon the gravity of the situation on a case-to-case basis. The charge shall be comparable to that, which is the closest to the unsafe act/condition, indicated in Table 2.



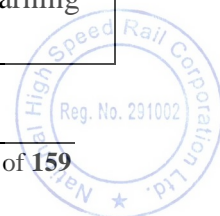
- 7.2.4. Except as may be required otherwise by the Laws of the Republic of India, upon receipt of the Engineer's notification concerning an unsafe act or condition as described in Table No. 2, the Contractor shall promptly comply with such notification, investigate the cause of the unsafe act or condition and as soon as possible (but no later than 7 days, or within such other period from receipt of the Engineer's notification as may be approved by the Engineer), submit to the Engineer for review full details of the proposed correction, prevention and any other measures (hereinafter referred to as the "measures") to be taken by the Contractor to rectify and close-out the matter and to prevent re-occurrence. Such measures shall be to the satisfaction of the Engineer.
- 7.2.5. The Engineer are entitled to withhold amounts from the Contractor's payment until the Engineer have verified the Contractor's measures, submitted to the Engineer for review as above, and accepted them after a joint inspection in response to the RFI for the same.
- 7.2.6. Shall the Contractor default in implementing any measures within the time previously agreed between the Contractor and the Engineer or the Contractor makes subsequent violations as specified in Table No. 2, the Engineer shall be entitled to the deduction to be recovered from the Contractor under Sub-Clause 2.5 [Employer's Claims] of the Conditions of Contract. Such deductions shall be made via the certification and payment process provided for in the Contract, including Sub-Clauses 14.3 (f) [Application for Interim Payment], 14.6 [Issue of Interim Payment Certificates] and 14.7 [Payment] of the Conditions of Contract. Without limiting to the unsafe acts and or conditions mentioned above in Table 2.
- 7.2.7. The release or deduction of amount shall happen in the next payment process.
- 7.3. Suspension of work**
- 7.3.1. The Engineer may issue a notice to the Contractor in accordance with Sub-Clauses 3.3 [Instructions of the Engineer] and 8.8 [Suspension of Work] of the Conditions of Contract to suspend the progress of part of the Works in a form of Nonconformity Report, if in the Engineer's opinion such work is non-compliant with the SHE requirements of the Contract. Such notification shall include details of the cause of the suspension. During such suspension, the Contractor shall protect, store and secure such part of the Works against any deterioration, loss or damage.
- 7.3.2. The Contractor shall not proceed with the affected Works until its measures are accepted by the Engineer.
- 7.3.3. Suspension of part of the Works as described in clause 7.3.1 above and withholding of the amount from the Contractor's payment clause 7.2 above shall continue together or independently until the Engineer has verified the Contractor's correction and close-out of any such non-conformity.
- 7.3.4. The Contractor shall not be entitled to any extension of time or to the payment of any cost or profit due to any suspension in accordance with the clause 7.2.



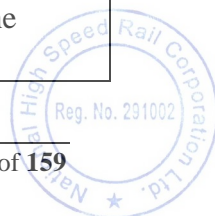
7.3.5. The maximum amount of delay damages set out in Sub-Clause 8.7 [Delay Damages] of the Conditions of Contract shall not be applicable where the cause of delay to completion is suspension of part of the Works due to the Contractor's non-compliance as described in this Clause 7.

**Table No. 2: Unsafe Acts/Conditions**

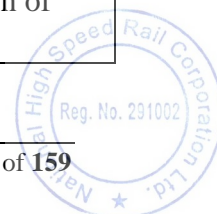
Sl. No	Unsafe Act/Condition		Deductible amount from the Contractor in Indian Rupees
1.	SHE Management Policy & Plan	1) SHE policy a) Non-compliance of Clause 2.4.1 b) (Per Month)	For first violation warning letter, 2 <sup>nd</sup> violation withholding Rs 5,000 along with undertaking from the Contractor There after deduction Rs.25,000 for subsequent violations.
		2) SHE plan: a) Delay in submission (Clause 2.4.2.) b) Not updated as per employer's instruction as per Clause 2.4.2. c) Copies not provided to all required supervisors / engineers (Clause 2.4.3.)	For first violation warning letter, 2 <sup>nd</sup> violation withholding Rs 100,000 along with undertaking from the Contractor There after deduction of amount Rs100,000 for single violation, compounded to a maximum of Rs.2,00,000 at any single instance.
2.	SHE Organization	i) Not complying to the minimum manpower requirements as mentioned in General Instruction SHE/GI/ 002 (Clause 8. Attachment-1) ii) Not filling up the vacancies created due to SHE personnel leaving the Contractor within 30 days. (Clause 2.6.1.) iii) SHE organization not provided with required Audio-visual and other equipment as per General Instruction SHE/GI/ 003 (Clause 8. Attachment-3)	For first violation warning letter, 2 <sup>nd</sup> violation withholding Rs 1,00,000 along with undertaking from the Contractor There after deduction of amount i) Rs.1,00,000 per month for first month and Rs.2,00,000 for subsequent months ii) & iii) Rs.50,000 per month for first month and Rs.1,00,000 for subsequent months
3.	SHE Committee	i) Failed to formulate or conduct SHE Committee meeting for	For first violation warning letter, 2 <sup>nd</sup> violation



Sl. No	Unsafe Act/Condition		Deductible amount from the Contractor in Indian Rupees
	any month (Clause 2.8.1.) ii) The Contractor and Sub-the Contractor representatives not attending SHE Committee meetings (Clause 2.8.4.) iii) Failed to conduct Site inspection before conducting SHE Committee meeting (Clause 2.11.9.) iv) Failed to send SHE Committee Minutes of Meeting or Agenda to Employer in time (Clause 2.8.6 & 2.8.8.)		withholding Rs 1,00,000 along with undertaking from the Contractor There after deduction of amount i) Rs. 100,000 for the first violation and Rs.5,00,000 for the subsequent violations ii) Rs. 5,000 to the member of the contractor who had not attended the meeting for first violation and Rs. 25,000 for subsequent violations. For item iii) & iv) Rs.25,000 for first violation and Rs.50,000 for subsequent violations
4.	ID Card	i) Non-adherence of Clause 2.9.	For first violation warning letter, 2 <sup>nd</sup> violation withholding Rs 100,000 along with undertaking from the Contractor There after deduction of amount Rs. 100,000 per month.
5.	SHE Training	i) Not complying to the requirements as mentioned in conditions of contract on SHE and project SHE manual (Clause 2.9.1, 2.10.2, 2.10.5 and 2.10.6)	For first violation warning letter, 2 <sup>nd</sup> violation withholding Rs 50,000 along with undertaking from the Contractor There after deduction of Rs.1,00,000 for subsequent violations
6.	SHE Inspection	i) Not complying to the requirements as mentioned in conditions of contract on SHE and project SHE manual as per Clause 2.11.	For first violation warning letter, 2 <sup>nd</sup> violation withholding Rs 50,000 along with undertaking from the Contractor



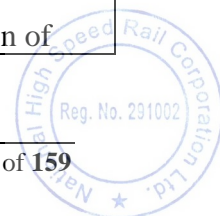
Sl. No	Unsafe Act/Condition		Deductible amount from the Contractor in Indian Rupees
			There after deduction of Rs.1,00,000 for subsequent violations
7.	SHE Audit	Internal Audit: MARS & External Audit i) Not conducted as per SHE Plan (2.12.2 & 2.12.4) ii) Report not sent to Employer (2.12.2.6) iii) Corrective action not taken for any month (2.12.4.8)	For first violation warning letter, withholding Rs 50,000 along with undertaking from the Contractor There after deduction of Rs.1,00,000 for subsequent violations.
8.	SHE Communication	i) Important days to be observed for SHE awareness as furnished by employer not observed (2.13.2) ii) Posters as directed by Employer not printed and displayed (2.13.2)	i) Rs.10,000 for first violation and Rs.50,000 for subsequent violations ii) 200,000 per month
9.	SHE Submittals	Non-compliance of Clause 2.14	For first violation warning letter, 2 <sup>nd</sup> violation withholding Rs 50,000 along with undertaking from the Contractor There after deduction of Rs.1,00,000 for subsequent violations
10.	Traffic Management	a) Non-compliance of Clause 4.36  b) The Contractor Vehicles (Clause 4.7) i) Over loading of vehicles ii) Unfit drivers or operators iii) Unlicensed vehicles iv) Absence of traffic marshals v) Absence of reversing alarm	For first violation warning letter, 2 <sup>nd</sup> violation withholding Rs 1,00,000 along with undertaking from the Contractor There after deduction of Rs.2,00,000 for subsequent violations.  For first violation warning letter, 2 <sup>nd</sup> violation withholding Rs 25,000 along with undertaking from the Contractor There after deduction of amount



Sl. No	Unsafe Act/Condition		Deductible amount from the Contractor in Indian Rupees
	vi) Absence of fog light (at winter) vii) Power / hand brakes not in working condition		Rs.25,000 per single violation Compounded to a maximum of Rs.1,00,000 at any single instance.
11.	Emergency Preparedness Plan	Non-compliance of Clause 2.16	For first violation warning letter, withholding Rs 1,00,000 along with undertaking from the Contractor. There after deduction of amount Rs.1,00,000 for subsequent violation.
12.	Permit to work	Non-compliance of Clause 4.35	For first violation warning letter, withholding Rs 1,00,000 along with undertaking from the Contractor. There after deduction of amount Rs.1,00,000 for subsequent violation.
13.	Occupational Health	Non-compliance of Clause 5.2	For first violation warning letter, 2 <sup>nd</sup> violation withholding Rs 50,000 along with undertaking from the Contractor. There after deduction of amount Rs. 50,000 per month for subsequent violations.
14.	Labour Welfare Measures	Non-compliance of Clause 5.6	For first violation warning letter, 2 <sup>nd</sup> violation withholding Rs 50,000 along with undertaking from the Contractor. There after deduction of Rs.50,000 per month for subsequent violations.



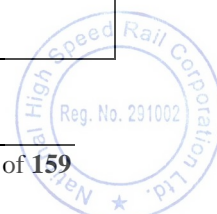
Sl. No	Unsafe Act/Condition		Deductible amount from the Contractor in Indian Rupees
15.	Environmental Management	i) Tyre wash facility not provided for vehicle running on metaled public roads (4.2.3) ii) Spillage from vehicles (6.7.6) iii) Dust control measures (6.8.2) iv) Improper disposal of debris / residues (6.11)	For first violation warning letter, 2 <sup>nd</sup> violation withholding Rs 50,000 along with undertaking from the Contractor. There after deduction of Rs.50,000 for subsequent violations.
16	Housekeeping (4.2)	i) Surrounding areas of drinking water tanks / taps not hygienically cleaned / maintained ii) Office, stores, toilet / urinals not properly cleaned and maintained. iii) Required garbage bins at appropriate places not provided / not cleaned. iv) Stairways, gangways, passageways blocked. v) Lumber with protruding nails left as such vi) Openings unprotected vii) Excavated earth not removed within a reasonable time. viii) Truck carrying excavated earth not covered/tyres not cleaned. (Clause 4.2.4.) ix) After close of work Vehicles / equipment not parked at designated place x) Unused surplus cables / steel scraps lying scattered xi) Wooden scraps, empty wooden cable drums lying scattered xii) Water stagnation leading to mosquito breeding	For first violation warning letter, 2 <sup>nd</sup> violation withholding Rs 50,000 along with undertaking from the Contractor. There after deduction of Rs.50,000 for subsequent violations.
17.	Working at Height / Ladders and Scaffolds	Non-compliance of Clause 4.3.	For first violation warning letter, 2 <sup>nd</sup> violation withholding Rs 50,000 along with undertaking from the Contractor. There after deduction of



Sl. No	Unsafe Act/Condition		Deductible amount from the Contractor in Indian Rupees
			Rs.50,000 for subsequent violations.
18.	Lifting Appliances and Gear	Non-compliance of Clause 4.5	For first violation warning letter, 2 <sup>nd</sup> violation withholding Rs 50,000 along with undertaking from the Contractor. There after deduction of amount Rs.50,000 for subsequent violations.
19.	Launching Operation	Non-compliance of Clause 4.6	For first violation warning letter, 2 <sup>nd</sup> violation withholding Rs 50,000 along with undertaking from the Contractor. There after deduction of amount Rs. 5,000 Compounded to Rs.1,00,000 for subsequent violations.
20.	Site Electricity	Non-compliance of Clause 4.10	For first violation warning letter, 2 <sup>nd</sup> violation withholding Rs 10,000 along with undertaking from the Contractor There after deduction of amount Rs. 10,000 Compounded to Rs.1,00,000 for subsequent violations.
21.	Power Tools	Non-compliance of Clause (4.10.11)	For first violation warning letter, 2 <sup>nd</sup> violation withholding Rs 10,000 along with undertaking from the Contractor There after deduction of amount Rs. 10,000 Compounded to Rs.100,000 for subsequent violations



Sl. No	Unsafe Act/Condition		Deductible amount from the Contractor in Indian Rupees
22.	Gas Cutting (4.12)	i) Wrong colour coding of cylinder. ii) Cylinders not stored in upright position. iii) Flash back arrester, non-return valve and regulator not present or not in working condition. iv) Fail to put cylinders in a cylinder trolley. v) Damaged hose and fail to use hose clamps vi) Using domestic LPG cylinders vii) Fail to store cylinder 6.6m away from fire prone materials viii) Fire extinguisher not placed in the vicinity during operation	For first violation warning letter, 2 <sup>nd</sup> violation withholding Rs 10,000 along with undertaking from the Contractor. There after deduction of amount Rs. 10,000 Compounded to Rs.100,000 for subsequent violations.
23.	Welding (4.12)	i) Voltmeter and Ammeter not working ii) Non-availability of separate switch in the transformer iii) Improper grounding and return path. iv) Damaged and bare openings in the welding cable. v) Damaged holder vi) Fire extinguisher not placed in the vicinity during operation	For first violation warning letter, 2 <sup>nd</sup> violation withholding Rs 10,000 along with undertaking from the Contractor. There after deduction of amount Rs. 10,000 Compounded to Rs50,000 for subsequent violations.
24.	Fire Precaution (4.32)	i) Smoking and open flames in fire prone area ii) Using more than 24V portable electrical appliances in the fire prone area iii) Not proper ventilation in cylinder storage area. iv) Absence of fire extinguishers v) Fire extinguishers not refilled once in a year. vi) Fire extinguisher placed in a not easily accessible location	For first violation warning letter, withholding Rs 10,000 along with undertaking from the Contractor There after deduction of amount Rs. 5,000 Compounded to Rs25,000 for subsequent violations.





Sl. No	Unsafe Act/Condition		Deductible amount from the Contractor in Indian Rupees
25.	Excavation, Tunneling and Confined Space (4.13, 4.14, 4.15, 4.16 & 4.31)	Non-compliance	For first violation warning letter, 2 <sup>nd</sup> violation withholding Rs 10,000 along with undertaking from the Contractor There after deduction of amount Rs. 10,000 Compounded to Rs50,000 for subsequent violations.
26.	Traffic Management and site barricading (4.36)	a) Barricades – Items of attention are as under - i) Not Cleaned ii) Not in alignment iii) Not numbered iv) Not painted v) Red lights / reflectors not working vi) Damages not repaired vii) Not secured properly viii) Barricade inspector not employed ix) Protruding parts	For first violation warning letter, 2 <sup>nd</sup> violation withholding Rs 25,000 along with undertaking from the Contractor There after deduction of amount Rs. 25,000 Compounded to Rs1,00,000 for subsequent violations.
27.	Batching plant and Casting yard	Non-compliance of Clause 4.20	For first violation warning letter, 2 <sup>nd</sup> violation withholding Rs 10,000 along with undertaking from the Contractor There after deduction of amount Rs. 10,000 Compounded to Rs1,00,000 for subsequent violations.



Sl. No	Unsafe Act/Condition		Deductible amount from the Contractor in Indian Rupees
28.	Personal Protection Equipment	Non-compliance of Clause 4.41. Items of attention are as under – i) Not having ii) Not wearing (or) using and kept it elsewhere iii) Using damaged one iv) Using wrong type v) Using wrong colour helmet or helmet without logo vi) Using for other operation (e.g. Using safety helmet for storing materials or carrying water from one place to other)	The deduction of amount from item i) to vi). Rs.200 per single violation Rs.50,000 for first violation and Rs.1,00,000 for subsequent violations.
29.	Working near Railway	Non-compliance of Clause 4.37.	For first violation warning letter and withholding Rs 50,000 along with undertaking from the Contractor There after deduction of amount Rs. 50,000 Compounded to Rs1,00,000 for subsequent violations.



## 8. ATTACHMENT

### Attachment -1: Contents of SHE Management Plan

#### 1. General

- 1.1. The Contractor shall prepare a Safety, Occupational Health and Environment (SHE) Management Plan, which provides measures to protect the safety and health of employees always when engaged in the construction process and the public when exposed to construction activities either on- or off-site.
- 1.2. The Contractor’s SHE Management Plan shall be based on safety and health considerations submitted with the Bid and shall have the content shown in the previous section [Contents of SHE Management Plan].
- 1.3. The Contractor shall submit his for review by the Engineer within 28 days after the Commencement Date of the Services and shall amend the SHE Management Plan to address any comments made by the Engineer and submit a Final SHE Management Plan within 14 days of receipt of comments.
- 1.4. The Final SHE Management Plan shall be binding on the Contractor for the duration of the Services.

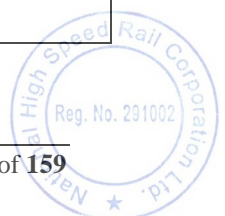
#### 2. Content of SHE Management Plan

- 2.1. The Contractor’s SHE Management Plan shall cover the following aspects:

Site SHE Management Plan	
Contract No.	
Contractor Name	
Project Name	
1	Project Highlights i) Title of the content ii) The Contractor Number iii) Brief scope of work iv) Location map/key plan v) Period of the project
2	SHE Management Policy with Senior management responsibility;
3	Site Organization Chart 1) Chart indicating reporting of SHE Management Personnel and Appointment, duties and responsibilities



4	<p>Roles &amp; Responsibility</p> <p>Individual responsibility of the</p> <ul style="list-style-type: none"> <li>i) The Contractor’s Representative</li> <li>ii) Chief SHE Officer</li> <li>iii) Construction Manager</li> <li>iv) Construction Supervisors</li> <li>v) SHE Committee Members</li> <li>vi) SHE in Charge</li> <li>vii) Site Engineers</li> <li>viii) First Line Supervisors</li> <li>ix) Subcontractors</li> </ul>
5	<p>SHE Committee</p> <ul style="list-style-type: none"> <li>i) Details - Chairman, Members, Secretary and Engineer</li> <li>ii) Procedures for effective conduct of meeting</li> </ul>
6	SHE Training
7	Subcontractor Safety and health procedures for Subcontractors;
8	SHE Inspection and Audit
10	Accident, diseases Investigation Reporting Procedures
11	Occupational Health First aid and emergencies Measures ;
12	Staff and Labour Welfare Measures at site
13	Policy for identifying hazards and risks with Risk Assessment and Mitigation Procedures
14	<p>Safe Work Procedures e.g.</p> <ul style="list-style-type: none"> <li>i) Excavation</li> <li>ii) Structural Steel Erection</li> <li>iii) Form Works</li> <li>iv) Concrete Placement</li> <li>v) Other Special Works (if any.)</li> <li>vi) Work at Height</li> <li>vii) Switch-over works</li> <li>viii) Floor, Wall Openings and Stairways</li> <li>ix) Welding, Cutting and Bracing</li> <li>x) Lifting appliances</li> <li>xi) Work Permit System</li> <li>xii) Electrical Equipment</li> <li>xiii) Mechanical Equipment</li> <li>xiv) Fire Prevention</li> <li>xv) Hazardous Chemicals and Solvent</li> <li>xvi) Ionizing Radiation</li> <li>xvii) Lighting</li> <li>xviii) Abrasive Blasting</li> </ul>
15	Work Permit System



16	List of standard job specific PPEs to be used in the site
17	Maintenance of Regime for construction Equipment and Machinery
18	Traffic Management
19	Housekeeping
20	Environmental and Social Management
21	Visitors and Security arrangement
22	Disciplinary procedures
23	Safety and health promotion and awareness;
24	Safety and health equipment and Safety and health of the Contractor's construction and office equipment;

Note: -The Safety, Occupational and Health (SHE) Management Plan shall be incorporated in the relevant sections.

### 3. Training

3.1. The Contractor shall describe the training program and content he will provide for workers and staff to:

- a) Raise awareness of: the role and importance of safety and health matters; the potential negative impacts of construction work in general and the ways in which impacts can be prevented; and the expected construction impacts and long-term environmental and social benefits of the applicable project;
- b) Disseminate the philosophy and approach of the SHE Management Plan throughout the workforce, and explain the roles of all parties in implementing the SHE Management Plan; and
- c) Inform all employees of the safety and health activities they are required to comply with when conducting their work, and the penalties for non-compliance.

3.2. Training to raise the awareness and capacity of the Subcontractors and their employees shall also be incorporated where necessary.

3.3. The Contractor shall prepare the following plans to supplement the SHE Management Plan:

- a) Emergency Preparedness and Response Plan; and
- b) Fire Prevention, Control and Evacuation Plan.



## **Attachment -2: Work Place Policy (on HIV/AIDS Prevention & Control)**

### **1. Background and Rationale**

- 1.1. The Employee recognizes that the continuing spread of HIV/AIDS constitutes a serious obstacle to the process of development and realizes that there is a need to have coordinated and sustained response to the HIV/AIDS epidemic.
- 1.2. The Employee recognizes that access to medication in the context of pandemics such as HIV/AIDS is one of the fundamental elements necessary to achieve progressively the full realization of the right of everyone to the enjoyment of the highest attainable standard of physical and mental health.
- 1.3. The Employer recognizes that care, support and treatment can contribute to effective prevention through increased acceptance of voluntary and confidential counselling and testing, and by keeping people living with HIV/AIDS and vulnerable groups in close contact with health-care systems and facilitating their access to information, counselling and preventative supplies.
- 1.4. The Employer recognizes that effective prevention, care and treatment strategies will require behavioural changes and increased availability of and non-discriminatory access to, inter area, vaccines, condoms, microbicides, sterile injecting equipment, drugs including anti-retroviral therapy, diagnostics and related technologies as well as increased research and development;

### **2. General**

- 2.1. The transmission of the Human Immunodeficiency Virus (HIV) is through:
  - a) Unprotected sexual contact with an infected person;
  - b) Transfusion of infected blood or blood products;
  - c) Sharing of infected needles or syringes; and
  - d) From infected mother-to-child during pregnancy, childbirth or breast feeding.
- 2.2. There is no scientific or epidemiological evidence to suggest that HIV can be transmitted through ordinary workplace contact (talking to or touching the person, using the same office equipment, tools, utensils or bathroom). Transmission is therefore not likely in the regular workplace setting.
- 2.3. People with HIV may remain healthy and fit to work for several years despite their infection.
- 2.4. With the availability of Anti-Retroviral Treatment, the life of people living with HIV can be prolonged substantially and they can lead a normal productive life.

### **3. Aim**

- 3.1. The policy aims to:
  - a) Prevent transmission of HIV infection amongst workers engaged by the

Contractor including those of his subcontractors and consultants and their families;

- b) Provide access to care, support and treatment to those who are infected; and
- c) Protect workers from stigma and discrimination related to HIV/AIDS by assuring them equity and dignity at the workplace.

#### **4. Scope**

4.1. This policy applies to all contractors, subcontractors, consultants and their employees (including applicants applying them for work) in the Site, office locations, accommodation camps, all other workplaces and contracts of employment, and all aspects of work, formal and informal and the self-employed worker engaged with the Contractor for providing goods or services at any work location and their spouse and children or other family members, residing with the Worker.

#### **5. Guiding Principles**

5.1. The policy adopts the key principles of the International Labour Organisation (ILO) 'Code of Practice on HIV/AIDS and the World of Work' that are in line with the Government of India's 'National HIV/AIDS Policy' and approach of Japan International Cooperation Agency (JICA).

5.2. Based on above, the Contractor shall:

- 1) Provide a safe and healthy work environment for employees;
- 2) Educate its employees and their family members on prevention, care and treatment of HIV/AIDS;
- 3) Provide counselling service;
- 4) Educate its employees on safe blood donation and transfusion;
- 5) Maintain confidentiality regarding the identity and medical information of an infected employee. Only the immediate senior would be kept advised to prevent any medical eventuality;
- 6) Allow an HIV positive employee to continue to work in his or her job unless medical conditions interfere with the job requirement. On health grounds, the employee may be shifted to another job for which he is medically fit;
- 7) Ensure continued employment and benefits to people living with HIV (PLHIV);
- 8) Ensure that the co-employees do not shun their HIV positive peer or refuse to work alongside them;
- 9) Not discriminate against any employee infected by HIV/AIDS regarding promotions, training and any other privileges, applicable to all employees of his organisation;
- 10) Not ask any person who is being offered a job to undergo HIV/AIDS prevalence test, without an informed consent and pre-test counselling of the candidate, as a part of general medical examination before the issue of the appointment letter, or



otherwise;

- 11) Educate its employees and encourage them to participate in voluntary counselling and testing of HIV/AIDS. However, HIV/AIDS tests shall not be a part of any annual or regular health check-ups, without the employee's informed consent and pre-test counselling;
- 12) Ensure that proper treatment is available to employees infected with HIV/AIDS and prescribe a reasonable limit on expenditure in meeting the cost of anti-retroviral (ARV) drugs. All other costs related to treatment of HIV/AIDS (non-ARV) shall be borne by the Contractor; and
- 13) Empanel appropriate hospital(s) for treatment of HIV/AIDS of an infected employee and release payment directly to such hospital.

## **6. Action Plan**

- 6.1. The Contractor shall engage a professional agency (PA), with approval of the Engineer, to facilitate implementation of the guidelines laid down in this policy by the Contractor.
- 6.2. The Contractor shall undertake measures to reduce the risk of the transfer of HIV virus between and among the Contractor's employees including those engaged by his subcontractors and the local community, to promote early diagnosis and to assist the affected individuals.
- 6.3. The Contractor shall conduct Information, Education and Communication (IEC) campaigns via, the appointed professional agency, once in every month, addressed to all employees including the employees of the Subcontractors and consultants, all truck drivers, helpers, crew making material deliveries at the site and the local communities. The IEC campaign shall focus on risks, dangers, impact, and avoidance behaviour in respect of:
  - a) Sexually transmitted diseases (STD);
  - b) Sexually transmitted infections (STI) ; and
  - c) HIV/AIDS.

The IEC campaign shall include distribution of informative leaflets, screening of educative films, display of posters and banners, small group lectures, street plays etc.

- 6.4. The Contractor shall identify peer educators (one for every hundred workers) from among his employees and refer them for professional training to the appointed professional agency.
- 6.5. The peer educators on completion of the training shall serve as the focal point for any information, education and awareness campaigns among the Workers throughout the contract period.
- 6.6. The peer educators shall be paid a monthly honorarium as fixed by the Contractor for rendering these services in addition to their regular duties.
- 6.7. The total number of peer educators (1 for 100 workers) shall always be maintained by



the Contractor.

- 6.8. If a peer educator leaves the Contractor’s employment, then the Contractor at his own expense shall train the new replacement peer educator via the Engineer/Employers’ appointed agency for the purpose.
- 6.9. The Contractor shall establish on-site health clinics to provide free of charge counselling and information on STI/HIV/AIDS, and first-aid services.
- 6.10. The Contractor shall provide facility for STI and HIV/AIDS screening, diagnosis, and referral to a dedicated national STI and HIV/AIDS programme in such clinics.
- 6.11. The Contractor shall arrange for health checks including HIV/AIDS screening before work begins and annually thereafter.
- 6.12. The Contractor shall arrange for free supply of condoms at accommodation camps.
- 6.13. The Contractor shall submit, as a part of the SHE Management Plan, a comprehensive action plan listing the activities to be undertaken regarding prevention of STI and HIV/AIDS, within 28 days of award of the Contract, for approval of the Engineer.
- 6.14. The action plan shall contain various activities to be undertaken by the Contractor during the period of contract as mentioned in this policy and specified in the Contract.

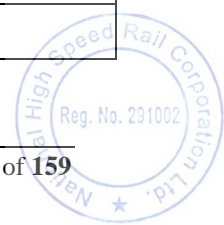
**7. Implementing Organization**

- 7.1. A project coordination committee (PCC) shall be constituted by the Employer in respect of each contract awarded where this policy is required to be implemented. The PCC shall consist of the following members:
  - 1) The Employer/Engineer;
  - 2) The Contractor;
  - 3) Representative of the professional agency appointed by the Employer;
  - 4) Representative of SACS/Local Health Department of the state; and
  - 5) Representative of workers.
- 7.2. The PCC shall monitor the implementation of the Employer’s workplace policy on HIV/AIDS prevention and control for employees engaged by the Contractors at the project level.

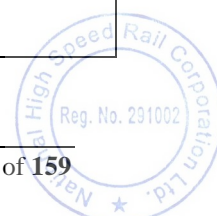
**8. Role of Key Stakeholders**

- 8.1. The following shall be the role of the key stake holders regarding implementation of this policy:

Key Stakeholder	Role
PCC	The PCC shall:



	<ul style="list-style-type: none"> <li>a) Examine the action plan submitted by the Contractor under this policy or the Contract and recommend the same for approval of Employer;</li> <li>b) Monitor and evaluate the progress of activities, budget utilisation etc. under this policy or the Contract;</li> <li>c) Provide guidance for implementation of the action plan ;</li> <li>d) Monitor and review the activities being undertaken including resource (budget) utilisation;</li> <li>e) Advise on problems being faced by the Contractor during implementation;</li> <li>f) Give periodic progress report to the Engineer.</li> </ul> <p>The PCC shall meet once in 2 months or whenever necessity arises.</p>
<p>The Engineer</p>	<p>The Engineer shall:</p> <ul style="list-style-type: none"> <li>a) Formulate, in consultation with the Employer, the project specific HIV/AIDS prevention programme;</li> <li>b) Approve the Contract specific HIV/AIDS prevention programme submitted by the Contractor;</li> <li>c) Approve the Terms of Reference (TOR) submitted by the Contractor for hiring the Professional Agency (PA);</li> <li>d) Coordinate with other stakeholders to modify or revise the action plan as and when required;</li> <li>e) Supervise the programme implementation;</li> <li>f) Monitor, evaluate and report the implementation progress;</li> <li>g) Supervise the Contractor’s obligation under this policy or the Contract for prevention and control of HIV/AIDS.</li> </ul>
<p>Contractors</p>	<p>The Contractor shall:</p> <ul style="list-style-type: none"> <li>a) Submit to the Engineer for his approval, the Contract specific detailed HIV/AIDS prevention programme;</li> <li>b) Submit to the Engineer for his approval, the Terms of Reference (TOR) for hiring the Professional Agency (PA);</li> <li>c) Engage a professional agency with approval of the Engineer;</li> <li>d) Work with the Professional Agency (PA) in implementing HIV/AIDS prevention programme among his employees including the employees of his subcontractors and consultants.</li> <li>e) Establish on-site health clinics to provide the following without any charge, to his employees and their families:                         <ul style="list-style-type: none"> <li>i) Information and counselling on STI/HIV/AIDS;</li> <li>ii) First-aid services on universal precaution for HIV/AIDS prevention;</li> <li>iii) Screening and diagnosis facility;</li> <li>iv) Referral facility to a national programme; and</li> </ul> </li> </ul>



	<ul style="list-style-type: none"><li>v) Supply of contraceptive devices to males/females, including condoms.</li><li>f) Ensure participation of his employees and employees of his subcontractors and consultants including self-employed or piece rated employees, in the HIV/AIDS prevention programme while their employment and during normal working hours;</li><li>g) Do nothing to dissuade the employees as mentioned in (f) above from participating in HIV/AIDS prevention programme;</li><li>h) Encourage employees to work as peer educators on HIV/AIDS prevention after being trained by the Professional Agency (PA);</li><li>i) Ensure active participation of his occupational health staff in implementing the key tasks organized by the Professional Agency (PA);</li><li>j) Arrange distribution of contraceptive devices including condoms in the employee accommodation camps without any charge;</li><li>k) Arrange distribution of IEC materials among the employees and their family members prepared through the Professional Agency (PA);</li><li>l) Establish linkage with SACS and/or local health authorities for their help, guidance and integration with the national programme;</li><li>m) Facilitate monitoring activities and undertake supervision to ensure that the programme is implemented as planned;</li><li>n) Convene monthly meeting with the Professional Agency (PA) for updates on progress of the programme; and</li><li>o) Report progress to the Engineer and PCC monthly.</li></ul>
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8.2. The Contractor is expected to apply the above concepts to promote the same in a positive and proactive manner during the execution of its contract.



**Attachment -3: Reference for SHE Activities**

**General Instruction: SHE/GI/001**

**MINIMUM MANPOWER REQUIREMENTS OF SHE ORGANIZATION**

Chief SHE Officer	Dy. Chief SHE Officer	Sr. SHE Manager	SHE Manager	SHE Executive	SHE (Electrical) Engineer		Labour Welfare Officer
01	02	Refer Note 01	Refer Note 02	Refer Note 02	Refer Note 02		01
Community Liaison officer (CLO)	OH Officer with Necessary Nursing Assistants (each shift)	Senior Traffic Engineer (Refer Note 4)	Barricade maintenance Squad	House Keeping/ Site Maintenance Squads	Sr. Environmental Manager	Environmental manager	
01	At each occupational centre	Refer Note 2&3	As required	As required	01	Refer Note 02	

Note 1. Minimum number of Sr. SHE Manager required is Four (4) or One (1) for every 40 km, rounded off to higher whole number) which ever is higher. In case of Sabarmati and Thane Depot, minimum number of Sr. SHE Manager required will be Two (2) in each.

Note 2. The number of the staff for the package will be proposed by the contractor and approved by the Engineer.

Note 3:Senior Traffic Engineer Post (including the staff) is applicable to contracts where the work must be executed either below or over the ROW like viaduct, station contracts wherein erection and maintenance of barricades are paramount important.

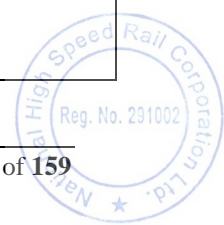
Note 4:The actual manpower will depend on project specific requirements. The Contractor shall advise the Engineer its complete organization chart within 28 days from the commencement date.



**General Instruction: SHE/GI/002**

**MINIMUM QUALIFICATION AND EXPERIENCE FOR (SHE)  
 SAFETY, ELECTRICAL, ENVIRONMENTAL, TRAFFIC ENGG. AND  
 OCCUPATIONAL HEALTH PROFESSIONALS**

Sl. No	Designation	Qualification	Experience (in years)
1	Chief SHE Officer	Chief SHE Officer shall have minimum qualification in any of the following degree/diploma: B.E/B. Tech with Govt. recognized full time Diploma in Safety. BE/B. Tech in safety. Government recognized PG Degree in Environmental Engineering/Sciences with Full Time Govt. Recognized Safety diploma/Degree. International Qualifications like CSP (Certified safety professional), NEBOSH Diploma, Grad IOSH, CMIOSH.	15 (Similar work =5)
2	Dy Chief SHE officer	Same as above	12 (Similar work =5)
3	Senior SHE Manager	B.E/B. Tech/ with Govt .recognized full time Diploma in Safety. BE/B. Tech in safety. Government recognized PG Degree in Environmental Engineering /Science. With Full Time Safety diploma/Degree from state Govt. recognized university in safety. International Qualifications like CSP (Certified safety professional), NEBOSH Diploma, Grad IOSH, CMIOSH.	10 (Similar work =3)
4	SHE Manager	Any Graduate with Govt. recognized full time Diploma in Safety. with 5 years of work experience in full-fledged SHE department of any Public Sector/Leading Private Sector/MNC/with prior approval of the Engineer on a case to case basis	5 (Similar work =2)
5	CLO	Govt. recognised PG degree/PG diploma/Degree in sociology/Social Science.	5
6	SHE (Electrical) Engineer	Degree in Electrical Engineering + Govt. recognized Electrical Licence holder	5



<b>7</b>	Occupational Health Officer	MBBS with Diploma in Industrial Health or Post Graduate Certificate Course – Associate Fellow of Industrial Health (AFIH) from DGFASLI or its approved institute.	<b>1</b>
<b>8</b>	Traffic Engineer	Govt. recognized PG Degree/Degree/Diploma in Traffic/Transportation Engineering or Planning or another similar course	<b>5</b>
<b>9</b>	Labour Welfare Officer	Any Degree with Govt. Recognized Degree/Diploma/PG Diploma in Labour Welfare related fields like Law, Personnel/Industrial Relations etc.	<b>3</b>
<b>10</b>	Senior Environment Manager	BE or MSc. Environmental Engineering/Environment Sciences from govt. recognised institutions.	<b>7</b> (Similar work =3)
<b>11</b>	Environment Manager	BE or MSc. Environmental Engineering/Environment Sciences from govt. recognised institutions.	<b>5</b> (Similar work =2)

The qualifications and experience in respect of the following positions shall be proposed by the Contractor and seek consent of the Engineer before their mobilization at Site:

- a) Director/Chief/Senior and other Safety, Occupational Health and Environment Managers; and
- b) Community Liaison Officer.

Note 1: In some exceptional cases where the candidate had earlier worked successfully in Railway Projects, they can be considered, depending upon the qualification and no. of years of experience on a case to case basis even if they do not possess the prescribed qualification as listed above.





## General Instruction: SHE/GI/003

### **MINIMUM REQUIREMENTS OF SHE MONITORING AND AUDIO-VISUAL EQUIPMENT**

- 1) Every contractor shall provide the following audio-visual aids for conducting weekly review, monthly safety committee and other post review meeting of all fatal and major incidences effectively. This audio-visual equipment is a must for conducting periodical in-house safety presentations in the training programs; and
- 2) In addition to the above, portable hand held digital sound level meter (SLM) and portable hand held digital Lux meter are also to be provided.
- 3) The minimum requirement of the quantity to be provided in SHE management Plan and approved by the Engineer.

Sl. No	SHE Monitoring and Audio-Visual Equipment details
1.	Portable hand-held Digital Sound Level Meter (SLM)
2.	Portable hand-held Digital Lux Meter
3.	Laptop computer with standard configuration including multimedia facilities
4.	Colour printer
5.	Computer projector with screen
6.	Overhead projector
7.	Camera (For taking accident investigation photos in which case the images cannot be easily altered)
8.	Digital camera/camera equipped mobile phone with flash of minimum 8 mega pixel and video facility
9.	Digital still camera /camera equipped mobile phone with flash of minimum 8 mega pixels
10.	Portable loudspeaker (for tool-box talk and emergency purpose)
11.	Communication facility like mobile phone, walky-talky etc.
12.	Accident investigation Kit containing the following:
a)	Chalk piece for marking
b)	Measuring tape for measuring. Flexible tape – 2m length Metal Foot long scale and Metal tape- 30m
c)	Equipment tags
d)	Multipurpose Flash light
e)	Barrier tape
f)	Accident investigation Forms and checklists
g)	Enough Paper for witness recording and other noting
h)	Emergency Phone Numbers list

## **General Instruction: SHE/GI/004**

### **Topics for SHE Orientation Trainings for Workmen for First Day at Work**

#### **1) Hazard Identification Procedure**

Hazards on site:

- Falls;
- Earthing work;
- Electricity;
- Machinery;
- Handling materials;
- Transport;
- Site housekeeping;
- Fire;
- Safety of nearby located structures;
- Works close to railway tracks or roads.

#### **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/Cardiopulmonary Resuscitation (CPR). /Automated External defibrillator(AED)

#### **4) Duties of the Contractor**

- Brief outline of the responsibilities of the Contractor by law;
- Details of the Contractor's accident prevention policy;
- The Employer SHE Management Manual (if any);
- 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 (induction and orientation).

## General Instruction: SHE/GI/005

### ID CARD FORMAT (85 mm x 55mm)

#### FRONT SIDE OF ID CARD

Company Logo	Contractor Details
<b>PROJECT NAME</b>	
Name: _____	PHOTO
Designation: _____	
Blood Group: _____	
Valid Up to: _____	
ID No: _____	
Authorized Signatory	

#### BACK SIDE OF ID CARD

Employee Address: _____ _____ _____
1. This card is the property of XXXXXXand must be returned on demand and on transfer/cancellation of employment. 2. A charge will be levied for replacement of this card due to loss or theft 3. If found, please return it to below mentioned address.
<b>OFFICE ADDRESS</b>

### General Instruction: SHE/GI/006 [SHE Training Matrix]

Types of training	Management																Supervisor						Specific							
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
1. Contractor Representative	•																													
2. S/c. Construction Managers	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
3. Quality Managers	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
4. Planning engineers	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
5. Construction Managers	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
6. Construction Supervisors	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
7. SHE Professionals	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
8. Construction Foreman	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
9. Medical Doctor	•			•			•																							
10. Machinery Operators	•			•			•																							
11. Material Handlers	•			•			•																							
12. Steel workers	•			•			•																							
13. Mechanical workers	•			•			•																							
14. Civil workers	•			•			•																							
15. Electrical workers	•			•			•																							
16. Transportation Drivers	•			•			•																							
17. Office/Clerical Staff	•			•			•																							
18. Welders, Gas Cutters & Helpers	•			•			•																							
19. Traffic Supervisors / Wardens/Security officers	•			•			•																							



## General Instruction: SHE/GI/007

### WEEK/DAYS TO BE OBSERVED FOR CREATING SHE AWARENESS

1st Monday to Sunday of January	Road Safety Week (Subjected to confirmation from Ministry of Road Transport, Govt. of India every year.)
16th February	Kyoto Protocol Day
March	Red Cross Month
1st to 7th May	Emergency Preparedness Week
4th March	National Safety Day
7th April	World Health Day
14th April	Fire Safety Day
18th to 22nd April	Earth Week
20th April	Earth Day
20th April	Noise Awareness Day
28th April	ILO World Day for Safety and Health at Work Day
5th June	World Environmental Day
12th June	World Day against Child Labours
9th July	Occupational Health Day
17th October	World Trauma Day
1st December	World AIDS Day
22March	World Water Day
21st June	World Yoga Day



## General Instruction: SHE/GI/008

### Minimum Requirements of SHE Communication Posters/Signage/Video:

- 1) For Minimum requirements of SHE Communication Posters/Signage/Video, for every 50 km.
- 2) Every contractor falling into the above groups shall prepare a SHE Communication Plan as a part of site specific SHE Management Plan and shall include the following minimum requirement of Posters/Signage/Video as applicable. In case readymade posters are available in any of the category from National Safety Council or any other safety related organizations they may procure the same and display it. In case the same is not available, then the Contractors shall make necessary arrangements to get the posters designed and printed on their own. All posters shall each be in Hindi, English and the regional language; and
- 3) All the above is to be detailed in the Contractor's SHE Management Plan and he shall obtain the Engineer's prior consent for the numbers, contents, locations, etc.

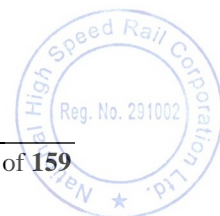
**Table No.: 1 - Minimum No. of Posters**

Sl. No	SHE Poster Title	Minimum No. of concepts in each title	No. of Posters/Signage/Video
1.	Safety Culture	5	Each 10
2.	Daily Safety Oath	1English, 1 Hindi & 1 in regional language	Each 50
3.	Signage to display the messages like PPE ZONE, NO PPE ZONE, HARD HAT AREA etc.	2 types of sizes made up of metal sheet to be mounted at different locations	Each 25
a)	Helmet	5	Each 25
b)	Shoe	5	Each 25
c)	Goggles & Ear Protection	5	Each 25
d)	Full Body Harness	5	Each 25
e)	Hi-Vi Jacket	5	Each 25
4.	Emergency Management Plan	5	Each 25
5.	Working at Heights	10	Each 25
a)	Ladder, Stairway, Scaffold - Signage to display the messages like SAFE, UNSAFE, FIT FOR USE, AVOID USE etc.	5 types of sizes made up of metal sheet to be mounted at different locations	Each 25
6.	Site Electricity	5	Each 25

Sl. No	SHE Poster Title	Minimum No. of concepts in each title	No. of Posters/Signage/Video
7.	Crane Safety	5	Each 25
8.	Slings	5	Each 25
9.	Rigging Procedures	5	Each 25
10.	Excavation	5	Each 25
11.	Occupational Health (Mosquito Control, HIV/AIDS awareness, Dust Control, Noise Control, No Smoking/Spitting, etc.)	10	Each 25
12.	First – Aid	3	Each 25
13.	Labour Welfare Measures (Payment of Minimum Wages, Avoidance of Child labour, signing in the Muster Roll, in case of accidents- what to do? Etc.	5	Each 25
14.	Importance of “Safety Handbook”	1	25
15.	Traffic Safety (Speed limit, safe crossing and working within barricaded area etc.)	5	Each 25
16.	Environmental Monitoring (Spillage of Muck, hazardous material, Improper drainage, water spray for dust containment etc.)	5	Each 25
17.	Video in Hindi on PPE usage – 15 minutes duration	1	-

Note 1: Items mentioned under 17 is video. Items under 3 (a) and 5 (a) are metal signage boards and all other items are posters.

Note 2: The above minimum numbers are for guidance only. The actual number will depend on the project’s specific requirements. The Contractor shall propose and obtain Engineer’s prior consent to the final numbers, locations, etc.





**Table No.: 2 – Size of Posters/Signage**

<b>Sl. No</b>	<b>Item</b>	<b>Size</b>
1.	Posters – Standard	17”x22” –135 GSM 4 Colour Printing
2.	Posters – Special (Wherever required)	17”x22” card laminated FA Poster
3.	Posters - Mega size (Wherever required)	32”x40” Flex FA Poster
4.	First-Aid Booklet	6”x4”
5.	Safety Handbook	6”x4”
6.	Signage	Small: 12”x6” Big: 24”x12”
7.	Road Traffic Sign Boards	Strictly as per Indian Road Congress (IRC) specifications

**Table No.: 3 – Safety Signage Colour (as per IS: 9457)**

<b>Sl. No</b>	<b>Type of signage</b>	<b>Colour</b>
1	Mandatory	Blue
2	Danger	Yellow
3	Prohibitory	Red
4	Safe conditions	Green



## **Attachment -4: Instruction Manual for the Usage of Track bound Motor Cars/Machines**

### **1. General Rules**

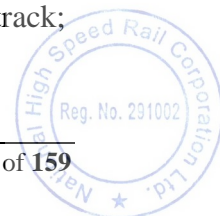
1.1. Unless otherwise specified in the other regulations and guidelines, the following rules in this manual apply to the use of track bound motor cars/machines and other vehicles for the track works/electrification works etc. Mumbai-Ahmedabad High Speed Railway Construction Work include electrical and civil engineering work to be carried out using track bound motor cars/vehicles and machines etc. on the main line.

1.2. Listed below are the other regulations and guidelines:

- 1) Indian Railways Manual of AC Traction Maintenance and Operation Vol-II( Part-I)
- 2) Indian electricity Act and Rules;
- 3) Rules for the Management and Operation of Construction Machines (JRRT Regulations No. 165, October 2003);
- 4) Standard Specification of Track-related Construction Work (JRRT Regulations No. 66, February 2006); and
- 5) Standard Specification of Electricity-related Construction Work (JRRT Regulations No. 176, October 2003).

1.3. Terms and Definitions:

- 1) [Track motorised or self-propelled vehicles, etc.]: Vehicles such as track motorised or self-propelled cars, special-purpose cars (with a road-rail device), tamping machines, slab track service cars, track inspection cars, electricity-related service cars, carriage wagons (including ballast hopper cars) (hereinafter referred to as “vehicles”) and other service cars used for work;
- 2) [Service cars]: Simple trolleys (excluding those with a brake that can easily be removed or with materials and equipment that are hard to be removed), rail-carrying wagons, rail warmers, hand wagons, bolt power wrenches, transportable generators for construction work and other equipment that run on the track;
- 3) [Persons engaged in the use of vehicles and service cars]: The persons who are directly engaged in the use of vehicles and service cars for work; specifically, the Administrator, Supervisor, Operations Leader, Driver, Persons in charge of work for vehicles on tracks, and Service Engineers;
- 4) [Ground-based workers]: The Operations Team Leader and Security Guards;
- 5) [Work line]: The tracks or sections where work is performed with any of the vehicles and service cars;
- 6) [Passage line]: The tracks or sections where vehicles and service cars pass through;
- 7) [Engineer]: The Director of the Employer’s project office in charge of the track;



- 8) [General section]: Sections where the maximum gradient is lower than 15%;
  - 9) [Steeply-sloped section]: Sections where the maximum gradient is 15% or higher;
  - 10) [Uncompleted section]: Sections where the track conditions have not met the completion standards;
  - 11) [Completed section]: Sections where the track conditions have met the completion standards; and
  - 12) [Double-headed]: Two power cars connected with their double headed functions that have been confirmed.
- 1.4. Designation of persons engaged in the use of vehicles and service cars are listed in the following items.
- 1) Administrator  

The deputy project manager of ~~director~~ of the Contractor's project office who is appointed by the Chief Project Manager ~~Director~~.
  - 2) Supervisor  

A person with the qualification of Chief Project Manager of the contractor's project office in charge of Track-related Construction Work, the Standard Specification of Electricity-related Construction Work and other guidelines, who is approved by the Administrator in advance.
  - 3) Operations Leader  

A person who has full knowledge of the vehicle or service car to be used, including its performance and functions, and has leadership skills regarding the operation, who is approved by the Supervisor in advance.
  - 4) Driver  

Regarding self-propelled or traction vehicles, such as track bound motor cars or tamping machines, Drivers have to have a certificate of skills issued by the Indian Railway Authority or qualifications by the Indian Designated Training Institute. Drivers shall be persons with full knowledge of the vehicle or service car to be used, who are approved by the Supervisor in advance.

Regarding other vehicles, Drivers for each type of vehicles shall be persons who are approved respectively by the Engineer in advance.
  - 5) Persons in charge of work for vehicles on tracks  

Persons with the knowledge and skills of coupling vehicles, operating the point machine, and preventing operation accidents, who are approved by the Supervisor in advance.
  - 6) Service Engineer



Persons with qualifications that are equivalent to or higher than those of Drivers, who are approved by the Supervisor in advance. (They can also serve as Drivers.)

1.5. Duties of persons engaged in the use of vehicles and service cars are listed in the following items.

1) Administrator

After receiving an order from the Engineer, the person makes adjustment with relevant parties for the use of a vehicle or service car and carries out tasks regarding operation in the area under the jurisdiction of his office, approval and management.

2) Supervisor

Regarding the use of vehicles or service cars, the person communicates with the Administrator, and carries out paperwork, such as filing of an application for use. The person also instructs and supervises the Operations Leader, the Driver, the Persons in charge of work for vehicles on tracks, and the Service Engineers.

3) Operations Leader

The person informs all workers of his/her group of the operation plan given by the Supervisor and ensures that they understand it. The person also communicates accurately with the Driver and the Persons in charge of work for vehicles on tracks, and then concentrates on taking command of the operation.

4) Driver

The Driver carries out a pre-operational check to make sure that the vehicle is in good condition and properly maintained, and then concentrates on driving it, following the Operations Leader's instructions.

5) Persons in charge of work for vehicles on tracks

They carry out coupling and decoupling of the vehicle and operate point machines, following the Operations Leader's instructions.

The Operations Leader may also take up the role.

6) Service Engineer

Service Engineers maintain and manage vehicles to make sure that the vehicles are in good condition and properly operated.

1.6. Duties of ground-based Contractor's workers are listed in the following items.

1) Operations Team Leader

The person takes charge of the work group, supervises them and carries out tasks to prevent an accident at the construction site.

2) Look out & Safety Guard



The Look out & Safety Guard concentrate on checking the passage line, the work line and the area adjacent to them for an approaching train in order to ensure the safety of vehicles, service cars and workers.

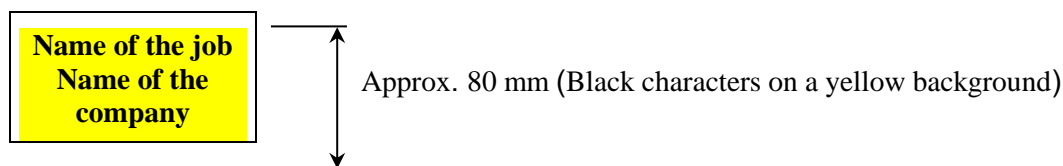
1.7. Belongings of persons engaged in the use of vehicles and service cars

The persons engaged in the use of vehicles and service cars and Security Guards shall have the following minimum items with them during work.

Job name	Item name	Smoke grenade	Hand flag	Signal light	Whistle	Train operation diagram	Watch	Armband
Operations leader		○	Red, Green	○	○	○	○	○
Driver		○				○	○	○
Persons in charge of work for vehicles on tracks			Red, Green	○	○			○
Security guard		○	Red, White	○	○	○	○	○

ID card, Proof for competency (to be added in the table)

The shape of the armband shall be as follows.



For communication, suitable and reliable tele communications may be installed, or each worker may have a transceiver with them as needed.

2. Operation of Vehicles or Service Cars

2.1. For the use of a vehicle or service car, the general guidelines are mentioned below must be observed.

1) Submission of “Vehicle Operation Plan”

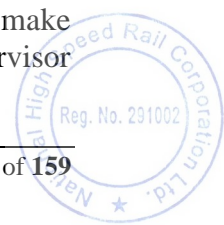
By the end of each week, the Supervisor creates “Vehicle Operation Plan” for the next week and submits it to the Administrator.

2) Submission of “Application for the Use of Vehicles”

For using the vehicles specified in the Vehicle Operation Plan, the Supervisor submits “Application for the Use of Vehicles” to the Administrator at least 3 days before the date of use.

3) Creation and issuance of “Operation Timetable”:

a) Based on the “Application for the Use of Vehicles” submitted by the Supervisor, the Administrator arranges the matter with relevant parties, make adjustment, creates “Operation Timetable” and submits it to the Supervisor

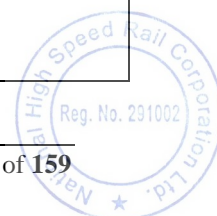


- by at least 2 days before the date of use; and
- b) The Supervisor hands the copies of the issued “Operation Timetable” to the relevant workers and makes it known to everyone.
- 4) Submission and approval of “Application for the Use of Service Cars”:
    - c) The Supervisor creates and submits “Application for the Use of Service Cars” to the Administrator by at least 3 days before the use of service cars; and
    - d) The Administrator makes arrangements for the use of the service cars and approves it.
  - 5) The Administrator, when he/she determines the need for the use of a section outside of their jurisdiction, obtains prior consent from the Engineer of the relevant agency based on the Vehicle Operation Plan.
- 2.2. As a rule, two or more vehicles or service cars shall not be used on the same work line or passage line. However, this excludes cases where the Administrator determines the need.
- 2.3. Regarding the composition of a vehicle, the following items must be observed:
- 1) Each vehicle must be equipped with a brake (electromagnetic brake, hereinafter referred to “braking equipment”). Each track motor car, special-purpose car (with a road-rail device) or service car for overhead wiring must be equipped with an “overrun prevention system”; and
  - 2) When a train is composed of vehicles with a through brake system, the brake pipe or electrical train pipe must run through the vehicles.
- 2.4. When a service train is composed of vehicles for work, the Operations Leader must confirm the coupling device between each vehicle, the couplings of the brake pipe or electrical train pipe, release condition of air valves, etc.
- 2.5. Before driving a train or when compose vehicles, the Operations Leader and the Driver must carry out a brake test, using the method described in the table below, and confirm that the braking function and the overrun prevention system work properly.

The Operations Leader must record the results of the brake test and the confirmation of the overrun prevention system in the Inspection Record Book.

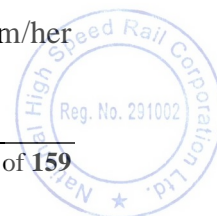
The Inspection Record Book must always be placed near the driving seat.

Item	Operations Leader	Driver
When the vehicles are completely composed	2. Gives the signal to the Driver to “fasten the brake” from a position near the back of the train. (Daytime) Raises his/her arm high	1. Immediately charge the compressed air into the brake pipe.



Item	Operations Leader	Driver
	and moves it in a circular motion. (Night-time) Holds a white light in his/her hand, raises the arm and moves it in a circular motion.	
	4. After confirming that the brake of each vehicle is tightened and hearing the whistle signal from the Driver, the Operations Leader gives the signal to “release the brake.” (Daytime) Raises his/her arm high and moves it from side to side. (Night-time) Holds a white light in his/her hand, raises the arm and moves it from side to side.  6. After confirming that the brake of each vehicle is released, gives the signal to tell the Driver that the brake test is completed. (Daytime) Raises his/her arm high. (Night-time) Holds a white light in his/her hand and raises the arm.	3. Confirms the signal, check that air for breaking is not leaking, and gives the whistle signal. Whistle signal (Brake is tightened) “- . -”  5. After confirming the signal, releases the brake and gives the whistle signal. Whistle signal (Brake is released) “- -”  7. Confirms the signal and responds with the whistle signal. Whistle signal (The brake test is completed) “- - -”
Overrun prevention system	Confirm functions based on the “Overrun Prevention System Flow”.	
When a vehicle has a problem with the brake	When the brake does not work properly, Such vehicles cannot be used.	

2.6. The Driver can start driving a vehicle only after the Operations Leader told him/her





to do so.

2.7. The Driver must repeat each direction of the Operations Leader and follow the Operations Leader’s directions when driving a vehicle.

The table below shows the permitted speed limits for vehicles.

Type	General section		Steeply-sloped section		Remarks
	Uncompleted section	Completed section	Uncompleted section	Completed section	
Track motor car	20	40	20	35	When a single vehicle is used
Special-purpose car (with a road-rail device)	20	40	20	35	Same as above
Tamping machine	20	40	20	35	Same as above
Service car for overhead wiring	15	35	15	25	Same as above

- As a rule, the Driver must use the holding brake system while driving a vehicle down a slope.
- Before reaching a turnout or point, the Driver must stop the vehicle and confirm the course to take, and then, drive the vehicle at a very low speed to pass through it.

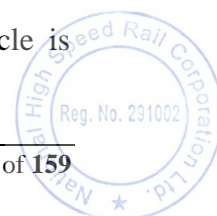
2.8. For the use of a vehicle with traction capability, the work procedure and method, and the calculation of the tractive capacity, braking distance, maximum speed, etc. must be submitted to the Engineer to receive the prior approval.

2.9. As a rule, vehicles shall be used based on the predetermined operation timetable.

2.10. If this is impossible due to a trouble with a vehicle or delay in work, the work team shall report the situation to the Administrator and follow his/her directions.

2.11. When shunting or coupling work is performed in a depot, the following items must be observed to prevent an accident:

- 1) The Operations Leader communicates with the Persons in charge of work for vehicles on tracks to determine the order of shunting vehicles in advance. Shunting work shall be performed according to the order;
- 2) Speed limits in a depot are prescribed as follows:
  - a) Turnouts or points must be passed at a very low speed; and
  - b) Others: 10 km/h or lower.
- 3) The Operations Leader confirms that the course for shunting the vehicle is



properly opened, and then gives the Driver the signal to shunt the vehicle;

- 4) Point machines in the depot must be operated by Persons in charge of work for vehicles on tracks;
- 5) When the point machine is set to the reverse position, the operator must set it back to the normal position immediately after using it; and
- 6) When parking a vehicle in the depot, the Driver must completely activate the brake equipment, and then, completely tighten the hand brake. After confirming that the Operations Leader securely set wheel chocks, the Driver stops the engine and gives the vehicle a buffer stop. The same procedure must be taken for each vehicle without a hand brake.

2.12. Regarding the use of turnouts and crossovers installed for construction work, the following items must be observed:

- 1) As a rule, the opening of each turnout or crossover installed for construction work shall be set to the normal position. When you set a turnout or crossover to the reverse position, be sure to set it back to the normal position immediately after using it for work;
- 2) Before reaching a turnout or crossover installed for construction work, the Driver must stop the vehicle. The Operations Leader gets off the vehicle, walks to the point to confirm the opening route, and guides the Driver to pass the vehicle through the point at a very low speed; and
- 3) When the turnout is equipped with a key bolt or securing lock, the locking state must be confirmed before the vehicle reaches the point.

2.13. When two or more vehicles are used on a same work line or passage line, the following items must be observed:

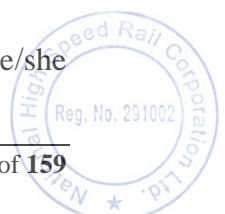
- 1) The distance between two vehicles must be kept at least 200 meters. When the distance cannot be confirmed due to conditions of low visibility, the Driver behind must slow down the vehicle and follow the vehicle in front; and
- 2) When the Driver of the front vehicle finds a problem with running it due to a breakdown or an abnormality, he/she must report it immediately in order to stop the vehicle behind.

2.14. Regarding the overrun prevention for vehicles and service cars, the following items must be observed to take all possible safety measures:

- 1) Before using a track motor car or other type of vehicle, take measures to prevent the vehicle from overrunning the ends of the work area;

(Note) “Overrun prevention measures” refers to buffer stops, which may be wooden sleepers or sandbags.

- 2) The Driver must be on standby without leaving the vehicle (including when he/she is not driving the vehicle);
- 3) When the Driver needs to leave the vehicle due to unavoidable reasons, he/she



must obtain the Operations Leader's consent, completely apply the air brake, completely tighten the hand brake, and then, stop the engine after confirming that the Operations Leader securely set wheel chocks;

- 4) When the Driver parks the vehicle for a long period of time, he/she must obtain the Operations Leader's consent, completely apply the air brake, completely tighten the hand brake, and then, stop the engine after confirming that the Operations Leader securely set wheel chocks;

(Note) "A long period of time" means an hour or longer.

- 5) The couplings, fittings, mounting pins shall be designated ones;
- 6) Regarding the overrun prevention for service cars, the following items must be observed:
  - a) The brake equipment of a service car must be operated all the more carefully because it is simple and easy to operate;
  - b) A simple trolley must have overrun prevention equipment. Be sure to confirm functions of the braking device before use;
  - c) When a simple trolley is being used, at least two workers must be present. Do not use it to carry a heavy object that is hard to be unloaded;
  - d) When it is necessary to use a simple trolley, the Use Plan (that includes specifications, the intended use, place, and time period, the person in charge of inspection, the form of the Inspection Record Book, photos, the reference number, etc.) must be submitted to the Engineer to receive the prior approval;
  - e) The summary of the records of inspecting the brake equipment and other mechanisms of the simple trolley must be maintained;
  - f) When parking the trolley for a while during the work process, workers must securely set wheel chocks; and
  - g) Service cars that are not in use must be removed from the track and placed outside the structure gauge in an orderly manner.

### **3. Safety Equipment for Driving**

- 3.1. When there is a temporary building for construction work beside the railway to be used, and the clearance between the vehicle and the building is not enough, "warning signs or equipment" must be set up at the far side and near side of the building.

(Note) Warning signs or equipment refer to "markings", "warning equipment", or other signs calling for attention. The Administrator determines the shape and the installation method. When a vehicle needs to be used in a tunnel or at night, red lamps, fluorescent paint, or reflective sheet shall be used.

- 3.2. For each turnout or crossover installed for construction work, the "fouling point marker" shall be installed.
- 3.3. For each crossover installed for construction work, the "point machine marker" shall be installed.



- 3.4. A buffer stop must be installed on the dead end of the line in a depot, which is always used for parking the vehicle. In addition, the “buffer stop sign” must be placed there.
- 3.5. The buffer stop signs placed on the both ends of the work area shall be illuminated triangular safety reflectors (called reflector in the Road Traffic Law) or the like.
- 3.6. At each location where the Driver needs to stop the vehicle to confirm safety, the “stop sign” shall be set up.
- 3.7. The vehicles shall have signal lamps that are clearly visible at a distance:
- 1) The signal lamps must always be well inspected and maintained;
  - 2) A red lamp must be installed on the back of the unpowered vehicle at the end of a train towed by a powered vehicle. If this is impossible, red reflective sheet can be used; and
  - 3) During pushing operation by locomotive, a rotating-type warning lamp must be installed on the front of the train.
- 3.8. The “use-of-vehicle indication panel” shall be put up in the railway construction project office in charge of the track. The panel shows the locations of vehicles and service cars, the Driver route, work methods, etc.

#### 4. Hand/Whistle Signals

- 4.1. When shunting or moving a vehicle to another track, signals in the following table shall be used.

Message Signal type	Daytime	Night time or in a tunnel
Drive the vehicle towards the person giving the signal.	Hold a green flag and move it from side to side. Or move your hand from side to side when a green flag is not there.	Hold a green light and move it from side to side.
Drive the vehicle away from the person giving the signal.	Hold a green flag and move it up and down. Or move your hand up and down when a green flag is not there.	Hold a green light and move it up and down.
Decrease the speed.	Stop moving the green flag in your hand, and then, move it up and down once as far as your arm goes. Or, when a green flag is not there, stop moving your hand vertically or laterally, and then, move your arm up and down once as far as it goes.	Stop moving the green light in your hand vertically or laterally, and then, move it up and down once as far as your arm goes.



<b>Message Signal type</b>	<b>Daytime</b>	<b>Night time or in a tunnel</b>
Drive the vehicle a little bit forward or backward.	Hold a rolled-up red flag and give the signal to the Driver to drive the vehicle forward or backward while moving the rolled-up flag over your head.  Or, when a flag is not there, move your hand to give the signal to the Driver to drive the vehicle forward or backward while waving the other hand over your head.	After moving up and down the red light in your hand, give the signal to the Driver to drive the vehicle forward or backward.
Stop the vehicle.	Show a red flag.  Or raise your arms instead when a red flag is not there.	Turn on the red light.
Coupling	Hold a red flag and a green flag and raise them over your head, showing both flags by putting the bottom ends of the sticks together.	Turn on the red and green lights several times by turns.

4.2. The Driver of a vehicle or service car shall give the whistle signals in the following table as needed.

<b>Whistle signals</b>	<b>Signalling method</b>
1. To ask the Operations Team Leader to come.	--
2. To warn about a danger.	•••••
3. To start driving the train that has two or more driven vehicles backwards.	••-
4. To start coasting the train that has two or more driven vehicles.	-••
5. To start power running of the train that has two or more driven vehicles.	•
6. To call attention.	-
7. To start moving (the vehicle).	-
8. To respond to a coupling sign.	••
9. To respond to ground-based workers.	-

(Note) Regarding the symbols in the signalling method column, “-” means a middle whistle and “•” means a short whistle.

4.3. When vehicles or service cars are pushed by a locomotive, the Operations Leader must be in the front part of the front vehicle, pay attention to the front, and give the Driver signals as listed in the table below.



Message Signal type	General case		Verbal signals using communication equipment
	Daytime	Night-time or in a tunnel	
No problem ahead	Show a green flag.	Turn on a green light.	Ahead is all right.
Something is ahead. Decrease the speed.	Hold a green flag and move the arm up and down once as far as your arm goes.	Turn on a yellow light. Or, when a yellow light is not there, hold a green light in your hand and move the arm up and down once as far as it goes.	Be careful. Slow down.
Stop the vehicle.	Show a red flag.	Turn on the red light.	Stop.

4.4. The following table lists signals used in the brake test after vehicles or service cars are coupled into a train.

Signal type	Daytime	Night-time or in a tunnel
Tighten the brake.	Raise your arm and move it in a circular motion.	Hold a white light in your hand, raise the arm and move it in a circular motion.
Loosen the brake.	Raise your arm and move it from side to side.	Hold a white light in your hand and move the arm from side to side.
The test is finished.	Raise your arm.	Hold a white light in your hand and raise the arm.

4.5. The following table shows the signals used by ground-based workers as needed to express the presence or absence of a problem with the vehicles or service cars passing them.

Signal type	Daytime	Night time or in a tunnel
When there is no problem with the passage of the vehicles or service cars	Show a white flag. Or, raise your arm about 45 degrees from directly overhead.	Hold a white light in your hand move it in a circular motion.
When there is a problem with the passage of the vehicles or service cars.	Show a red flag. Or, when a red flag is not there, raise your arms or hold something else other than a green flag and shake it fast instead.	Hold a red light in your hand and shake it strongly from side to side. Or, when a red light is not there, use a smoke grenade or hold a light other than a green light and shake it fast instead.

## 5. Prevention of Accidents

5.1. When a vehicle is used, workers must observe the following items in order to prevent an accident:

- 1) The Operations Leader must display his/her name and the name of the Driver on each vehicle to be used;
- 2) The Operations Leader must give directions to the Driver to inspect the braking device, functions of signal lamps and the couplings before he/she drives the vehicle;
- 3) Workers who are on board with the Driver for moving the vehicle must be on the designated place in safe postures so that the Driver can concentrate on the operation;
- 4) When necessary, the Operations Leader must give clear instructions or information to the Driver while he/she is driving the vehicle. The Driver repeats the words, replies and confirms the safety; and
- 5) Jumping onto or off a vehicle that is not completely stopped is prohibited.

5.2. For the transportation of workers, use a passenger car designed for carrying people or a vehicle with equipment that is made for the purpose. Do not use a carriage wagon or a vehicle without such equipment.

(Note) Such equipment shall include flat space, railing, and steps for the safety and ease of getting aboard.

5.3. As a rule, two or more tasks shall not be carried out on a same passage line or work line. However, this excludes small tasks that are permitted exceptionally by the Administrator.

When a task is performed pursuant to the preceding paragraph, or work is performed in the vicinity of a track in use, the following items must be observed to ensure the safety of the workers:

- 1) The Operations Team Leader must allocate the Security Guards who watch the operation of the vehicles in the work site as needed and ensure that the work does not impede the track in use;
- 2) When a vehicle or a service car is approaching, the Security Guards must take action to evacuate the workers, check the railway for a problem, and give the predetermined signal to the Operations Leader, etc;
- 3) When work needs to be performed on a railway in service due to unavoidable reasons, workers must work in groups of two or more;
- 4) In order to call attention to the Operations Leader and crew of vehicles in operation, the “construction work sign” must be set up in the work area;
- 5) After confirming the “construction work sign” described above, the Operations Leader or the Driver of a vehicle must give a warning whistle, confirm the safety, and slow down the vehicle to pass the place;



- 6) Do not cross the tracks right in front of or right behind any of the vehicles or service cars being used for work (or being maintained).
- 7) The workers must communicate well with each other when switching equipment.

When it is unavoidable to lubricate, inspect or adjust a machine of a vehicle while driving, and then, confirm the condition of each portion of the machine. Be very careful when approaching any of the driving parts and hazardous parts (painted in red). The Operations Team Leader must be assigned in each work group and the reporting line must be clearly defined.

- 5.4. If a derailment, accident or emergency occurs in the use of vehicles, the following items must be observed to take proper actions without delay:
  - 1) If a derailment or an accident made it impossible for workers to drive a vehicle or continue working, take immediate actions needed for recovery, and report the situation to the Administrator;
  - 2) If an accident caused a personal injury, immediately give the injured first-aid and report the accident to the relevant parties;
  - 3) If an accident caused damage to any of the vehicles, fully investigate the circumstances of the accident even when it was a minor accident, take actions to prevent it from causing another accident and report it to the Administrator; and
  - 4) The reporting system in case of an emergency must be formulated based on the construction plan and approved by the Engineer in advance.
- 5.5. When a vehicle has something wrong with it, attach a sign to the vehicle in order to indicate the state of all workers, which includes information, such as the damaged parts and precautions.
- 5.6. The following items must be observed to control brake shoes.
- 5.7. In order to indicate the limit of abrasion, paint the side of the brake shoes with white paint, excluding the thickness of 20 mm (25 mm for those of the track motor car 290PS).
- 5.8. Regarding the storage, inspection and maintenance during the lending period, the following items must be observed:
  - 1) The workers must communicate well with each other to confirm the safety during the inspection and maintenance work; and
  - 2) Regarding the storage, inspection and maintenance of the vehicles, the workers must follow the rules set forth in the “Construction Machine Handling Procedure Manual, issued by the Contractors’ Project Office”.

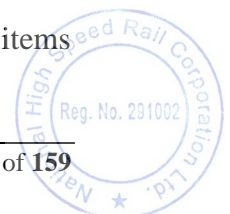


## **Attachment -5: Instruction Manual for the Control of Electrical Work during the Period when the Overhead Contact System is Energized**

### **1. General rules**

- 1.1. This manual is intended for the control of work, etc. and, in order to prevent an electrical accident during the period when power is supplied to the equipment of substations, etc. and equipment of power distribution lines, etc. between Mumbai and Ahmedabad stations of the High Speed Railway, and also the control of the system of all electrical driving equipment, signal maintenance equipment and electrical communication equipment during the period of comprehensive audit and inspection.
- 1.2. The scope of application of the Electrical Control work for the prevention of an electrical accident during the period when power is supplied to the equipment of substations, etc. and equipment of power distribution lines, etc. (hereinafter referred to as “Electrical Control work”), and the applicable sections and periods shall be as follows.
- 1) Scope of application:
    - a) Entry into and work in substations, etc.;
    - b) Dead-line work for power distribution lines, etc. and work performed near these lines; and
    - c) Work to break a return circuit (including rail).
  - 2) The applicable sections between Mumbai and Ahmedabad stations and the period.
- 1.3. The scope of application of the system control of the electrical driving equipment, signal maintenance equipment, and electrical communication equipment during the period of the comprehensive audit and inspection (hereinafter referred to “electrical system control work”).
- 1) Scope of application:
    - a) Entry into and work in substations, etc. and in the communication equipment room;
    - b) Dead-line work for power distribution lines, etc. and work performed near these lines;
    - c) Work to break a return circuit (including rail);
    - d) Work that stops signals; and
    - e) Other work that affects the operation of each system
- 1.4. Terms and Definitions:
- 1) [Electrical Driving Equipment]: Collective term for the electrical equipment of substations, power distribution stations, contact lines, distribution lines, etc.;
  - 2) [Specified Section]: Railway’s Facilities Control sections and sections being used by Indian Railway Authority;

- 3) [The section where power shutdown must be confirmed]: Since the section is connected to a railway, dead-line work for power distribution lines and work performed near these lines requires the confirmation of power shutdown with Indian Railway Authority;
- 4) [Substations, etc.]: Collective term for substations, sectioning posts, auxiliary sectioning posts, power distribution stations, and post-transformers;
- 5) [Power Distribution Lines]: Collective term for contact lines and distribution lines;
- 6) [Contact Lines]: Collective term for feeders, overhead contact lines, line transformers, etc. and the structures that support them;
- 7) [Return Circuit]: Normal relays, neutral cables, and protective wires;
- 8) [Feeding System]: The system from the feeding bus line of a substation up to the overhead contact system;
- 9) [Distribution System]: The system from a distribution station through the contact lines to the loads;
- 10) [Signal System]: A systematic method of integrating the functions of signal equipment for ensuring the safety of driving;
- 11) [Communication System]: A systematic method of integrating the functions of electrical communication equipment for transmitting codes, sounds or images;
- 12) [Dead-Line Work]: Collective term for work that must be performed with the electrical driving equipment de-energized. This includes [Work with the feeder de-energized] and [Work with distribution lines de-energized];
- 13) [Work performed near these lines]: Work performed in the area within a 2-meter radius of the energized portion of a contact line, the area within a 0.3-meter radius of the energized portion of a high-voltage distribution line, work performed on lines in a high-voltage cable duct (excluding the case that they are covered with cable ducts, etc.);
- 6) [Work that stops signals]: Collective term for work that needs to replace, stop functions or temporarily remove signal system equipment, which directly affects train operation;
- 7) [Test Energization, Test Feeding]: Application of voltage in order to test distribution lines after an automatic shutdown and to investigate the cause or determine the circuit;
- 8) [Substation, etc. monitoring station]: A place in a substation, etc., where staff members stay and monitor the equipment of the substation or other facilities;
- 9) [Electrical Control]: The organization that manages and controls all items covered in this manual. The head of the organization is called “Electrical Control Manager” and the members in this office are called “Electrical Control Members”;
- 10) [Facilities Control]: The organization that manages and controls all items



regarding the rules and procedures of maintenance work and entry into the inside of the railway's safety fence. The chief of the organization is called the Facilities Control manager;

- 11) [Work Control Supervisor]: The person in charge of electrical and Facilities Control in the comprehensive audit and inspection;
- 12) [The Chief of the Relevant Party]: Chief Project Manager of the contractor that has jurisdiction over the subcontractors performing the said work or the chief in charge of the relevant site of the applicable railway authority;
- 13) [Operations Team Leader]: The leader who instructs and supervises his/her team in performing work covered in this manual;
- 14) [Person in charge of Applications]: The person, who receives the applications for work covered in this manual, examines and investigates the contents before passing them to the "Electrical Control Manager". The Chief Project Manager of railway electrical contractor of each applicable section acts as such a person; and
- 15) [Equipment Operators]: Persons who are familiar with the operation of machinery used in the place and approved by the Electrical Control Manager. They operate the equipment of substations and other facilities in supplying or stopping power to electrical driving equipment.

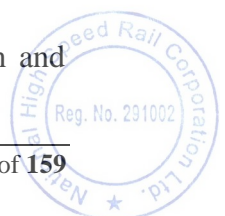
## **2. Electrical Control**

2.1. In order to implement the rules outlined in this manual, the following organizations shall be established:

- 1) For the Electrical Control work and electrical system control work specified, the Electrical Control shall be established in the Contractor's railway electrical project office, and Electrical Control Members shall be placed there; and
- 2) Regarding the Electrical Control work and electrical system control work specified, the chief of the Contractor's railway electrical project office shall act as the Electrical Control Manager.

2.2. The Electrical Control Manager shall manage and control the Electrical Control Members and Equipment Operators and perform the following duties to prevent an electrical accident during the period when power is supplied to the equipment of substations, etc. and equipment of power distribution lines, etc. and ensure the safety of the workers during the period of comprehensive audit and inspection:

- 1) Approval (change, rejection, etc.) of work plans, and reporting to relevant dispatchers and substation, etc. monitoring stations;
- 2) Examination of the state of the electrical driving equipment as a whole system;
- 3) Information gathering regarding the times of starting/stopping operation of substations, etc. for train operation and starting/stopping power to contact lines, reporting of such information to relevant people and provision of instructions to Equipment Operators;
- 4) Provision of instructions to Equipment Operators regarding the operation and



- stoppage of substations and power distribution lines relating to the work;
- 5) Provision of instructions on the methods of recovery from a disaster (occurrence or prediction) or accident, giving of advice to Work Control Supervisors, and reporting to relevant people;
  - 6) Mutual adjustment with relevant dispatchers, substation, etc. monitoring station and Facilities Control managers; and
  - 7) Provision of instructions and various information of other system control or work control to relevant people.
- 2.3. The Electrical Control Members perform the following duties under the direction of the Electrical Control Manager:
- 1) Receipt of work applications and adjustment;
  - 2) Receipt of reports at the start/end of work and confirmation;
  - 3) Mutual communication with Equipment Operators, Substation, etc. monitoring station, relevant dispatchers and the Facilities Control;
  - 4) Information gathering and reporting of the circumstances in case of the occurrence of a disaster or accident;
  - 5) Duties of the Electrical Control Manager on behalf of the manager when necessary; and
  - 6) Adjustment with relevant people regarding other work control.
- 2.4. In preparation for any kind of natural disaster or accident, the Electrical Control Manager must have established a communication flow, recovery system, etc., in advance and made them known to all relevant people.
- 2.5. The Electrical Control Manager must maintain all documentation required for the implementation of the rules outlined in this manual.

### **3. Procedures for work**

- 3.1. The Operations Team Leader for work specified in this manual must have worked as a team leader in the high speed railway construction project, have received the specified training program regarding the contents of this manual, etc., and been approved by the Chief Project Manager of contractor.
- 3.2. Any party who needs to perform work specified in this manual must file an application and receive prior approval, observing the rules as follows.
- 1) The rules regarding Electrical Control work are as follows:
    - a) The Operations Team Leader must fill in the “Electrical Control Work Application” and file the application to the Electrical Control Manager by noon of Thursday of the previous week;
    - b) The Electrical Control Work Application must be agreed by The Chief of the Relevant Party and the Person in charge of Applications before submitted to

the Electrical Control Manager for approval; and

- c) When any information of an Electrical Control Work Application is changed, the Operations Team Leader must report it to the Electrical Control Manager by 4:00 p.m. of the day before the work day to obtain approval.

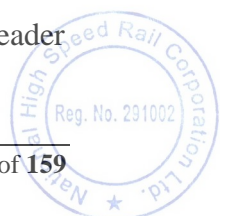
16) The rules regarding electrical system control work are as follows:

- a) The Operations Team Leader must fill in the “Detailed Work Plan” and file it to the Electrical Control Manager by Thursday of the previous week;
- b) The detailed work plan must be agreed by the Chief of the Relevant Party and the Person in charge of Applications before submitted to the Electrical Control Manager for approval;
- c) When any information of the detailed work plan is changed, the Operations Team Leader must immediately report it to the Electrical Control Manager to obtain approval;
- d) When an application for the work in the section including both a specified section and a section where power is shutdown, which affects the system control is received, the Electrical Control Manager must obtain the confirmation of the relevant dispatchers;
- e) When an application for the work in the section where power is shutdown or the section including the section where power is shutdown, which affects the system control is received, the Electrical Control Manager must obtain the confirmation of the relevant dispatchers;
- f) For dead-line work or work that causes signals to stop in the period of comprehensive audit and inspection, the Operations Team Leader shall confirm the work plan with the Electrical Control by the day before the implementation; and
- g) For the work that causes signal equipment to stop in the period of comprehensive audit and inspection, the turnout must be locked with the key bolt and the use of the applicable ATC sectional route must be stopped.

3.3. The rules of communication regarding work specified in this manual are as follows.

1) Reporting at the start of work:

- a) Before the start of work (or entry), the Operations Team Leader shall report on the necessary information in the Electrical Control Work Application or the work plan to the Electrical Control, receive approval, and then tell the team members to start working;
- b) Before team members start performing approved dead-line work, the Operations Team Leader must confirm that no voltage is applied, using a voltage detector, and that the grounding conductor is properly installed. Workers who use a voltage detector or install a grounding conductor must have an experience of dead-line work of a distribution line or contact line of 20,000 volts or higher, or a high-voltage distribution line of 6,000 volts or higher, and have been approved by the Electrical Control Manager;
- c) When it is necessary to use a maintenance car, the Operations Team Leader





must report it in accordance with the rules set by the chiefs;

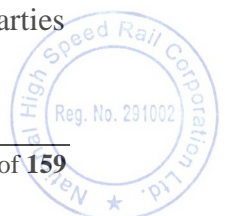
- d) When work is done in a specified section, the Electrical Control Manager must report to the relevant dispatchers; and
- e) When work is done in the section where power is shutdown, the Electrical Control Manager must report to the relevant dispatchers.

17) Reporting at the end of work:

- a) After the work for the day is completed, the Operations Team Leader shall report on the necessary information in the Electrical Control Work Application or the work plan to the Electrical Control before leaving the office;
- b) Dead-line work must be completed at least 20 minutes before the scheduled time. The Operations Team Leader must ensure that all work needed for the recovery of power, such as the removal of grounding conductors, is finished and then, make a report;
- c) If there is a possibility that work may not be finished by the scheduled time specified in the Electrical Control Work Application and the work plan, the operation team leader must report to the Electrical Control at least 30 minutes before the scheduled time to seek for their directions;
- d) When work is done in a specified section, the Electrical Control Manager must report to the relevant dispatchers; and
- e) When work is done in the section where power is shutdown, the Electrical Control Manager must report to the relevant dispatchers.

#### 4. Work Control

- 4.1. For the use of maintenance cars or work inside the railway's safety fences (hereafter referred to "work inside the fences"), all workers must observe the applicable rules.
- 4.2. Each person who enters the inside of the fences must wear an armband in accordance with the applicable rules.
- 4.3. Without prior approval of the Electrical Control Manager, the Operations Team Leader must not tell the members to start working. Or, the Operations Team Leader must not change any part of the work plan without permission. The Electrical Control Members must not change the section or time period for energization without permission from the Electrical Control Manager.
- 4.4. Actions in case of a problem or emergency:
  - 1) If electrical equipment has a problem, or an electrical shock accident occurs, the Operations Team Leader must immediately take appropriate actions and report on it to the Electrical Control Manager;
  - 2) Upon receiving such a report, the Electrical Control Manager must give the leader instructions in taking the safest possible actions, and inform the relevant parties of the situation of the accident;

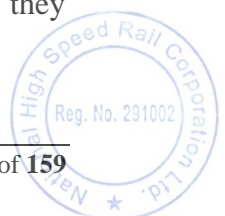




- 3) Unless the cause of the accident or emergency is not determined, the Electrical Control Manager must not allow the workers to operate equipment in the recovery process after the accident;
- 4) Upon receiving a report of an accident from a relevant dispatcher or substation, etc. monitoring station, the Electrical Control Manager must give the relevant people instructions about the recovery, investigation of the causes, etc. and take necessary actions; and
- 5) Any worker who noticed a potential of problem with electrical equipment, which can cause an accident, must report it immediately to the Electrical Control or the relevant dispatcher to seek for their directions.

## **5. Electrical equipment system control**

- 5.1. For driving operations during the period of electrical equipment system control, the use of maintenance cars, work inside the railway's safety fences, the use of armbands and other procedures, all workers must observe the rules set by the Contractor's Project Office.
- 5.2. The feeding and distribution systems of the railway shall be directly monitored during the period from the start of the operation of substations, etc. and distribution stations to the day before the remote monitoring starts after the function of operation command is switched.
- 5.3. Distribution systems shall be operated and controlled directly by the Equipment Operators.
- 5.4. Only Equipment Operators are allowed to operate the switches of substations, etc. However, this shall not apply to cases where the operation of switches does not affect any of the distribution lines. The Equipment Operators must enter the substation, etc. by the time specified in the test train driving manual or the work plan, operate switches according to the directions of the Electrical Control.
- 5.5. Upon noticing a problem with signal equipment, workers must immediately report it to the Work Control Supervisor.
- 5.6. The Electrical Control and the relevant dispatchers shall communicate with each other regarding the operation of equipment, monitoring, etc.
- 5.7. Upon receiving the report of an accident from a relevant dispatcher or substation, etc. monitoring station, the Electrical Control must give the relevant people instructions about the recovery, investigation of the causes, etc. and take the actions specified in the following items:
  - 1) If an accident (or electrical power failure) occurs in a substation, etc., the Electrical Control must report it the power company and take necessary actions;
  - 2) If an accident of a feeding system occurs and there is a train in the section, the Electrical Control must request relevant people to check the train for abnormalities, lower the pantographs, and take necessary actions after they receive permission from the Work Control Supervisor;



- 3) Perform test energization or test feeding required to determine the section or circuit that caused the accident, to confirm the recovery, etc.;
- 4) Re-energization or re-feeding the circuit, etc., whose recovery is confirmed, must be performed with the permission of the Work Control Supervisor;
- 5) If an accident of signal equipment occurs, the Electrical Control must direct the relevant people to investigate the cause, determine the coverage of suspension or prohibition of use, and report it to the Work Control Supervisor; and
- 6) When the emergency device is activated, the Electrical Control must take appropriate actions. When there is no problem with the conditions (operation), it shall be treated as a recovery. When there is a failure, the Electrical Control must determine the coverage of prohibition of use and report it to the Work Control Supervisor.

Any worker who noticed a potential of a problem with electrical equipment, which can cause an accident, must report it immediately to the Electrical Control to seek for their directions.

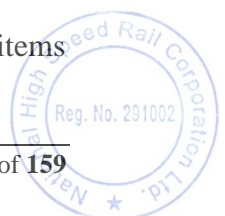
- 5.8. When the Electrical Control receives information from relevant dispatchers, etc. about the occurrence or prediction of natural disaster, it shall direct the relevant people to investigate the status, report it to the Work Control Supervisor, and take necessary measures according to his/her instructions.
- 5.9. Work and operations outlined in this manual must be performed with the approval of the Electrical Control Manager. Workers must not do the followings when handling signal equipment. However, this shall not apply to items 1 through 4 only when approved by the Electrical Control Manager:
  - 1) Do not connect a jumper wire between contacts of a relay, circuit controller or other devices without permission;
  - 2) Do not make a change to signal equipment (including wire connection change and revision of software) without approval;
  - 3) Do not use a lever or other tools, whose use is limited to qualified workers;
  - 4) Do not use an improper power supply to operate a relay or other devices;
  - 5) Do not use other conductors in place of circuit breakers (for signals) or fuses;
  - 6) Do not remove the seal from the relay; and
  - 7) Do not constitute a contact by pushing the armature.



## **Attachment -6: Instruction Manual for the Control of Other Work during the Period when the Overhead Contact System is Energized**

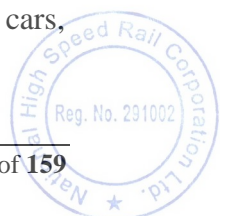
### **1. General Rules**

- 1.1. The purpose of this manual is to prevent an electrical accident and ensure the safety of all workers who use a maintenance car or work inside the railway's safety fences (hereafter referred to "work inside the fences") during the period from the day on which energization starts to the day before the start of the comprehensive audit of the equipment of substations, etc. and equipment of Power Distribution Lines.
- 1.2. This manual applies to the following:
- 1) Work that requires track possession;
  - 2) Driving of maintenance cars used for work and the handling of service cars used on the track;
  - 3) Return circuit breaking work; and
  - 4) Other work inside and near the fences and entry into the area inside them.
- 1.3. Terms and Definitions:
- 1) [Substations, etc.]: Collective term for facilities such as substations, sectioning posts, auxiliary sectioning posts, disconnecting switches that are used in case of an accident, and power distribution stations;
  - 2) [Power Distribution Lines, etc.]: Collective term for feeders, auxiliary lines, contact lines, return circuits, line transformers, high-voltage distribution lines, and facilities that belong to them;
  - 3) [Work that requires track possession]: The following construction work or tasks that are carried out with the railway track closed:
    - a) Renewal of rails;
    - f) Partial renewal of turnouts or expansion joints, or detailed inspection that requires disassembly work;
    - g) Continuous welded rail temperature restressing;
    - h) Welding of rails mounted on tracks;
    - i) Renewal of sleepers or tie plates;
    - j) Track maintenance;
    - k) Construction work or tasks, which disturb the structure gauge; and
    - l) Other exceptional tasks or those similar to the above-mentioned construction work or tasks.
  - 4) [The Chief of the Relevant Party]: The Chief Project Manager of Contractor's construction project office of the applicable section;
  - 5) [Facilities Work Control]: The organization that manages and controls the items



specified in this manual;

- 6) [Facilities Control Manager]: A person appointed by the Employer/the Engineer, who is in charge of managing the Facilities Work Control;
  - 7) [Facilities Control Members]: Persons appointed by the Employer/the Engineer, who assist the Facilities Control Manager;
  - 8) [Person in charge of Work Applications]: The Chief Project Manager of the contractor's track construction project office; and
  - 9) [Operations Team Leader]: Persons who are responsible for work specified in Section 1.1.2. Scope of Application. When they are employees of the Subcontractors, they must have been certified as construction managers and have received the training program regarding the contents of this manual. Or, qualified leaders of construction or work, or persons in charge of various inspections and tests, who have received the training program regarding the contents of this manual and exceptionally approved by the Chief of the Relevant Party.
- 1.4. An organization that carries out work control Operations at MASHR Project Office shall be established, where the Facilities Control Manager and members are stationed.
- 1.5. The Facilities Control Manager supervises the Operations of the Facilities Control Members and performs the following duties:
- a) Approval of applications for work that requires track possession;
  - b) Approval of applications for using a maintenance car;
  - c) Approval of work specified in Section 1.1.2 (4);
  - d) Actions and reporting after an accident; and
  - e) Adjustment with the electrical work control manager and other tasks necessary for the control
- 1.6. The Facilities Control Members perform the following duties under the direction of the Facilities Control Manager. In the event of absence of the Facilities Control Manager, a facilities control member who is appointed by the Facilities Control Manager shall carry out the manager's duties;
- a) Receipt of applications for using service and maintenance cars and adjustment;
  - b) Approval of starting and confirmation of finishing of the use of maintenance cars;
  - c) Creation and distribution of a diagram for the maintenance cars;
  - d) Actions and reporting after an accident; and
  - e) Other tasks necessary for the control.
- 1.7. The Person in charge of Work Applications performs the following duties:
- a) Management of the applications for work and the use of maintenance cars, which are received from the Chief of the Relevant Party;



- b) Submission of the work applications to the Facilities Control Manager and the electrical control manager, and reporting of the approval to the Chief of the Relevant Party;
- c) Reporting of the applications for the use of maintenance cars to the Facilities Control Manager and reporting of the approval to the Chief of the Relevant Party; and
- d) Actions and reporting after an accident.

## 2. Procedures for Work

### 2.1. Application prior to work:

- 1) The Operations Team Leader must fill out the work application form and file it, through the Chief of the Relevant Party, to the Person in charge of Work Applications on a weekly basis by noon of Thursday of the previous week;
- 2) The applicant must include the week plan in the application form for the use of maintenance cars, and file it, through the Chief of the Relevant Party, to the Person in charge of Work Applications on a weekly basis by noon of Thursday of the previous week;
- 3) The Chief of the Relevant Party must summarize the contents of the work applications, create a facilities control work application (Summary), and submit it, together with the work applications, to the Person in charge of Work Applications;
- 4) The Person in charge of Work Applications must submit the work applications, the applications for the use of maintenance cars, and the facilities control work application (Summary) to the Facilities Control Manager and obtain the person's approval for the plans of work and use of maintenance cars, etc;
- 5) After receiving approval for the work and maintenance car operation diagrams, the Person in charge of Work Applications must return them to the Chief of the Relevant Party by noon of the next day (Friday). However, when the day for work and use of maintenance cars falls on one of the separately-specified days on which electrical power is not supplied, only the work diagrams shall be returned;
- 6) The Operations Team Leader must confirm the details of approved work together with Facilities Control Members by 4:00 p.m. of the day before the work. However, this confirmation is not necessary when the day for work falls on one of the separately-specified days on which electrical power is not supplied; and
- 7) The Operations Team Leader must confirm the details of the approved use of maintenance cars together with Facilities Control Members by 4:00 p.m. of the day before the use. However, this confirmation is not necessary when the day for work falls on one of the separately-specified days on which electrical power is not supplied.

### 2.2. Change or addition:

- 1) When the work plan needs to be revised, the Operations Team Leader must fill out the work application form and/or the application for the use of maintenance

- cars and file them, through the Chief of the Relevant Party, to the Person in charge of Work Applications by noon of the second day before the work day;
- 2) The revised and approved work plan and maintenance car operation diagrams must be returned to the Person in charge of Work Applications, through the Chief of the Relevant Party, by noon of the next day. However, when the day for the revised work plan and use of maintenance cars falls on one of the separately-specified days on which electrical power is not supplied, only the revised work diagrams shall be returned;
  - 3) When a crane or other tall equipment is used in the vicinity of a viaduct or a section under construction, the operation team leader must fill out the work application form and report the work plan, through the Chief of the Relevant Party, to the Person in charge of Work Applications on a weekly basis by noon of Thursday of the previous week; and
  - 4) The Chief of the Relevant Party must summarize the contents of the applications for work near a viaduct, etc., create a facilities control work application (Summary), and submit it, together with the work applications, to the Person in charge of Work Applications.
- 2.3. Before entering the inside of the fences to start working or using a maintenance car, the Operations Team Leader must report the location of work and the time to the Facilities Control Members and obtain approval. However, reporting at the time of entry is not necessary when the day for work falls on one of the separately-specified days on which electrical power is not supplied.
- 2.4. Immediately after all workers left the fenced area after the end of work and use of maintenance cars, the Operations Team Leader must report the location and the time to the Facilities Control Members. If there is a possibility that work and use of maintenance cars may not be finished by the scheduled time, the operation team leader must report it to the Facilities Control Members at least 30 minutes before the scheduled time to seek for their directions. However, reporting at the time of exit is not necessary when the day for work falls on one of the separately-specified days on which electrical power is not supplied.
- 2.5. When there is a possibility that the construction work may disturb any part of the MAHSR structure, the Chief of the Relevant Party must exchange confirmation documents, etc. regarding the prevention of an electrical accident during the period when power is supplied.
- 3. Things that are Prohibited**
- 3.1. Without prior approval of the Facilities Control Manager, the Operations Team Leader must not tell his/her members to start working or using maintenance cars. The operation team leader and all workers must not change the work plan or any details regarding the use of maintenance cars without permission.
- 4. Actions in Case of an Emergency**
- 4.1. Reporting, etc. in case of an emergency:



- 1) If an emergency or electrical accident occurs, the Operations Team Leader must immediately take appropriate actions and report the situation to the Facilities Control Manager. Upon receiving such a report, the Facilities Control Manager must inform the relevant parties of the situation;
- 2) When workers need to work or use maintenance cars to deal with an emergency, the Operations Team Leader must communicate with the Chief of the Relevant Party, and report it to the control manager to obtain approval; and
- 3) Upon receiving such an urgent request regarding work or the use of maintenance cars, the Facilities Control Manager communicates with relevant parties, and when there is no problem, approves it. All necessary documents, such as work applications, applications for the use of maintenance cars and a facilities control work application (Summary), must be submitted to the Person in charge of Work Applications immediately after the completion of work.

## **5. Others**

- 5.1. Each person who enters the inside of the fences during the work control period must wear an armband that is specified separately.
- 5.2. The Facilities Control Manager and members must create charts, diagrams, tables, etc. necessary in performing their duties.

