डेडीकेटेड फ्रेट कोरीडोर

SAFETY, HEALTH and ENVIRONMENT MANUAL

Dedicated Freight Corridor Corporation of India Limited
(A GOVERNMENT OF INDIA ENTERPRISE)

October 2013

Safety Health and Environment Manual

Dedicated Freight Corridor Corporation of India Ltd.

New Delhi

October, 2013

डेडीकेटेड फ्रेट कोरीडोर

आर. के. गुप्ता, आई.आर.एस.ई.
प्रबन्ध निदेशक
R. K. Gupta, I.R.S.E.
Managing Director

डेडीकेटेड फ्रेट कोरीडोर कॉर्पोरेशन ऑफ इण्डिया लि.
भारत सरकार (रेल मंत्रालय) का उपक्रम
Dedicated Freight Corridor Corporation of India Ltd.
A Government of India (Ministry of Railways) Enterprise

FOREWORD

Dedicated Freight Corridor is an ambitious infrastructure project undertaken by Ministry of Railways with an aim to provide clean & environment friendly mode of transportation for bulk & faster goods movement along Golden Quadrilateral and its Diagonals. Safety, Health and Environment Protection is of paramount importance in planning, construction and operation stages of Dedicated Freight Corridor. In DFCCIL, an approved Corporate Safety, Health and Environment (SHE) Policy is in place. SHE Policy aims to ensure sustainable development and safe, healthy work environment and pollution free condition. Keeping in view of the SHE Policy, Safety, Health and Environment Manual has been prepared. SHE Manual is a reference document which provides elaborate guidelines on Safety, Occupational Health, Environment Protection and Penalties for not adhering to SHE procedures at DFCC work sites. It is expected that site specific SHE manual based on DFCCIL's SHE Manual will be developed by the work executors for implementation.

SEMU team of DFCCIL deserves congratulations for preparing this useful & practical SHE Manual. I am sure all departments and unit offices of DFCCIL will make good use of the manual.

(R. K. Gupta)
Managing Director

Corporate Office : 5th Floor, Metro Station Building Complex, Pragati Maidan, New Delhi-110001
Tel.: +91-11-23454600, 23379820 Fax : 91-11-2345 4605
Web : www.dfccil.org email: rkgupta@dfcc.co.in

CONTENTS

INTRODUCTION

Indian Railway (IR) is one of the largest railway systems in the world. It serves a landmass of over 3.3 million sqm. and a population of over one billion. The last 50 years have seen a tremendous growth in the Indian transportation sector. In the past few years, the volume of rail freight has increased by over five times and the number of passenger kilometers has increased over seven times. The tonnage handled by Indian ports has increased 16 times while the airfreight has increased 30 times. Railway freight, which was 73 MT in 1950-51, had increased to 474 MT in 2000-01, at an average annual increase of 10.98 percent. However, post 2001, the freight traffic has grown at an annual average of 8.50 percent and about 794 MT of freight was transported in 2008-09. This rapid increase in freight traffic is attributed to India's economic growth, which however resulted in traffic congestion of existing IR tracks.

To cater to the rapid growth and demand for additional capacity of rail freight transportation, Government of India has initiated development of 'Dedicated Freight Corridors' along eastern and western routes, connecting the cities of Ludhiana- Kolkata and Delhi-Mumbai. Dedicated Freight Corridor Corporation of India Limited (DFCCIL) was established to undertake planning & development, mobilization of financial resources, construction, maintenance and operation of the dedicated freight corridors.

- 1399 km long western corridor will be double line track from Mumbai (JNPT) to Dadri near Delhi and connects the cities of Vadodara, Ahmedabad, Palanpur, Phulera and Rewari.
- The eastern corridor is a 1839 km track from Dankuni, near Kolkata to Ludhiana. This encompasses a double line electrified traction corridor from Sone Nagar to Khurja (820 Km) & Khurja to Dadri corridor (46 Km) and single electrified line from Khurja to Ludhiana (412 Km).
- The eastern and western corridors are proposed to meet at Dadri, near Delhi.

The infrastructure project of dedicated freight corridor envisages engineering works of high magnitude along the alignment. To ensure safe work environment and incident free execution of the project, Safety, Health and Environment guidelines need to be followed. The SHE Manual is referred in work tenders and Works Manual.

CORPORATE SAFETY, HEALTH AND ENVIRONMENT POLICY

Dedicated Freight Corridor Corporation Ltd. is committed to conduct business with commitment to excellence in Safety, Health and Environment ensuring sustainable development, safe & healthy work environment and pollution free condition at work places. We in DFCCIL shall

- Establish and maintain effective standards for safety of employees & workers, assets and provide adequate control of the safety, health, pollution risk arising from work activities
- Comply with relevant Rules and Regulations on Safety, Occupational Health and Environment Protection
- Integrate Safety, Health and Environment and Practices in work activities
- Plan, Design, Construct, Operate and Maintain all facilities to secure sustained Safety, Health and Environment Protection
- Create awareness on SHE and develop required level of knowledge & skills in all personnel through need based training, internal communications and continue to enhance the said skills & competence
- Make reasonable effort to prevent accident, work related ill health during construction & operation and preservation of ecological balance & heritage

SAFETY, HEALTH
&
ENVIRONMENT

PART-I
SHE

1.0 General

1.1 Scope

1.1.1 This document defines the principal requirements of the Employer on Safety, Health and Environment (SHE) for works associated with the contractor / sub - contractor and any other agency to be engaged at construction worksites of Dedicated Freight Corridor Corporation of India Ltd.(DFCC). Since DFCC is the Principal Employer for all work men / women at all its work sites, applicability of DFCC's SHE Manual is very important.

1.2 Definition / languages and abbreviations:

1.2.1 In this document

(1) The use of 'shall' indicates a mandatory requirement.

(2) The use of 'should' indicates a guideline that is strongly recommended.

(3) The use of 'may' indicates a guideline that requires to be considered.

(4) SHE' means Safety, Health and Environment.

(5) Employer means DFCCIL.

(6) Chief Safety Officer means an officer nominated by DFCCIL who is overall responsible for monitoring all SHE functions prescribed in this document.

(7) BOCWA means Building and Other Construction Workers (Regulation of Employment and Conditions of Service) Act. 1996.

(8) BOCWR means Building and Other Construction Workers (Regulation of Employment and Conditions of Service) Central Rules, 1998.

(9) BOCWW Cess Act means The Building and Other Construction Workers Welfare Cess Act, 1996.

(10) DG means Director General, Ministry of Labour, Govt. of India.

(11) The Factories Act, 1948.

(12) Environment: the sum of all living and non-living things that surround an organism, or group of organisms. Environment includes all elements, factors and conditions that have some impact on growth and development of certain organism. Environment includes both biotic and abiotic factors that have influence on observed organism.

(13) Safety: The condition of being safe; freedom from danger, risk, or injury.

(14) Health: Occupational Health is the promotion and maintenance of the highest degree of physical, mental and social well-being of workers in all occupations by preventing departures from health, controlling risks and the adaptation of work to people, and people to their jobs.

(15) Work site: the contract limit for construction. The site will include stacking, debris disposal area and transportation route as well.

(16) SPCB: State Pollution Control Board.

(17) CPCB: Central Pollution Control Board.

(18) CCoE: Chief Controller of Explosives, PESO, Nagpur.

1.3 Application of this document:

1.3.1 This document applies to all aspects of the contractor's scope of work, including all aspects conducted by Sub-contractors and all other agencies. There shall be no activity associated with the contract, which is exempted from the purview of this document.

1.4 Purpose of this document

1.4.1 The objective of these guidelines is to ensure that adequate precautions are taken to avoid unwanted incidents or accidents, occupational illness and harmful effects on the environment during construction.

1.4.2 This document

i) describes the SHE interfaces between Employer and the Contractor.

ii) details the processes by which the contractor shall manage SHE issues while carrying out the work under the contract.

iii) describes by reference, the practices and procedures as given in the DFCCIL Project Safety, Health & Environment manual for best SHE performance.

2.0 'SHE' Targets and Goals

2.1 The SHE targets, goals and aims for the Works are to achieve

i) Zero total recordable injury or accident.

ii) Zero reportable environmental incident.

iv) All personnel inducted in accordance with the approved Contractor's SHE plan

v) Total compliance of conducting inspections and audits as per approved SHE plan

vi) 100% incident / accident recording and reporting

vii) 100% adherence of usage of appropriate PPEs at work.

viii) Executing construction work with least disturbance to environment, road/ rail users, nearby residential area and traffic.

3.0 Compliance

3.1 Memorandum of Understanding (MOU):

3.1.1 A Memorandum of Understanding placed at Appendix No.1 shall be executed before the award of contract to the contractor with regard to various provisions on Safety, Health and Environment to be practiced during the construction work.

3.2 DFCCIL's SHE Policy and Management Systems:

3.2.1 The construction works shall be undertaken in accordance with DFCCIL's SHE Policy and management system provided in the Project SHE Manual.

3.3 Indian Statutory requirements:

3.3.1 Primary statutory regulations:

3.3.1.1 Contractor shall develop through understanding about Building and Other Construction Workers (Regulation of Employment and Conditions of Service) Act 1996, State Building and Other Construction Workers' Rules, Building and Other Construction Workers' Welfare Cess Act, 1996 and Central Rules, 1998, The Factories Act 1948 not only to satisfy the Inspectors' perspective but the use of legislation as the strong tool for effective SHE management at construction worksites. Contractor is strongly advised to practice the principle of voluntary compliance.

3.3.1.2 In order to facilitate the contractor for better understanding on the various provisions of the above Act a tabulated information highlighting the Sections/Rules referring to the corresponding registration of contractors, maintenance of registers and records, hours of work and wages, welfare, medical facilities and safety requirements are given in Appendix No.2. It is an indicative one and not a limiting list.

3.3.2 Important Rules & Regulations:

The construction works shall be undertaken in accordance with all applicable legislation and Indian statutory requirements listed below but not limiting to:

i) Indian Electricity Act 2003 and Rules 1956.
ii) National Building Code, 2005.
iii) Factories Act, 1948.
iv) Motor Vehicles Act as amended in 1994 and The Central Motor Vehicles Rules, 1989.
v) Indian Road Congress Code IRC: SP: 55-2001 Guidelines on Safety in Road Construction Zones.
vi) The Petroleum Act, 1934 and Rules 2002.
vii) Gas Cylinder Rules, 2003.
viii) Indian Explosives Act. 1884, along with the Explosives substance Act 1908 and the Explosives Rules 1983.
ix) The (Indian) Boilers Act, 1923.

x) The Public Liability Insurance Act 1991 and Rules 1991
xi) Minimum Wages Act, 1948 and Rules 1950
xii) Contract Labour Act, 1970 and Rules 1971
xiii) Child Labour (Prohibitions & Regulations) Act, 1986 and Rules 1950
xiv) Environmental laws as described in Part-IV
xv) Fly ash utilization notification, Sept 1999 as amended in August 2003
xvi) Workman Compensation Act, 1923 along with allied Rules
xvii) Indian Railway Manual of AC Traction Maintenance and Operation
xviii) IRP Way Manual

3.3.3 The contractor shall ensure that all his employees/workmen are covered under 'Workmen Compensation Act' and shall pay compensation to his workmen as and when the eventuality for the same arises.

3.3.4 Notwithstanding the above Act/Rules, there is nothing in those to exempt the contractor from the purview of any other Act or Rule in Republic of India for the safety of men and materials.

3.3.5 If the requirements stated in this document are less stringent than or in conflict with the country's applicable legislation, the latter shall apply.

4.0 Contractor SHE Policy and Plan

4.1 As per Section 39 of the BOCW Act the contractor shall formulate a SHE policy in consultation with the Employer and get it approved by Competent Authority and display it at conspicuous places at work sites in Hindi and in Vernacular as understood by the majority of construction workers.

4.2 Within 4 weeks of the notification of acceptance of the tender, the Contractor shall submit a detailed and comprehensive Contract specific SHE Plan. The SHE Plan shall include detailed policies, procedures and regulations which, when implemented, will ensure compliance of the contract provisions. The SHE Plan shall include the following but not be restricted to:

i) A statement of the Contractor's policy, organization and arrangement for SHE.
ii) The name(s) and experience of person(s) within the Contractor's proposed management who shall be responsible for coordinating and monitoring the Contractor's SHE performance;
iii) The number of SHE staff who shall be employee on the Works, their responsibilities, authority and line of communication with the proposed Contractor's agent;
iv) A statement of the Contractor's policy and procedures for identifying and

estimating hazards, and the measures for addressing the same;

v) A list of SHE hazards anticipated for this Contract and sufficient information to demonstrate the Contractor's proposals for achieving effective and efficient health and safety procedures;

vi) A description of the SHE training courses and emergency drills which shall be provided by the Contractor, with an outline of the syllabus to be followed;

vii) Details of the safety equipment which shall be provided by the Contractor, including personal protective equipment;

viii) A statement of the Contractor's policy and procedures for ensuring that Contractor's Equipment used on the Project Site are maintained in a safe condition and are operated in a safe manner;

ix) A statement of the Contractor's SHE policy and procedures for ensuring that sub-contractors comply with the Contractor's safety plan;

x) A statement of the Contractor's disciplinary procedures with respect to SHE related matters, and

xi) A statement of the Contractor's procedure for reporting and investigating accidents, dangerous occurrences or occupational illnesses

4.3 The Contractor shall, from time to time and as necessary are required by the Employer to produce supplements to the SHE Plan such that it is at all times a detailed, comprehensive and contemporaneous statement by the Contractor of his site safety, occupational health and environment obligations, responsibilities, policies and procedures relating to work on site. Any and all submissions of supplements to the SHE Plan shall be made to the Employer in accordance with the agreed procedures.

4.4 If at any time the SHE plan is, in the Employer's opinion, insufficient or requires revision or modification to ensure the security of the Works and the safety of all workmen upon and visitors to the Site, the Employer may instruct the Contractor to revise the SHE plan and the Contractor shall within 7 days submit the revised plan to the Employer for review.

4.5 Any omission, inconsistency and error in the SHE Plan or the Employer's acceptance or rejection of the SHE Plan and/or supplements thereto shall be without prejudice to the Contractor's obligations with respect to site safety, occupational health and environment and shall not excuse any failure by the contractor to adopt proper and recognized safety practices throughout the execution of the Work.

4.6 The Contractor shall adhere to the SHE Plan and shall ensure, as far as practically possible, that all sub-contractors of all tiers require that contracting parties each

have a copy of the Site SHE Plan and comply with its provisions.

4.7 The details of contents to be covered in the site SHE plan are given in Appendix No.3.

5.0 Designer's role

5.1 Designer's role in Safety, Health and Environment:

5.1.1 Designer's primary role includes to minimize the risk to health and safety of those who are going to construct, maintain, clean, repair, dismantle or demolish the structures and anyone else like adjoining road users/general public, who might be affected by the work.

5.2 General philosophy:

5.2.1 When considering health and safety in designer's work, they shall be expected to do what is reasonable at the time the design is prepared. It may be possible for hazards, which cannot be addressed at the feasibility stage to be looked at during detailed design. In deciding what is reasonably practicable, the risk to health and safety produced by a feature of the design has to be weighed against the cost of excluding the feature. The overall design process does not need to be dominated by a concern to avoid all risks during the construction phase and maintenance. However, a judgment has to be made by weighing up one consideration against another so the cost is counted not just in financial terms, but also those of fitness for purpose, aesthetics, build ability or environmental impact. By applying these principles, it may be possible to make decisions at the design stage, which will avoid or reduce risks during construction work. In many cases, the large number of design considerations will allow a number of equally valid design solutions. What is important is the approach to the solutions of design problems. This should involve a proper exercise of judgment, which takes account of health and safety issues.

5.3 Hierarchy of Risk Control:

5.3.1 Designers shall need, so far as reasonably practicable, to avoid or reduce risk by applying a series of steps known as the hierarchy of risk control or principles of prevention and protection. The steps to be adopted shall include the following:

a) consider if the hazard can be prevented from arising so that the risk can be avoided (e.g., alter the design to avoid the risk);

b) if this cannot be achieved, the risk should be combated at source (e.g. Ensure the design details of items to be lifted include attachment points for lifting);

c) failing this, priority should be given to measures to control the risk that will

protect all people;

d) only as a last resort should have measures to control risk by means of personal protection be assumed (e.g., use of safety harnesses).

5.4 Duty to provide health and safety risks in the drawing itself:

5.4.1 In case of situations where the designers have carried out the design work and concluded that there are risks, which was not reasonably practicable to avoid, detailed information shall be given about the health and safety risks, which remain. This information needs to be included in the design to alert others to the risks, which they cannot reasonably be expected to know. This is essential for the parties who have to use the design information.

5.4.2 If the designers' basic design assumptions affect health or safety, or health and safety risks are not obvious from the standard design document, the designer shall provide additional information. The information shall include a broad indication of the assumptions about the precautions for dealing with the risks. The information will need to be conveyed in a clear manner; it shall be included on drawings, in written specifications or outline method statements. The level of detail to be recorded will be determined by the nature of the hazards involved and the associated level of risk.

5.5 Employer's approval:

5.5.1 Every temporary structure like scaffold, false work, launching girder, earth retaining structures etc. shall have its design calculations included in the method statements in addition to health and safety risks. Employers' designer or his approved proof check consultants as applicable as per the contract conditions shall approve all these designs.

5.5.2 Any non-standard structures like trestles made up of re-bars or structures which are very old, corroded, repaired for many times etc. for which no design calculations can be made accurately from any national standards, shall not be allowed for use at sites even for a short duration.

5.5.3 If any of the above mentioned clauses are not adhered penalty shall be imposed depending upon the gravity of the unsafe act and or condition.

6.0 Contractor SHE Organization

6.1 Education and Experience:

6.1.1 The contractor shall appoint the required SHE personnel as prescribed in General Instructions **DFCCIL/SHE/GI/01** (enclosed at the end) based upon the statutory requirement and establish the safety organization based upon the contract value. The minimum educational qualification and the work experience are given in

General Instruction **DFCCIL/SHE/GI/02.**

6.1.2 In order to effectively interact on labour welfare matters with the Employer and the statutory authorities enforcing the labour welfare legislations every contractor shall employ a full time Labour Welfare Officer duly qualified and experienced as per clause 6.1.1.

6.2 Conduct and competency:

6.2.1 The conduct and functioning of the contractor SHE personnel shall be monitored by the Employer. Any default or deficiency shall attract penalty as per details given under penalty clause 59.0 in Part-V of this document.

6.2.2 The Contractor shall ensure that all personnel are competent to perform the job assigned to them. In the event that the Contractor is unable to demonstrate the competency of any person whose activities can directly impact on the Works' SHE performance, the Employer shall remove that person from the site without any procedural formalities.

6.3 Approval from Employer:

6.3.1 The name, address, educational qualification, work experience and health condition of each personnel deployed for SHE jobs shall be submitted to the Employer in the format prescribed for the purpose for comments and approval well before the start of the work. Only on approval by the Employer these personnel are authorized to work. In case any of the SHE personnel leaves the contractor the same shall be intimated to the Employer. The contractor shall recruit new personnel and fill up the vacancy.

6.4 Responsibility of SHE personnel:

6.4.1 For all works carried out by the contractor and his sub-contractors, the responsibility of ensuring the required SHE manpower lies with the main contractor only. The minimum required manpower indicated by the Employer includes the sub-contractors' work also. It shall be the responsibility of the main contractor to provide required SHE manpower for all the works executed by all contractors. Necessary conditions shall be included in all sub-contract documents executed by the main contractor.

6.5 Employment status of SHE personnel:

6.5.1 No contractor shall engage SHE manpower from any outsourcing agencies in which case the effectiveness would be lost. All SHE manpower shall be on the payroll of the main contractor only and not on the payroll of any subcontractor or outsourcing manpower agencies etc. This condition does not apply to positions like traffic marshals who are engaged almost on a daily requirement basis.

6.6 Reporting of SHE personnel:

6.6.1 All SHE personnel are to report to the Head of SHE who shall report directly to the Chief Project Manager of the Employer. The Employer shall monitor adherence to this procedure at all times. In case of non-adherence penalty shall be levied as indicated in the penalty clause.

6.7 Inadequate SHE personnel:

6.7.1 In case if the contractor fails to provide the minimum required manpower as illustrated in General Instruction **DFCCIL/SHE/GI/01**, or fails to fill up vacancies created within 14 days, the same shall be provided by the Employer at contractor's cost. Any administrative expenses involved to provide the same like paper advertisement or manpower consultant charges, etc. shall also be at the cost of contractor

6.8 Prohibition of performance of other duties:

6.8.1 As per Schedule VIII of BOCWR no SHE personnel shall be required or permitted to do any work which is unconnected to, inconsistent with or detrimental to the performance of the SHE duties for respective category mentioned in General Information **DFCCIL/SHE/GI/01.**

6.9 Facilities to be provided to SHE personnel:

6.9.1 As per schedule VIII of BOCWR, the contractor shall provide all SHE personnel with such facilities, equipment and information that are necessary to enable him to dispatch his duties effectively.

6.9.2 The Employer's minimum requirements of such facilities / equipment to be provided for SHE personnel are given in the General Instruction **DFCCIL/SHE/GI/03.**

7.0 Contractor SHE Committee

7.1 All employees should be able to participate in the making and monitoring of arrangements for safety, occupational health and environment at their place of work. The establishment of site SHE committees in which employees and contractor and sub-contractor management are represented can increase the involvement and commitment of employees. The contractor shall ensure the formation and monitor the functioning of contractor SHE committees.

7.2 Terms of Reference:

7.2.1 The Terms of Reference for the committee shall be as follows:

i) To establish company safety policies and practices

ii) To monitor the adequacy of the contractor's site SHE plan and ensure its implementation

iii) To review SHE training

iv) To review the contractor's monthly SHE report.

v) To identify probable causes of accident and unsafe practices in construction work and to suggest remedial measures.

vi) To stimulate interest of Employer and workers in safety by organizing safety week, safety competition, safety talks and film- shows on safety, preparing posters or taking similar other measures as and when required or as necessary.

vii) To go round the construction 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.

viii) Committee team members should perform a site inspection before every committee meeting and monitor SHE inspection reports.

ix) To bring to the notice of the Employer the hazards associated with use, handling and maintenance of the equipment used during the course of construction work.

x) To suggest measures for improving welfare amenities in the construction site and other miscellaneous aspect of safety, health and welfare in construction work.

xi) To look into the health hazards associated with handling different types of explosives, chemicals and other construction materials and to suggest remedial measures including personal protective equipment.

xii) To review the last safety committee meeting minutes and to take action against persons/sub-contractors for non-compliance if any.

7.3 Within 4 weeks from date of LOA, the SHE committee shall be constituted and notification regarding the same shall be communicated to the members and employees as per the format provided in **Form No. DFCC/SF/01.**

7.4 Site SHE Committee meeting shall be conducted once in a calendar month and participation of following members shall be ensured.

Chairman: Chief Project Manager of the Contractor

Member-Secretary : SHE Manager (In-Charge)

Members:

(i) Labour Welfare Officer

(ii) In-Charge of Plant & Machinery

(iii) Senior Manager/Engineer of different functions

(iv) Representatives of sub-Contractors

(vi) Labour Contractor's representative

(vii) Workers' representative

(ix) SHE official

(x) Employer's representative

7.5 Co-contractors' participation:

7.5.1 In case of depot, station and other contiguous areas where more than one main contractors are working together, the Employer shall instruct the other contractors to join for the monthly SHE committee meeting of the main civil contractor, so as to discuss and decide about the common provision of security, safety, lighting, toilet, drinking water etc. and sharing the maintenance cost of the same etc.

7.5.2 The general principle for sharing the cost shall be either based on the contract value of works executed at the contiguous area or the daily average number of workmen employed by each contractor in the contiguous area.

7.6 Minimum time between two monthly SHE committee meetings:

7.6.1 A minimum period of 21 days shall be maintained between any two SHE monthly committee meetings.

7.7 Agenda:

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

7.7.2 The agenda should broadly cover the following:

(i) Confirmation of minutes
(ii) Chairman's review/ overview of site SHE performance / condition
(iii) Previous month's SHE statistics
(iv) Incident/ accident investigation / near miss/ dangerous occurrence report
(v) Site SHE inspection
(vi) Sub-contractor's SHE issues
(vii) Safety presentation by members
(viii) Report from Employer
(ix) Any other issue

7.8 Minutes of the meeting:

7.8.1 The Minutes of the meeting shall be prepared as per the format provided at **Form No. DFCC/SF/02** 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.

7.9 Disciplinary Action:

7.9.1 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 co/ sub-contractors and propose suitable disciplinary action including provisions of monitory penalty as per the relevant contract clauses, the Employer shall ensure that the same is implemented.

8.0 ID Card and First day at work, SHE orientation training

8.1 The Contractor shall ensure that all personnel working at the site receive an induction SHE training explaining the nature of the work, the hazards that may be encountered during the site work and the particular hazards attached to their own function within the operation. The training shall cover the contents as given in the General Instruction **DFCCIL/SHE/GI/04.**

8.2 All personnel shall be issued a photo identity card of size 85mm x 55mm duly signed by the authorized representative of the contractor before they are engaged for any work as per the format given in the General Instruction **DFCCIL/SHE/GI/05.**

8.3 Contractor shall also issue a personnel SHE handbook/ card in a language known to the workers, which provides information on SHE and emergency procedures that all personnel working on contract are required to know, emergency telephone numbers and the need to follow. Contractor shall ensure that this is distributed and its content introduced to all personnel working at the site.

9.0 SHE Training

9.1 The behavior of people at all levels of the contractor is critical for SHE performance.

9.2 The contractor shall organize quality SHE training to engage Managers, supervisors and other personnel in behavioral change and safety performance.

9.3 The Contractor shall analyze the training requirements for all the employees and initiate a training program to demonstrate that all persons employed, including subcontractors, are suitably qualified, competent and fit. This will include:

i) Detailed Job descriptions for all personnel, to include their specific SHE responsibilities

ii) Specification of qualifications, competency and training requirements for personnel

iii) Assessment and recording of training needs for all personnel, including subcontractors' employees in the workforce, vender representatives and site visitors.

iv) A system for assessing new hirers e.g. previous training

v) A means of confirming that the system is effective

vi) A matrix and schedule of training requirements, covering general, task-specific and SHE-related training, showing the training frequency and interval between refresher courses

vii) Timely, competent delivery of training courses

9.4 The contractor shall arrange behavioral-based training programmes for all the executives to identify, recognize and eliminate unsafe act and unsafe conditions.

9.5 The contents of SHE training to Managers/Supervisors as given in general instruction **DFCCIL/SHE/GI/06** shall be conducted.

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

9.7 Toolbox talk as given in the Employers Project SHE manual shall be conducted to all high-risk workmen every day.

9.8 On-the spot practical skill development training on height safety including scaffold safety, crane safety, welding safety, electrical safety, traffic safety for marshals shall also be conducted to all foremen/workmen who were associated to the concerned jobs.

9.9 Daily Safety Oath as given in Project SHE manual shall be taken by every employee including workman without fail.

9.10 All vehicle drivers including Hydra operators shall be trained on defensive driving at recognized Institute for Driver Training. All vehicle drivers shall also undergo refresher training on defensive driving provided by recognized institutes for the purpose once in 6 months.

9.11 All the above listed training programmes expect at clause 9.10 shall be organized by the contractor only after taking approval from the Employer for the training faculty/ organization, content and duration.

9.12 In case of failure on the part of the contractor to provide all the above- mentioned training programs to all employees in time, the same shall be provided by the Employer through recognized & competent agencies if required by formulating a common scheme to all contractors. Any administrative expenses and training fee towards the same shall be at the cost of the contractor.

10.0 SHE Inspection

10.1 The contractor shall evolve and administer a system of conducting SHE inspections and other risk management analysis on a periodical basis.

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

10.3 Following SHE inspections program shall be adopted.

i. Planned General Inspection
ii. Routine Inspection
iii. Specific Inspection
iv. Other inspection
v. Surprise inspection

10.3.1 Planned General Inspection:

10.3.1.1 Planned general inspections are performed at predetermined intervals and it usually

involves the representation from both Contractor and the Employers.

10.3.1.2 Inspections that will be classified under this inspection program are:

i. Monthly contractor and subcontractors' site safety committee inspection.
ii. Daily safety inspection by contractor site SHE team.

10.3.2 Routine Inspection:

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

Inspections that will be classified under this inspection program are:

i. Daily inspection of plant and equipment by operator
ii. Weekly Inspection of scaffold by scaffolding supervisor
iii. Monthly Inspection of electrical hand tools by competent electrical supervisor
iv. Quarterly inspection of temporary electrical systems by competent electrical supervisor.
v. Half-yearly inspection of lifting machinery, lifting appliances/ tools & tackles, equipment and gears by Govt. approved competent person.
vi. Random inspection of PPEs

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

10.3.3 Specific Inspection:

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

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

i. Inspection performed before a heavy lifting operation.
ii. Inspection performed before and after the entry of person into a confined space.
iii. Inspection performed before and after a welding and gas cutting operation.
iv. Inspection of formwork before concreting by formwork erector. The list mentioned above is not exhaustive. The contractor shall ensure that a competent supervisor inspects all high-risk processes and activities.

10.3.4 Other Inspection:

Other inspections includes the following:

i. Mandatory inspections by Labour Department of Government.
ii. DFCCIL site SHE management team

10.3.5 Surprise inspection:

a) taking a round of the work site

b) checking welding, working at a height/ inside the trench for adherence to SHE manual conditions.

c) if critical activity is carried out as per SHE manual, work permit taken where necessary

10.3.6 Employer shall undertake surprise Inspection of equipment, temporary structures like platform/ scaffold etc. and review safety preparedness from time to time

10.3.7 The contractor shall prepare all required safety inspection checklists for all activity operations and equipment. Checklists will be prepared based on the Indian standards, rules and regulations and Employer's requirements. The formats provided in the project SHE manual may be referred to.

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

11.0 SHE Audit

11.1 General:

11.1.1 The purpose and scope of SHE audit is to assess potential risk, liabilities and the degree of compliance of construction Safety, Health & Environmental plan and its supplementary procedures and programs against applicable and current SHE legislation regulations and requirements of the employer. SHE Audit shall be a structured inspection to compare prevailing practice w.r.t. laid down practice/ procedure.

11.1.2 Project Manager holds the ultimate responsibility in ensuring implementation of SHE audit program during the construction work.

11.2 Monthly Audit Rating Score (M A R S):

11.2.1 Monthly Audit Rating Score (MARS) will be performed once in a month. A team consisting of Project Manager and Employer 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 Project SHE manual.

11.2.2 This Monthly SHE Audit Rating Score (MARS) report will enable the Employer to evaluate the general compliance by the Contractor with the Conditions of Contract, the Employer's Project SHE Manual and the Contractor's site specific SHE Plan.

11.2.3 Monthly Audits will be conducted in accordance with DFCCIL Guidelines. The Project Manager accompanied by the Employer's representatives shall carry out the Audit. The contractor's senior manager and SHE in-charge should also be invited to attend.

11.2.4 Timing:

The Monthly Audit Rating Score (MARS) should be conducted at least 7 days prior to the scheduled date of Monthly SHE committee meeting.

11.2.5 Evaluation:

11.2.5.1 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:

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

11.2.5.2 The criticality of the Audit will be classified as:

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

The Contractor shall closely monitor remedial measures taken in case of MARS at sr. no. 1 & 2 and report improvement to the Employer.

11.2.6 Report:

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

11.3 Monthly Electrical Safety Audit:

11.3.1 A team comprising of contractors senior SHE (Electrical) engineer and Employer's representative shall conduct monthly electrical safety audit covering the following and submit the report to Employer nominated EIG for DFCCIL.

i. Electrical Accidents investigation findings and remedy.
ii. Adequacy of power generation and power requirements.
iii. Power distribution and transmission system in place.
iv. Updated electrical single line diagram showing the current condition of power source and distribution including the IP44 DBs arrangement.
v. Electrical protection devices - selection, installation and maintenance.

vi. Earth or ground connection and earth pit maintenance details.
vii. Education and training of electrical personnel undertaken.
viii. Routine electrical inspection details.
ix. Electrical maintenance system and register.
x. Name plate details of major electrical equipment
xi. Classified zones in the site, if any.

11.4 External SHE Audit:

11.4.1 External SHE audits are to be conducted by external agencies that are competent with qualified auditors having requisite experience with the prior approval of the Employer.

11.4.2 Areas of competence of Audit team:

11.4.2.1 Practical understanding of BOCW Act and Rules, statutory requirements on health/medical and welfare of workmen, construction hazards and its prevention and control, traffic management, electrical safety, rigging, safety or construction equipment and environment management.

11.4.2.2 Audit shall be conducted as per the guidelines of ILO and/ or national standards. Audit report shall also be presented as per the above formats.

11.4.3 External SHE audit shall be conducted on annual or at workable interval basis throughout the currency of the contract.

11.4.4 Targets of SHE Audit.

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

11.4.4.1 SHE management:

i. Organization
ii. Communication and Motivation
iii. Time office
iv. Inspection
v. Emergency preparedness
vi. Budget allocation
vii. Education and Training
viii. Work permit system

11.4.4.2 Technical:

I Building and Structure
ii. Construction operational safety
iii. Material safety
iv. Hand tools and Power tools
v. Electrial system
vi. Safety Appliances
vii. Fire prevention and control
viii. Housekeeping

ix. Maintenance and Machinery safety
x. First-aid and Medical Facilities
xi. Welfare measures
xii. Environmental Management
xiii MSDS of chemicals handled
xiv Lifting appliance/ tools & tackles

11.4.5 Audit Documents:

11.4.5.1 Contractor shall make the below listed documents available for the review by the Audit team.

i. SHE Policy
ii. SHE manual
iii. SHE Rules and Regulation
iv. Organization chart
v. Annual SHE objectives/programs
vi. Accident/near miss statistics and analysis
vii. SHE Training program/records for all personnel
viii. Operating manuals and maintenance manual of all equipment
ix. Safe worthiness certificates of all lifting appliances and gears
x. Medical fitness record for all personnel
xi. Risk identification, assessment and control details
xii. Environmental management reports
xiii. Emergency Management Records including mock drill

11.4.6 Audit Preparation:

i. Audit team members are required to gather information by observations through interviews and by checks of hardware and documentation.
ii. Audit team shall prepare checklist to cover all parts based on SHE legislations rules and regulations and DFCCIL requirements.
iii. Audit team members shall verify the facts and findings leading to the identified gaps and weakness.
iv. Audit leader has overall responsibility for reaching a conclusion.

11.4.7 Reporting:

11.4.7.1 Audit report shall be prepared and directly sent to the Employer with 7 days of conducting the audit with a copy to the contractor.

11.4.8 Report contents:

i. Executive summary - based on the finalized checklists as written, the findings to the employer by the audit team members, the audit leader will compile a concise and accurate summary of observations and findings.
ii. 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).

iii. 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.

iv. 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 and recommendations shall be made for time bound compliance..

a. Priority 1 : Actions to rectify gaps or weakness should generally be implemented within two weeks time, if risk potential is high or unacceptable.

b. Priority 2 : Actions should be generally implemented or rectified with a maximum of 3 - 4 weeks, if not rectified would create a likelihood of minor injury or business loss.

11.4.9 Conformity Report & Action by Employer:

11.4.9.1 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 Employer with a copy to the contractor.

11.4.9.2 The auditor shall again inspect after 28 days of conducting initial audit for checking the adequacy of implementation of items maintained under priority 2 by the contractor and shall submit a conformity / non-conformity report to the Employer with a copy to the contractor.

11.4.9.3 In case of non conformity of items mentioned by auditor, the Employer shall take necessary steps including stoppage of work and or imposing any penalty for getting the item implemented.

11.4.10 Failure of contractor to conduct External SHE Audit:

11.4.10.1 If the contractor fails to conduct the external SHE audit in time, the Employer at the cost of contractor shall get it done. Penalty as indicated at sr. no. 59.0 shall also be attracted.

12.0 SHE Communication

12.1 The contractor shall take every effort to communicate the Safety, Occupational health and Environment management measures through posters campaigns/ billboards/banners/glow signs being displayed around the work site in addition to oral communication through loud hailer as part of the effort to increase safety awareness amongst to the work force. Posters should be in Hindi, English and other suitable language deemed appropriate. Posters/billboards/banners/glow signs should be changed at least once in a month to maintain the impact.

12.2 The contractor shall also observe important days as listed in General Instruction **DFCCIL/SHE/GI/07** and printing and displaying safety signage and posters as listed in General Instruction **DFCCIL/SHE/GI/08.**

12.3 The list indicated are the minimum requirements of the Employer and the contractor is encouraged to further the SHE communication activities by formulating suitable reward schemes for safety performers and any other activities, which deem fit for the purpose.

13.0 SHE Submittals to the Employer

13.1 The contractor's SHE management should send the following reports to the Employer periodically:

i. Daily Reporting of total no of workmen (as given in Clause 13.2)
ii. Monthly SHE report (as given in Clause 13.3)
iii. SHE Committee meeting minutes (as given in Clause 7.9.1)
iv. SHE inspection Reports
v. SHE Audit Reports
    a. Monthly Audit Rating Score (MARS report)
    b. External SHE Audit
    c. Electrical Safety Audit
vi. Air and Noise Quality monitoring report

13.2 Daily Reporting of total number of workmen:

13.2.1 The contractor shall report to the Employer the total no of workmen engaged by all including any subcontractor within 2 hours of starting of any shift in any day. This reporting shall be the primary duty of the chief SHE Manager of the contractor and reporting shall be through tele-fax/email. The onus of checking the receipt of the same by the Employer lies with the contractor. If the information is not received or received more than 2 hrs after starting of the shift, penalty shall be levied as per relevant clause.

13.3 Monthly SHE Report:

13.3.1 The contractor shall prepare a monthly SHE report consisting of the following and submit 3 copies within 7th of next month to the Employer as specified in the Project SHE manual.

i) Monthly man-hour details as specified in the Project SHE manual
ii) Monthly accident/incident details as specified in the Project She manual
iii) SHE Committee details
iv) Details of SHE training conducted in the month
v) SHE Inspection
vi) SHE internal audit details like electrical audit etc.
vii) SHE communication activities under taken in the month indicating the

number of posters displayed and balance availability in stock.

viii) Air quality/Noise monitoring details

ix) Toolbox talks details

x) PPE details: Quantity purchased, issued to the workmen and stock available.

xi) Details on IP44 panel boards, lighting poles, welding and cutting equipment, Ladders, Hoists, tools & tackles.

xii) Monthly Lux meter study results.

xiii) Housekeeping.

xiv) Barricade maintenance details.

xv) No of critical excavations.

xvi) Health & welfare activities.

xvii) Safety walk conducted by Contractors' Project Manager in the month.

xviii) SHE Activities Planned for next month.

14.0 Accident reporting and investigation

14.1 Reporting to Employer:

14.1.1 All accidents and dangerous occurrences shall immediately be informed verbally to the Employer, followed by a written communication giving brief about incident/ accident, date/ time of occurrence. This will enable the Employer 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.

14.1.2 Reports of all accidents (fatal/injury) and dangerous occurrences shall also be sent within 24 hours as per format provided in the Employer's Project SHE manual.

14.1.3 No incident or accident, near miss / dangerous occurrences is exempted from reporting to the Employer.

14.1.4 Any willful delay in verbal and written reporting to the Employer shall be penalized as per relevant clause.

14.2 Reporting to Govt. organizations:

14.2.1 In addition to the above verbal and written reporting to the Employer, as per relevant Rule of BOCWR and Section 39 of BOCWA, notice of any accident to a worker at the building or construction site that:

a. Causes loss of life; or

b. disables a worker from working for a period of 48 hours or more immediately following the accident;

Above shall forthwith be sent by sms / email, telephone, fax, or similar other means including special messenger within four hours in case of fatal accidents and 72 hours in case of other accidents, to:

i. the Regional Labour Commissioner (Central), wherein the contractor has

registered the firm/work

ii. the board with which the worker involved was registered as a beneficiary;

iii. Director General and

iv. the next of kin or other relative of the worker involved in the accident;

14.2.2 Further, notice of accident shall be sent by the Employer where an accident

a. causes loss of life; or

b. disables the injured worker from work for more than 10 days to

i. the officer-in-charge of the nearest police station;

ii. the District Magistrate or, if the District Magistrate by order so desires, to

iii. the Sub-Divisional Magistrate

14.2.3 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.

14.2.4 Where any accident causing disablement that subsequently results in death, notice in writing of such death, shall be sent to the authorities mentioned in clause 14.2.1 and 14.2.2 above within 72 hours of such death.

14.2.5 Reporting of near misses or dangerous occurrences:

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

a. 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;

b. falling of objects from height;

c. 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;

d. explosion of receiver or vessel used for storage of pressure greater than atmospheric pressure, of any gas or gases or any liquid or solid used as building material;

e. fire and explosion causing damage to any place on construction site where workers are employed;

f. spillage or leakage of any hazardous substance and damage to their container;

g. collapse, capsizing, toppling or collision of transport equipment;

h. leakage or release of harmful toxic gases at the construction site;

14.2.6 In case of failure of launching girder, lifting appliance, loose gear, hoist or building and other construction work, machinery and transport equipment at a construction

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;

14.2.7 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 in the specified from given in the BOCWR.

14.3 Accident investigation:

14.3.1 General

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

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

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

14.3.2 Procedure of incident investigation

14.3.2.1 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:

a. take photographs and make sketches
b. examine involved equipment, work piece or material and the environmental conditions.
c. interview the injured, eye-witnesses and other involved parties
d. consult expert opinion where necessary
e. identify the specific contractor or sub-contractor involved.

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

a. establish the chain of events leading to the accident or incident
b. find out at what stage the accident took place
c. consider all possible causes and the interaction of different factors that led up to the accident, and identify the most probable cause the cause of an accident should never be classified as carelessness. The specific act or omission that caused the accident must be identified.

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

a. report on the findings and conclusions
b. formulate preventive measures to avoid recurrence
c. publicize the findings and the remedial actions taken

14.4 Employers' independent incident investigation:

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

14.4.2 The contractor shall take every effort to preserve the scene of accident till the Employer completes the investigation.

14.4.3 All persons summoned by the Employer in connection to witness recording shall obey the instructions without delay. Any willful suppression of information by any person shall be removed from the site immediately and/or punishable as per relevant penalty clause.

15.0 Emergency preparedness plan

15.1 The Contractor shall prepare as required under the relevant Rule of BOCWR, an Emergency Response Plan for all work sites as part of the Contractor SHE 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 communications arrangements, for dealing with all emergencies that could affect the Site. This include where applicable, injury, sickness, evacuation, fire, chemical spillage, severe weather and rescue.

15.2 The contractor shall ensure that an Emergency Response Plan is prepared to deal with emergencies arising out of:

i. Fire and explosion
ii. Collapse of lifting appliances and transport equipment
iii. Collapse of building, sheds or structure etc.
iv. Gas leakage or spillage of dangerous goods or chemicals
v. Bomb threatening, Criminal or Terrorist attack
vi. Drowning of workers.
vii. Landslides getting workers buried floods, Earthquake, storms and other natural calamities.
viii. Collapse of excavated trench
ix. Collapse of temporary platform or scaffold

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

15.4 Contractors shall require to tie-up with the hospitals and fire stations located in the neighborhood for attending to the casualties promptly and emergency vehicle kept on standby duty during the working hours for the purpose.

15.5 Contractors shall conduct an onsite emergency mock drill once in every month for all his workers and his subcontractor's workers.

15.6 It shall be the responsibility of the contractor to keep the Local Law & Order Authorities informed and seek urgent help, as the case may be, so as to mitigate the consequences of an emergency. Prompt Communication to DFCCIL, telephonically initially and followed by a written report, shall be made by the contractor.

16.0 Experts / Agencies for SHE services

16.1 Contractors may utilize the services of experts/agencies empanelled under relevant Rule of **BOCWR** for the purpose of training, internal audit and any other SHE services with prior approval of the Employer.

16.2 As an aide to contractors, a list of experts/agencies and the offered service are given in General Instruction **DFCCIL/SHE/GI/09** for ready reference. In addition to it if the contractor would like to use any expert/agencies' services for any SHE activities the same can also be allowed provided that they are competent and meet to the general requirements of Employer. In every case prior approval of the Employer is mandatory.

SAFETY

PART- II
SAFETY

17.0 Housekeeping

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

17.2 Contractor shall understand and accept that improper housekeeping is the primary hazard in any construction site and ensure that a high degree of housekeeping is always maintained. Indeed “Cleanliness is indeed next to Godliness”

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

17.4 General Housekeeping shall be carried out by the contractor and ensured at all times at Work Site, Construction Depot, Batching Plant, Labour camp, Stores, Offices and toilets/urinals. Toward this the Contractor shall constitute a special group of housekeeping personnel as per General Instruction **DFCCIL/SHE/GI/01**. This group shall ensure daily cleaning at work site & surrounding areas and maintain a register in a format approved by the Employer.

17.5 Adequate time shall be assigned to ensure that good housekeeping is maintained. This shall be carried out by team of housekeeping squad.

17.6 The contractor shall be responsible to provide segregated containers for disposal of debris at required places and regular cleaning of the same.

17.7 Full height fence, barriers, barricades etc. shall be erected around the site in order 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 Employer. These shall be maintained in one line and level.

17.8 The structure dimension of the barricade, material and composition, its colour scheme. DFCCIL logo and other details shall be in accordance with specifications laid down in tender document.

17.9 All emergency exits passageways, exits fire doors, break-glass alarm points, firefighting equipment, first Aid stations, and other emergency stations shall be kept clean, unobstructed and in good working order.

17.10 Lumber with protruding nails shall be either bent/ removed and properly stacked.

17.11 All surplus earth and debris are removed/disposed off from the working areas to officially designated dumpsites. Trucks carrying sand, earth and any pulverized materials etc. in order 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.

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

17.13 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. Similarly, if work site is on adjacent railway tracks, no obstruction shall be allowed on existing railway tracks.

17.14 Water logging or bentonite spillage on roads shall not be allowed. If bentonite spillage is observed on road endangering the safety of road users, the contractor shall be penalized as per relevant clause.

17.15 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.

17.16 Flammable chemicals/compressed gas cylinders shall be safely stored.

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

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

17.19 Empty cement bags and other packaging material shall be properly stacked and removed.

17.20 The Contractor shall ensure that all his sub-contractors maintain the site reasonably clean through provisions related to housekeeping.

18.0 Working at Height

18.1 Definitions

18.1.1 ‘access’ and ‘egress’ include ascent and descent.

18.1.2 ‘fragile surface’ means a surface, which would be able to fail if any reasonably foreseeable loading were to be applied to it.

18.1.3 ‘line’ includes rope, chain or webbing

18.1.4 ‘personal fall protection’ means -

a. a fall prevention, work restraint, work positioning, safety belt, fall arrest or rescue system, other than a system in which the only safeguards are collective safeguards; or

b. rope access and positioning techniques;

18.1.5 'work at height' means -

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

b. 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;

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

a. a guard-rail, toe-board, barrier or similar collective means of protection

b. a working platform

c. a net, airbag or other collective safe guard for arresting falls.

d. personal fall protection system

e. ladders

18.1.7 'working platform'

a. means any platform used as a place of work or as a means of access to or egress from a place of work;

b. includes any scaffold, suspended scaffold, cradle, mobile platforms, trestle, gangway, gantry and stairway, which is so used.

18.2 Organization and planning:

The contractor shall ensure that work at height is

i. properly planned for any emergencies and rescue

ii. appropriately supervised; and

iii. carried out in a manner, which is reasonably practicable safe.

18.3 The contractor shall ensure that work at height is carried out only when the weather conditions do not jeopardize the health or safety of persons involved in the work.

18.4 Competence:

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

18.5 Avoidance of risks from work at height:

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

18.6 Where work is carried out at height, the contractor shall take suitable and sufficient measures as given below to prevent, so far as is reasonably practicable, any person

falling a distance liable to cause personal injury.

a. his ensuring that the work is carried out
   i. from an existing place of work; or
   ii. (in the case of obtaining access or egress) using an existing means, complying to the requirements as given in 18.15

where it is reasonably practicable to carry it out safely and under appropriate ergonomic conditions; and

b. where it is not reasonably practicable for the work to be carried out in accordance with sub-paragraph (a), his providing sufficient work equipment for preventing, so far as is reasonably practicable, a fall occurring.

18.7 Where the measures taken under clause 18.6 do not eliminate the risk of a fall occurring, every contractor shall

a. so far as is reasonably practicable, provide sufficient work equipment to minimize -
   i. the distance and consequences; or
   ii. where it is not reasonably practicable to minimize the distance, the consequences, of fall; and

b. Without prejudice to the generality of clause 18.4, provide such additional training and instruction or take other additional suitable and sufficient measures to prevent, so far as is reasonably practicable, any person falling a distance liable to cause personal injury.

18.8 Selection of work equipment for work at height:

1. The contractor, in selecting work equipment for use in work at height, shall
   a. give collective protection measures priority over personal protection measures; and
   b. take account of
      i. the working conditions and the risks to the safety of persons at the place where the work equipment is to be used;
      ii. in the case of work equipment for access and egress, the distance to be negotiated;
      iii. the distance and consequences of a potential fall;
      iv. the duration and frequency of use;
      v. the need for easy and timely evacuation and rescue in an emergency; and
      vi. any additional risk posed by the use, installation or removal of that work equipment or by evacuation and rescue from it;
2. The contractor shall select work equipment for work at height which;
   a. has characteristic including dimensions which;

i. are appropriate to the nature of the work to be performed and the foreseeable loadings; and

ii. allow passage without risk; and

b. is in other respects the most suitable work equipment, having regard in particular to the purposes specified in 18.5 and 18.6

18.9 Fragile surfaces:

18.9.1 The contractor shall ensure that no person at work passes across or near, or working on, from or near, a fragile surface where it is reasonably practicable to carry out work safely and under appropriate ergonomic conditions without his doing so.

18.9.2 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,

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

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

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

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

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

18.10 Falling objects:

18.10.1 The contractor shall, where necessary to prevent injury to any person, take suitable and sufficient steps to prevent, so far as is reasonably practicable, the fall of any material or object.

18.10.2 Where it is not reasonably practicable to comply with the requirements of 18.9, every contractor shall take suitable and sufficient steps to prevent any person being struck by any falling material or object which is liable to cause personal injury.

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

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

18.11 Danger areas:

18.11.1 Without prejudice to the preceding requirements of these Regulations, every contractor shall ensure that

a. where a workplace contains an area in which, owing to the nature of the work, there is a risk of any person at work

i. falling a distance; or

ii. being struck by a falling object,

which is liable to cause personal injury, the workplace is so far as is reasonably practicable equipped with devices preventing unauthorized persons from entering such area; and

b. such area is clearly indicated.

18.12 Inspection of work equipment:

18.12.1 The contractor shall ensure that, where the safety of work equipment depends on how it is installed or assembled, it is not used after installation or assembly in any position unless it has been inspected in that position.

18.12.2 The contractor shall ensure that work equipment exposed to conditions causing deterioration, which is liable to result in dangerous situations, is inspected

a. at suitable intervals; and

b. each time that exceptional circumstances which are liable to jeopardize the safety of the work equipment have occurred.

to ensure that health and safety conditions are maintained and that any deterioration can be detected and remedied in good time.

18.12.3 Without prejudice to paragraph 18.12.1, the contractor shall ensure that a working platform used for construction work; and from which a person could fall 2 meters or more, is not used in any position unless it has been inspected in that position or, in the case of a mobile working platform, inspected on the site, within the previous 7 days.

18.12.4 The contractor shall ensure that the reports of all inspections are properly maintained and shown to the Employer as and when required.

18.12.5 In this clause ‘inspection’.

a. means such visual or more rigorous inspection by a competent person as is appropriate for safety purposes;

b. includes any testing appropriate for those purposes.

18.13 Inspection of places of work at height:

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

18.14 Duties of persons at work:

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

18.14.2 Every workmen shall use any work equipment or safety device provided to him for work at height by the contractor, in accordance with

a. any training

b. in the use of the work equipment or device concerned which have been received by him; and

c. the instructions respecting that use, which have been provided to him by the contractor as per the requirements of the Employer

18.15 Requirements for existing places of work and means of access or egress at height Every existing place of work or means of access or egress at height shall

a. be stable and of sufficient strength and rigidity for the purpose for which it is intended to be or is being used;

b. where applicable, rest on a stable, sufficiently strong surface;

c. be of sufficient dimensions 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 to be carried out there;

d. possess suitable and sufficient means for preventing a fall;

e. possess a surface, which has no gap

i. through which a person could fall;

ii. through which any material or object could fall and injure a person; or

iii. giving rise to other risk of injury to any person, unless measures have been taken to protect persons against such risk;

f. be so constructed and used, and maintained in such condition, as to prevent, so far as is reasonably practicable -

i. the risk of slipping or tripping; or

ii. any person being caught between it and any adjacent structure;

g. where it has moving parts, be prevented by appropriate devices from moving inadvertently during work at height.

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

i. Unless the context otherwise requires, any reference in this section to means of protection is to a guardrail, toe-board, barrier or similar collective means of protection.

ii. Means of protection shall

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

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

iv. Any structure or part of a structure which supports means of protection or to which means of protection are attached shall be of sufficient strength and suitable for the purpose of such support or attachment.

18.17 Requirements for all Working Platforms:

i. Every working platforms requires a supporting structure for holding it
ii. Any surface upon which any supporting structure rests shall be stable, of sufficient strength and of suitable composition safely to support the supporting structure, the working platform and any loading intended to be placed on the working platform.
iii. Stability of supporting structure:
Any supporting structure shall
a. be suitable and of sufficient strength and rigidity for the purpose for which it is being used;
b. in the case of a wheeled structure, be prevented by appropriate devices from moving inadvertently during work at height;
c. in other cases, be prevented from slipping by secure attachment to the bearing surface or to another structure, provision of an effective anti-slip device or by other means of equivalent effectiveness;
d. be stable while being erected, used and dismantled; and
e. when altered or modified, be so altered or modified as to ensure that it remains stable.
f. Have suitable base plates and properly footed thereby.
iv. Stability of working platforms
A working platform shall

a. be suitable and of sufficient strength and rigidity for the purpose or purposes for which it is intended to be used or is being used;
b. be so erected and used as to ensure that its components do not become accidentally displaced so as to endanger any person;
c. when altered or modified, be so altered or modified as to ensure that it remains stable; and
d. be dismantled in such a way as to prevent accidental displacement.

v. Safety on working platforms

A working platform shall

a. be of sufficient dimensions 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;
b. possess a suitable surface and, in particular, be so constructed that the surface of the working platform has no gap
    i. through which a person could fall;
    ii. through which any material or object could fall and injure a person; or
    iii. giving rise to other risk of injury to any person, unless measures have been taken to protect persons against such risk; and
c. be so erected and used, and maintained in such condition, as to prevent, so far as is reasonably practicable
    i. the risk of slipping or tripping; or
    ii. any person being caught between the working platform and any adjacent structure.

vi. Loading

A working platform and any supporting structure shall not be loaded so as to give rise to a risk of collapse or to any deformation, which could affect its safe use.

vii. Additional requirements for scaffolding

a. a note of the calculations, covering the structural arrangements contemplated, is available; or
b. it is assembled in conformity with a generally recognized standard configuration.

viii. Depending on the complexity of the scaffolding selected, a competent person shall draw up an assembly, use and dismantling plan. This may be in the form of a standard plan, supplemented by items relating to specific details of the scaffolding in question.

ix. 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.

x. The dimensions form and layout of scaffolding decks shall be appropriate to the nature of the work to be performed and suitable for the loads to be carried and permit work and passage in safety.

xi. 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.

xii. Scaffolding may be assembled, dismantled or significantly altered only under the supervision of a competent person and by persons who have received appropriate and specific training in the operations envisaged which addresses specific risks which the operations may entail and precautions to be taken, and more particularly in

a. understanding of the plan for the assembly, dismantling or alteration of the scaffolding concerned;
b. safety during the assembly, dismantling or alteration of the scaffolding concerned;
c. measures to prevent the risk of persons, materials or objects falling;
d. safety measures in the event of changing weather conditions which could adversely affect the safety of the scaffolding concerned;
e. permissible loadings;
f. any other risks which the assembly, dismantling or alteration of the scaffolding may entail.

18.18 Requirements for collective safeguards for arresting fall:

i. Collective safeguard are a safety net, airbag or other collective safeguard for arresting falls

ii. 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.

iii. A safeguard shall be suitable and of sufficient strength to arrest safely the fall of any person who is liable to fall.

iv. A safeguard shall

a. in the case of a safeguard which is designed to be attached, be

securely attached to all the required anchors, and the anchors and the means of attachment thereto shall be suitable and of sufficient strength and stability for the purpose of safely supporting the foreseeable loading in arresting any fall and during any subsequent rescue;

b. in the case of an airbag, landing mat or similar safeguard, be stable; and

c. in the case of a safeguard, which distorts in arresting a fall, afford sufficient clearance.

v. Suitable and sufficient steps shall be taken to ensure, so far as practicable, that in the event of a fall by any person the safeguard does not itself cause injury to that person.

18.19 Requirements for personal fall protection systems:

i. A personal fall protection system shall be used only if

a. a risk assessment has demonstrated that

i. the work can so far as is reasonably practicable be performed safely while using that system; and

ii. the use of other safer work equipment is not reasonably practicable; and

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

ii. A personal fall protection system shall

a. be suitable and of sufficient strength for the purposes for which it is being used having regard to the work being carried out and any foreseeable loading;

b. where necessary, fit the user;

c. be correctly fitted;

d. be designed to minimize injury to the user and, where necessary, be adjusted to prevent the user falling or slipping from it, should a fall occur; and

e. be so designed, installed and used as to prevent unplanned or uncontrolled movement of the user.

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

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

18.20 Requirements for Ladder:

i. 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 and
   a. The short duration of use; or
   b. Existing features on site, which he cannot alter.

ii. Only metal ladders shall be allowed. Bamboo ladders are prohibited.

iii. 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.

iv. A ladder shall be so positioned as to ensure its stability during use

v. A suspended ladder shall be attached in a secure manner and so that, with the exception of a flexible ladder, it cannot be displaced and swinging is prevented.

vi. A portable ladder shall be prevented from slipping during use by-
   a. securing the stiles at or near their upper or lower ends;
   b. an effective anti-slip or other effective stability device; or
   c. any other arrangement of equivalent effectiveness.

vii. A ladder used for access shall be long enough to protrude sufficiently above the place of landing to which it provides access, unless other measures have been taken to ensure a firm handhold.

viii. No interlocking or extension ladder shall be used unless its sections are prevented from moving relative to each other while in use.

ix. A mobile ladder shall be prevented from moving before it is stepped on.

x. Where a ladder or run of ladders raises a vertical distance of 9 meters or more above its base, there shall, where reasonably practicable, be provided at suitable intervals sufficient safe landing areas or rest platforms.

xi. Every ladder shall be used in such a way that
   a. a secure handhold and secure support ate always available to the user; and
   b. the user can maintain a safe handhold when carrying a load unless, in the case of a step ladder, the maintenance of a handhold is not practicable when a load is carried, and a risk assessment has demonstrated that the use of a stepladder is justified because of
      i. the low risk; and
      ii. the short duration of use.

19.0 Overhead protection

All contractors shall provide overhead protections as per relevant Rule of BOCWR

i. Overhead protection should be erected along the periphery of every building which is under construction and the building height shall be 15m or above after construction.
ii. Overhead protection shall be minimum 2m wide and the outer edge shall be 150mm higher than the inner edge and an angle not more than 20° to its horizontal sloping into the building.
iii. Overhead protection shall not be erected more than a height of 5m from the base of the building.
iv. Areas of inadvertent hazard of falling of material shall be guarded or barricaded or roped- off thereby by the contractor.

20.0 Slipping, Tripping, Cutting, Drowning and Falling Hazards

As per BOCWR,

i. All places should be free from dust, debris or similar materials.
ii. Sharp projections or any protruding nails or similar objects shall be suitably guarded or shall even be avoided to make the place safe to work.
iii. Contractor shall not allow workmen to work or use platforms, scaffolds/ passageways or any walkways, which has water, or oil or similar substances spilt and has a slipping hazard, unless it is cleaned of or covered or sanded or saw dusted or make it safe with any suitable material.
iv. When workers are exposed to areas where fall into water is possible, the contractor shall provide suitable and adequate equipment for saving the workers from drowning and rescuing from such hazard. If the Employer considers, the contractor shall provide well-equipped boat or launch, manned with trained personnel at the work place.
v. Open side or opening where worker, equipment, vehicle or lifting appliance may fall at a building or outside shall be guarded suitably except in places of free access by reasons of nature of work.
vi. Suitable safety net shall be provided at places of material/man falling is possible in accordance with national standards.

21.0 Lifting Appliances and Gear

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

or building workers and lifting gears means ropes, chain slings, shackles, hooks, lifting lugs, wire ropes, lifting eyebolts and eyenuts and other accessories of a lifting appliance.

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

i. the weights, dimensions and lift radii of the heaviest and largest loads.
ii. the maximum lift height, the maximum lift radius and the weight of the loads that must be handled at each.
iii. the number and frequency of lifts to be made
iv. how long the crane will be required on site
v. the type of lifting to be done (for example, is precision placement of loads important)
vi. the type of carrier required (this depends on ground conditions and machine capacity in its operating quadrants; capacity is normally greatest over the rear, less over the side, and non¬existent over the e front
vii. whether loads will have to be walked or carried
viii. whether loads will have to be suspended for lengthy periods
ix. the site conditions, including the ground where the machine will be set up, access roads and ramps it must travel, space for erection and any obstacles that might impede access or operation.

21.3 The contractor shall ensure that a valid certificate of fitness issued as per clause 21.7 is available for all lifting appliances including synchronized mobile jacks, pre-stressing hydraulic jacks, jacks fitted with launching girders etc. and Employers approval before inducting to the site. Only after obtaining the approval from the employer any lifting appliances and gear shall be used.

21.4 The laminated photocopies of fitness certificate issued by competent person, the Employers' 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.

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

21.6 The contractor shall 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.

21.7 Test and periodical examination of lifting appliances and gears:

21.7.1 All lifting appliances including all parts and gears thereof, whether fixed or movable shall be thoroughly tested, examined and certified by a competent person registered with State Inspectorate of Factories once at least in every six months or after it has undergone any alterations or repairs liable to affect its strength or stability, within the validity, if the lifting appliances are shifted to a new site, re-examination by the

same competent person for ensuring its safety shall also be done.

21.7.2 Contractors can utilize the services of any competent person as defined in Factories Act, 1948 and approved by Chief Inspector of Factories with the permission of the Employer.

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

21.8 Automatic safe load indicators:

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

21.9 Qualification of operator of lifting appliances and of signaler etc.

21.9.1 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 a operator of a rigger or derricks unless he

i. is above twenty-one years of age and possesses a valid heavy transport vehicle driving licence as per Motor Vehicle Act and Rules.
ii. is absolutely competent and reliable
iii. 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 Employer
iv. is medically examined periodically as specified in the BOCW Rules.

21.10 General requirements of appliances:

21.10.1 Out-of-level

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

21.10.2 Boom:

i. The boom is one of the more critical elements of the crane and must be in perfect condition at all time. No boom section with a bent lattice member shall be allowed
ii. All welds shall be crack and corrosion free
iii. No member of the boom shall be bent
iv. All telescopic boom shall be free from cracks, rust, flaking or cracked paint, bulges, greases or varnishes

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

21.10.4 The operator cab shall posses good and safe:

i. structure, windows and windshield wipers
ii. Drivers chair and foot rest
iii. Control handles
iv. Cab instrumentation
v. Telecommunication
vi. Cab out fitting
vii. wind indicator with an adjustable set point shall be in a position representative for the wind on the crane. The indicator shall give continuous information regarding constant speeds and gusts.

21.11 Mandatory rigging requirements:

21.11.1 Rigging shall be done under experienced and qualified rigger only.

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

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

21.11.4 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.

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

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

21.11.7 Requirements of outriggers:

i. All outriggers shall be fully extended and at all tyres are clear of the ground
ii. Heavy duty blocking having large bearing area shall be necessary to prevent sinking of floats.

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

21.11.8 No close working to any live overhead power line is permitted without the operation of a strict permit to work.

21.11.10 Minimum lighting is to be ensured at all lifting operations.

21.12 Failure to do any of the above shall attract penalty from the Employer as per relevant clause

22.0 Launching Operation

22.1 As launching operation is one of the riskiest job, the contractor shall take utmost precaution at all stages like planning, establishing casing yard, casting segments, transporting segments, fabrication and erection of launching girders, launching of

segments, pre-stressing, auto launching of girders and dismantling of launching girders.

22.2 The contractor shall prepare a comprehensive Method Statement for the launching operation, adhering to the SHE conditions laid down in conditions of contract on SHE and project SHE manual. Particular reference shall be made to the provisions on working at height. As the entire process of launching has to be undertaken at an elevated level the safety of workers and the girder is paramount important. The following general guidelines shall be adhered throughout the launching operation.

i. Necessary working platforms and fall protection anchorage arrangement shall be provided in the launching girder itself.

ii. Provisions for mounting light fittings shall also be made available in the launching girder.

iii. The casting yard shall be established ensuring the provision given in clause 38.0

iv. The workmen engaged in fabrication of reinforcement, concreting the segment shall be provided with necessary PPEs including compulsory hand protection gloves.

v. Casting and curing of segment shall be undertaken under the direct supervision of the responsible engineer of the contractor.

vi. Trucks with valid registration, licence, safe worthiness certificate, employer's approval certificate, and pollution under check certificate shall only be used for transport of segments

vii. Drivers engaged for driving these trucks, shall be trained once in 6 months at recognized training Institute on defensive driving.

viii. Drivers shall also have undergone proper medical examination as per relevant clause mentioned under Medical Facilities.

ix. The segments shall rigidly secured 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.

x. Every launching girder shall have a responsible engineer on duty all the time.

xi. All the time from erection to dismantling the area between the two piers wherein launching is in progress shall always be barricaded.

xii. Unloading of segments from trucks, lifting of segments, shifting of segments, gluing shall be done under the direct supervision of the approved engineer of the contractor.

xiii. Auto launching shall be done only after approval from the Employer. After every auto launching the stability of launching girder shall be ensured.

xiv. The vertical deflection of launching girder shall be monitored at all critical stages like with/without loads and after every auto launching.

xv. A register containing all important operational details from erection to dismantling of launching girders shall be maintained and made available to Employer whenever called for.

xvi. 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.

xvii. Adequate lighting at all time shall be ensured in the entire area of operation.

xviii. Access to drinking water & toilet shall be ensured to all workmen engaged for launching process.

xix. Proper access ladders/stairways shall be maintained for safe ascending/ descending of workmen/engineers.

22.3 Non-adherence to any of the clauses mentioned above shall be viewed seriously by the Employer and penalty levied as per relevant clause.

23.0 Construction machinery

23.1 A large number of men and machinery are deployed by the contractors for construction work, bridge rebuilding etc. It is therefore essential that adequate safety measures are taken for safety of trains as well the workforce. The following measures should invariably adopt:

(i) The contractor shall not start any work without the presence of DFCC supervisor or his representative and contractors supervisor at site.

(ii) Wherever the road vehicles and/or machinery are required to work in the close vicinity of railway line, the work shall be so carried out that there is no infringement to the railway's schedule of dimensions. For this purpose the area where road vehicles and/or machinery are required to ply, shall be demarcated and acknowledged by the contractor. Special care shall be taken for turning / reversal of vehicles / machinery without infringing the running track. Barricading shall be provided wherever justified and feasible as per site conditions.

(iii) The look out and whistle caution orders shall be issued to the trains and speed restriction imposed where considered necessary. Suitable flagmen / detonators shall be provided where necessary for protection of trains.

(iv) The supervisor / workmen should be counseled about safety measures. A competency certificate to the contractor's supervisor as per proforma annexed shall be issued by APM which will be valid only for the work which it has been issued.

(v) The unloaded ballast / rails / sleepers / other P.way materials after unloading along track should be kept clear off moving dimensions and stacked as per the specified heights and distance from the running track.

(vi) Supplementary site instructions, wherever considered necessary, shall be issued by the Engineer in Charge of DFCC.

The Engineer in-charge shall approve the methodology proposed to be adopted by the contractor, with a view to ensure safety of trains, passengers and workers and he shall also be ensure that the methods and arrangements are actually available at site before start of the work and the contractor's supervisors and the workers have clearly understood the safety aspect and requirements to be adopted / followed while executing the work.

There shall be an assurance register kept at each site, which will have to be signed by both i.e. DFCC Supervisor or his representative as well as contractor's supervisor as a token of their having understood the safety precautions to be observed at site."

23.2 Construction machineries may include dumpers and dump trucks, lift trucks and telescopic handlers piling figs, vibro hammers, rail welding equipment, mobile elevation 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, hydraulic and mechanical breakers etc.

23.3 Safe worthiness certificate:

23.3.1 Every construction equipment shall be in sound mechanical working condition undertaken in the past, any accident to the equipment, visual examination details critical components safety check, devises and its working condition, manufacturer's maintenance checklist, past projects wherein the equipment were used etc as its minimum content.

23.4 Reverse Horns:

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

23.5 General Operating procedures:

i. 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.

ii. No passengers shall be carried, unless specific seating has been provided in accordance with the manufacturers recommendations.

iii. Working on gradients beyond any equipment capability shall not be allowed.

iv. Prevention of dumper and dump truck accidents should be managed by providing wheel stops at a sufficient distance from the edges of excavations, spoil heaps, pits, etc.

v. The manufacturer's recommended bucket size must not be exceeded in excavators.

vi. If excavators operating on a gradient, which cannot be avoided, it must be ensured that the working cycle is slowed down, that the bucket is not extended too far in the downhill direction, and that travel is undertaken with extreme caution. A large excavator must never be permitted to travel in a confined area, or around people, without a banksman to guide the driver, who should have the excavator attachment close in to the machine, with the bucket just clear of the ground. On wheeled excavators, it is essential that the tyres are in good condition and correctly inflated. If stabilizing devices are fitted, they should be employed when the machine is excavating.

vii. When the front shovel of the 180° backhoe loaders is being employed, the backhoe attachment shall be in its "travel" position, with the safety locking device in place.

viii. When operating the backhoe in poor ground conditions, the stabilizers tend to sink into the surface of the ground, reducing stability. Therefore, frequent checks shall be made for the stability of the machine. The loading shovel should always be lowered to the ground to stabilize the machine when the backhoe is employed.

ix. The netting operation of the skip wagons should be carried out prior to lifting the skip to reduce the risks of working on the rear platform.

x. If a tractor dozer is employed on clearing scrub or felling trees, it shall be provided with adequate driver protection.

xi. When two or more scrapers are working on the same job, a minimum distance of at least 25m or adequate shall be kept between them.

xii. In case of hydraulic breakers, hydraulic rams and hoses shall be in good working condition.

23.6 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.

23.7 Penalty:

23.7.1 If any of the above clauses are not adhered, penalty shall be imposed as per relevant clause depending upon the gravity of the unsafe act and or condition.

24.0 Machine and general area guarding

24.1 The contractor shall ensure at the construction site all motors, cogwheels, chains and friction gearing, flywheels, shafting, dangerous and moving parts of machinery are securely fenced or legged. The fencing of dangerous part of machinery is not removed while such machinery is in motion or in use.

25.0 Manual lifting and carrying of excessive weight

25.1 The contractor shall ensure at his construction site of 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 said below as per Rule 38 of BOCWR, unless aided by another worker or device.

Person	Maximum weight in Kg.
Adult man	55
Adult woman	30

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

26.0 Site electricity

26.1 Competency of Electrical personnel:

26.1.1 The contractor shall employ qualified and competent electrical personnel as specified in general instruction **DFCCIL/SHE/GI/01.**

26.2 Assessment of power:

26.2.1 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.

26.2.2 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 Employer obtained before proceeding of the execution of the job.

26.2.3 The main contractor shall take into consideration, the requirements of the sub contractor electric power supply and arrive at the capacity of main source of power supply from diesel generators.

26.2.4 As small capacity generators create more noise and safety hazard, no small capacity diesel generators shall be allowed for whatsoever the type of job to be executed

under this contract.

26.2.5 If any unsafe noise making small capacity diesel generators are found used by sub contractors/contractor the main contractor shall only be penalized.

26.3 Work on site:

26.3.1 The contractor shall also submit electrical single line diagram, schematic diagram and the details of the equipment for all temporary electrical installation and these diagrams together with the temporary electrical equipment shall be submitted to the Employer's for necessary approval. Failure to do so shall invite penalty as per relevant clause.

26.4 Strength and capability of electrical equipment:

26.4.1 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.

26.5 Adverse or hazardous environments:

26.5.1 Electrical equipment which may reasonably be exposed to-

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

26.6 Distribution system:

26.6.1 The contractor shall provide distribution system for control and distribution of electricity from a main AC supply of 50Hz for typical appliances.

i. Fixed plant - 400V 3 phase
ii. Movable plant fed via trailing cable over 3.75 kW - 400 3 phase
iii. Installation in site buildings - 230V single phase
iv. Fixed flood lighting - 230V single phase
v. Portable and hand tools - 115V single phase
vi. Site lighting - 115V single phase
vii. Portable hand lamps - 115V single phase

26.7 Electrical protection circuits:

26.7.1 Precautions shall be taken, either by earthing or by other suitable means, to prevent danger arising when any conductor (other than a circuit conductor) which may reasonably foreseeable become charged as a result of either the use of a system, or a fault in a system, becomes so charged. A conductor shall be regarded as

earthed when conductors of sufficient strength and current-carrying capability to discharge electrical energy to earth connect it to the general mass of earth.

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

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

26.7.3 The contractor shall provide sufficient ELCBs (maintain sensitivity 20mA)/RCCBs for all the equipment (including Potable equipment), electrical switchboards, distribution panels etc. to prevent electrical shocks to the workers.

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

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

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

26.8 Cables:

26.8.1 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 3.3kV shall be in accordance with BS 6346.

26.8.2 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.

26.8.3 Flexible cords with a conductor cross sectional area smaller than 1.5mm2 shall not be used and insulated flexible cable shall conform to BS 6500 and BS 7375.

26.8.4 Where low voltage cables are to be used, reference shall be made to BS 7375. The following standards shall also be referred to particularly for under ground cables BS 6346 and BS 6708.

26.8.5 Cables buried directly in the ground shall be of a type incorporating armour or metal sheath or both. Such cables shall be marked by cable covers or a suitable marking tape and be buried at a sufficient depth to avoid their being damaged by any disturbance of the ground. Cable routes shall be marked on the plans kept in the site electrical register.

26.8.6 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 meters.

26.8.7 Cables that need to cross open areas, or where span of 3m or more are involved, a catenary wire on poles or other supports shall be provide for convenient means of suspension. Minimum height shall be 6m above ground.

26.8.8 Cables carrying a voltage to earth in excess of 65V other than supply for welding

process shall have metal armour or sheath, which has been effectively earthed and monitored by the contractor. In case of flexible and trailing cables such earthed metal sheath and/ or armour should be in addition to the earth core in the cable and shall not be used as the protective conductor.

26.8.9 Armoured cables having an over-sheath of polyvinyl chloride (PVC) or an oil resisting and flame retardant compound shall be used whenever there is a risk of mechanical damage occurring.

26.9 Plugs, socket-outlets and couplers:

26.9.1 The contractor shall ensure plugs, socket-outlets, and couplers available in the construction site as splash proof type. The minimum degree of ingress protection should be of IP44 in accordance with BS EN 60529.

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

i. 110 volts : Yellow.
ii. 240 volts : Blue.
iii. 415 volts : Red.

26.10 Connections:

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

26.10.2 No loose connections or tapped joints shall be allowed anywhere in the work site, office area, stores and other areas. Penalty as per relevant clause shall be put in case of observation of any tapped joints.

26.11 Portable and hand-held equipment:

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

26.12 Other equipment:

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

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

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

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

26.13 Work on or near live conductors:

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

i. it is unreasonable in all the circumstances for it to be dead; and

ii. it is reasonable in all the circumstances for him to be at work on or near it while it is live; and

iii. suitable precautions (including where necessary the provision of suitable protective equipment) are taken to prevent injury.

26.14 Inspection and Maintenance:

2614.1 All electrical equipment should be permanently numbered and a record kept of the date of issue, date of last inspection and recommended inspection period.

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

26.15 25 KV AC 50 Hz single phase Traction:

a) Induction effect of 25 KV AC 50 Hz single phase Traction

I. The attention of all staff is drawn to the fact that under 25 kv ac 50 Hz single phase traction, there is heavy induction on all metallic structures and conductors in the vicinity of the track. The induction is two – fold.

- Electro- static, which results from the high potential of 25 kv on the OHE system.
- Electro- magnetic, which is proportional to the currents passing from the sub –station to the OHE to the locomotives /EMUs and back partly through the earth.

II. The voltage induced is quite appreciable on overhead conductors running parallel to the tracks depending on the length of parallelism. This explains why most of the overhead telecommunications lines are replaced by underground cables. Special protective measures

are required to reduce the adverse effects of induction.

III. In a railway yard, voltage of the order of 200 volts may be induced on yard lighting mains situated 8 m away from the centre of a double-line track, of it runs parallel to the 25 KV lines for a distance of about 270 m; it could be several thousand volts when parallelism is much longer. In such a case, a dangerous voltage due to induction will exist even after power supply to the line has been switched off. No one shall therefore attempt to work on any overhead line running alongside the electrified tracks without taking special precautions of earthing on both sides of the work. Before a section is electrified, the necessary modifications to distribution lines in all stations and yards should be carried out, so as to limit the induced voltage within permissible values, but this by no means limits the need for earthing the lines on both the sides of the working party. Earthing should be done individually by each working party as close to the work spot as possible. The distance between the two earths shall not exceed 1 km.

IV. Such inductive effects occur on large metallic structures such as fencings, structural steelwork of platforms running parallel to the track. They will therefore, have to be earthed suitably to afford safety.

V. Inductive effects also show themselves on any metallic conductor, such as metallic clothes- lines, power lines and lines belonging to private parties running parallel and close to the electrified tracks. Wide publicity should be given to the effects of induction so that special precautions are taken by the private parties.

b) General Precautions

The precautions laid down below must be followed under all circumstances in sections equipped for 25 kv as single phase, 50 Hz traction.

i. No work shall be done above or within a distance of 2 m from the live OHE without a “permit-to-work.”

ii. No part of a tree shall be nearer than 4 m from the nearest live conductor. Any tree or branches likely to fall on live conductor should be cut or trimmed periodically to maintain this clearance. Cutting or trimming should be done by the OHE staff themselves or through an agency manage and supervised by them.

iii. Work for trimming of trees should also be done in the presence of authorized OHE staff or supervisor to maintain the safe clearance

of 4mt. Any dispute regarding cutting of trees may be done on contract basis or departmentally of the terms & conditions of concerning deptt.

iv. No fallen wire or wires shall be touched unless power is switched off and the wire or wires suitably earthed. In case the wires drop at a level crossing, the Gate-keeper shall immediately make arrangements to stop all road traffic and keep the public away.

v. As far as possible closed wagons shall be used for material trains. In case open or hopper wagons are used, loading and unloading or such wagons in electrified tracks shall be done under the supervision of an Engineering Official not below the rank of a APM who shall personally ensure that no tool or any part of the body of the worker comes within the 'danger zone' i.e. within 2 m of the OHE.

vi. Permanent Way staff should keep clear of the tracks and avoid contact with the rails either when approaching or reaching the work-spot when an electrically hauled train is within 250m.

vii. When unloading rails alongside the tracks, it should be ensured that rails do not touch each other to form a continuous metallic mass of length greater than 300m.

c) Safety precautions on Electrified Sections (Chapter-IV), Electrical Accidents (Chapter-V) Fire Precautions (Chapter-VI) of Indian Railways AC Traction Manual Volume – I, as applicable may be followed.

d) The Training and Competency Certificates (Chapter XII) of Volume-II, part-I of Indian Railway AC Traction Manual may be followed.

e) Power Blocks and Permit to Work are required to be taken in case of construction work going on in the vicinity of electrified line as per applicable Para of Chapter –VI of volume-II, part – I of Indian Railway AC Traction Manual.

27.0 Lighting

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

27.2 Selection of Luminaries:

The contractor shall select the luminaries as per the area requirement indicated below:

Type of Lighting	Area of Requirement	Luminaries
Area Lighting	Workmen and vehicles to move about in safely	i. Shovel type: non-symmetrical ii. Symmetrical or non-symmetrical tungsten halogen
Beam flood lighting	Concentrated light over an area from a relatively great distance.	i. Portable flood light (Conical beam) ii. Wide angle flood (fan shaped beam) iii. Medium or narrow angle flood (Conical beam)
Dispersive lighting	Lighting for indoor	i. Dispersive (Mercury florescent) ii. Cargo cluster iii. Florescent through
Walkway lighting	Lighting for stairways, ladder ways, corridors, scaffold access routs, etc.	i. Well glass unit ii. Bulkhead unit (tungsten filament) iii. Bulk head unit (florescent)
Local lighting	Lighting on sites and fittings are generally accessible to operatives	i. PAR (Parabolic Aluminised Reflector) lamp cluster ii. Festoons (with or without shades) iii. Adjustable florescent work lamp iv. Portable flood lamp (mounted on own cable drum)

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

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

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

27.6 Lamp holders not fitted with a lamp should be capped off.

27.7 The contractor shall take every effort to illuminate the work site as per the Employer's requirement illustrated in general instruction **DFCCIL/SHE/GI/10.**

28.0 Hand Tools and Power Tools

28.1 General

28.1.1 The contractor is wholly responsible for the safe condition of tools and equipment used by his employees and that of his sub-contractors.

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

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

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

28.2 Hand tools:

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

28.2.2 The contractor shall ensure that

i. For crosscutting of hardwood, saws with larger teeth points (no. of points per inch) shall be preferred to avoid the saw jumping out of the job.
ii. Mushroom headed chisels shall not be used in the worksite where the fragments of the head may cause injury.
iii. Unless hatchet has a striking face, it shall be used as a hammer.
iv. Only knives of retractable blades shall be used in the worksite.
v. No screwdrivers shall be used for scraping, chiseling or punching holes.
vi. A pilot hole shall always be driven before driving a screw.
vii. Wherever necessary, usage of proper PPEs shall be used by his employees.

28.3 Power tools:

28.3.1 Power tools include drills, planes, routers, saws, jackhammers, rinders, sprayers, chipping hammers, air nozzles and drills.

28.3.2 The contractor shall ensure that

i. Electric tools are properly grounded or/and double insulated.
ii. GFCIs/RCCBs shall be used with all portable electric tool operated especially outdoors or in wet condition.
iii. Before making any adjustments or changing attachments, his workers shall disconnect the tool from the power source.
iv. When operating in confined spaces or for prolonged periods, hearing protection shall be required. The same shall also apply to working with equipment, which gives out more noise as mentioned in clause 43.0 of this contract document.

v. Tool is held firmly and the material is properly secured before turning on the tool.

vi. All drills shall have suitable attachments respective of the operations and powerful for ease of operation.

vii. 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.

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

ix. Attachments such as speed reducing screwdrivers and buffers shall be provided to prevent fatigue and undue muscle strain to his workers.

x. Stock should be clamped or otherwise secured firmly to prevent it from moving.

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

xii. Electric plane shall not be operated with loose clothing or long scarf or open jacket.

xiii. Safety guards used on right angle head or vertical portable grinders must cover a minimum of 180° of the wheel and the spindle/wheel specifications shall be checked.

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

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

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

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

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

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

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

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

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

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

29.0 Welding, Gouging and Cutting

29.1 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.

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

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

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

29.5 Domestic LPG cylinders shall not be used for Gas welding and Cutting purpose.

29.6 DCP or CO_2 type fire Extinguisher not less than 5 kg shall be fixed at or near to welding process zone in an easily accessible location, Fire Extinguisher should confirm to latest BIS standard..

29.7 Use firewatchers if there is a possibility of ignition unobserved by the operator (e.g. on the other side of bulkheads).

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

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

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

29.11 Use a low voltage open circuit relay device if welding with alternating current in constricted or damp places.

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

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

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

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

30.0 Dangerous and harmful environment

As per BOCWR,

i. When internal combustion engines are used into a confined space or excavation or tunnel or any other workplace where either 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.

ii. 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.

31.0 Fire prevention, protection and fighting system

31.1 The contractor shall ensure that construction site is provided with fire extinguishing equipment sufficient to extinguish any probable fire at construction site. An adequate water supply is provided at ample pressure as per national standard.

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

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

31.4 The contractor shall also give consideration to the provision of adequate fire fighting arrangements within the underground and tunneling operations including the provision of Fire Service compatible hose connections and emergency lighting.

31.5 As per the BOCWR, all lifting appliances' driver cabin should be provided with a suitable portable fire extinguisher.

31.6 Combustible scrap and other construction debris should be disposed off site on a regular basis. If scrap is to be burnt on site, the burning site should be specified and located at a distance no less than 12 meters from any construction work or any other combustible materials.

31.7 Every fire, including those extinguished by contractor personnel, shall be reported to the Employer representatives.

31.8 Emergency plans and Fire Evacuation plans shall be prepared and issued. Mock drills shall be held regularly on monthly basis to ensure the effectiveness of the arrangements and as a part of the programme, the Telephone Number of the local Fire station should be prominently displayed near each telephone on site.

32.0 Corrosive substances

32.1 As per BOCWR relevant Rule, corrosive substances including alkalis and acids shall be stored and used by a person dealing with such substances at a construction site in a manner that it does not endanger the worker and suitable PPE shall be provided by the contractor to the worker during such handling and work. In case of spillage of such substances on worker, the contractor shall take immediate remedial measures.

33.0 Demolition

33.1 The Contractor shall ensure that

i. All demolition works be carried out in a controlled manner under the management of experienced and competent supervision.

ii. the concerned department of the Government of local authority be informed and permission obtained wherever required.

iii. 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 put-off and such lines so located or capped with substantial coverings so as to protect it from damage and to afford safety to the building workers and public.

iv. Examine the walls of all structures adjacent to the structure to be demolished to determine thickness, method of support to such adjacent structures.

v. No demolishing 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.

vi. Debris/Bricks and other materials or articles shall be removed by means of
   a. chutes
   b. buckets or hoists
   c. through openings through floors or
   d. any other safe means

vii. No person other than 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.

34.0 Excavation and Tunnelling

34.1 Excavation:

34.1.1 The contractor shall ensure

i. where any construction 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 one 1.5 m above his footing, such worker is protected by adequate piling and bracing against such bank or side.

ii. where banks of an excavation are undercut, adequate shoring is provided to support the material or article overhanging such bank.

iii. excavated material is not stored at least 0.65 m from the edge of an open excavation or trench and banks of such excavation or trench are stripped of loose rocks and the banks of such excavation or trench are stripped of loose rocks and other materials which may slide, roll or fall upon a construction building worker working below such bank.

iv. metal ladders and staircases or ramps are provided, as the case may be, for safe access to and egress from excavation where, the depth of such excavation exceeds 1.5m and such ladders, staircases or ramps comply with the IS 3696 Part 1&2 and other relevant national standards.

v. trench and excavation is protected against falling of a person by suitable measures if the depth of such trench or excavation exceeds 1.5m and such protection is an improved protection in accordance with the design and drawing of a professional engineer, where such depth exceeds 4m.

34.2 Tunnelling :

34.2.1 The contractor shall inform in writing to the Director General within 30 days, prior to the commencement of any tunneling work.

34.2.2 The contractor shall appoint a responsible person for safe operation for tunnelling work as per relevant Rule of BOCWR.

34.3 Warning signs and notices:

34.3.1 The contractor shall ensure that

i. suitable warning signs or notices, required for the safety of workers carrying out the work of an excavation or tunneling, shall be displayed or erected at conspicuous places in Hindi and in a language understood by majority of such building workers at such building such excavation or tunneling work.

ii. such warning signs and notices with regard to compressed air working shall include

a. the danger involved in such compressed air work.

b. fire and explosion hazard
c. the emergency procedures for rescue from such danger or hazards.

35.0 Work Permit System

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

35.2 A permit is needed when construction work can only be carried out if normal safeguards are dropped or when new hazards are introduced by the work. Examples of high-risk activities include but are not limited to:

i. Entry into confined spaces
ii. Work in close proximity to overhead power lines and telecommunication cables.
iii. hot work.
iv. To dig-where underground services may be located.
v. Work with heavy moving machinery.
vi. Working on electrical equipment.
vii. Work with radioactive isotopes.
viii. Heavy lifting operations and lifting operations closer to live power line.

35.3 The permit-to work system should be fully documented, laying down:

i. How the system works;
ii. The job it is to be used for;
iii. The responsibilities and training of those involved; and
iv. How to check its operation;

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

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

35.6 Format of Work Permits i.e., Cold Permit (for all works other than Hot or Excavation/ tunneling and Electrical Isolation), Hot Work, Electrical Isolation are given at the end of this document as **DFCC/SF 003, DFCC/SF 004 & DFCC/SF 005** respectively. These are indicative and can be suitably modified depending upon site condition.

36.0 Traffic Management

36.1 The basic objective of the following guidelines is to lay down procedures to be adopted by contractor to ensure the safe and efficient movement of traffic and also to ensure the safety of workmen at construction sites.

36.2 All construction workers should be provided with high visibility jackets with reflective tapes. The conspicuity of workmen at all times shall be increased so as to protect from speeding vehicular traffic.

36.3 The guiding principles to be adopted for safety in construction zone are to

i. Warn the road user clearly and sufficiently in advance.

iii. Provide safe and clearly marked lanes for guiding road users.

iv. Provide safe and clearly marked buffer and work zones.

v. Provide adequate measures that control driver behavior through construction zones.

36.4 Legal permission:

36.4.1 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 metropolitan/civil authorities as the case may be.

36.4.2 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.

36.5 The primary traffic control devices used in work zones shall include signs, delineators, barricades, cones, pylons, pavement markings and flashing lights.

36.6 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) provides a list of Traffic Signs. The size, colours and placement of sign shall conform to IRC:67.

36.7 Regulatory Signs:

36.7.1 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.

36.8 Warning Signs:

36.8.1 Warning Signs in the traffic control zone shall be utilized to warn the drivers of specific hazards that may be encountered.

36.8.2 The Contractor shall place detour signage at strategic locations and install appropriate warning signs. In order to minimize disruption of access to residences and business, the contractor shall maintain at least one entrance to a property where multiple entrances exist.

36.8.3 A warning sign as given in general instruction **DFCC/SHE/GI/11** shall be installed at an 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.

36.9 Delineators:

The delineators are the elements of a total system of traffic control and have two distinct purposes :

(i) To delineate and guide the driver to and along a safe path.

(ii) As a taper to move traffic from one lane to another.

36.9.1 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 should normally be retro-reflectors complying to IRC:79 - Recommended Practice for Road Delineators.

36.9.2 Traffic cones and cylinders

36.9.2.1 Traffic cones of 500 mm, 750 mm and 1000 mm high and 300 mm to 500 mm in diameter or in square shape at base and are often made of plastic or rubber and normally have retro-reflectorised red and white band shall be used wherever required.

36.9.3 Drums

36.9.3.1 Drums about 800 mm to 1000 mm high and 300 mm 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.

36.9.4 Barricades:

36.9.4.1 Full height fence, barriers, barricades, etc. shall be erected around the site in order to prevent the working area from the risk of accidents due to speedy vehicular movement. In the same way barricades protect the road users from the danger due to construction equipment and other temporary structures.

36.9.4.2 The structure dimension of the barricade, material and composition, its colour scheme, DFCC logo and other details shall be in accordance with specifications laid down in tender document.

36.9.4.3 All barricades shall be erected as per the design requirements of the employer, numbered, painted and maintained in good condition and also Barricade in-charge maintain a barricade register in site.

36.9.4.4 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 1000 mm. In addition, minimum one red light or red light blinker should be placed at the top of each barricade.

36.9.5 The contractor shall ensure that all his construction vehicles plying on public roads (like dump truck, trailer, 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.

36.9.6 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.

36.9.7 Tow away vehicle

36.9.7.1 The contractor shall make arrangements keeping tow away van/manpower to tow away any breakdown vehicle in the traffic flow without losing any time at his cost.

36.9.8 Cleaning of Roads

36.9.8.1 The contractor shall ensure the cleanliness of roads and footpaths by deploying proper manpower for the same. The contractor shall have to ensure proper brooming, cleaning, washing of roads and footpaths on all the time throughout the entire stretch till the currency of the contract including disposal of sweepage.

37.0 Work to adjacent Railways

37.1 Whenever work is to be executed in close proximity to Indian Railway track then following safety measures will be adopted.

(a) Provision of IRPWM related to block protection, safety precaution for protection of track must be followed.

(b) Works which is executed within 3.5 mtr from centre line of existing Indian Railway track should be executed under block protection and with permit to work from concerned railway

(c) For works to be executed between 3.5 mtr to 6 mtr from centre line of existing Indian Railway track work to be executed after erection of fencing as per approved plan.

(d) For works to be executed beyond 6 mtr from centre line of existing Indian Railway track, it must be ensured that no vehicle / construction equipment infringes demarcation line marked at 3.5 mtr from centre of existing railway track.

(e) All utilities, signaling cables, signaling equipment, pipelines, gate lodges, staff quarters etc., coming in the alignment must be shifted / relocated as per approved plan before undertaking earth-work. programme

(f) During earth-work if any signaling cable not identified earlier got damaged it should be immediately reported to Railway and immediate action should be taken for repair of the same to avoid interruption to traffic.

(g) Any material unloaded along the track should be kept clear of moving dimensions and stacked at minimum 3.5 mtr from track centre of running track.

(h) Movement of vehicle / working of machineries should not be permitted during night. In case night working is to be adopted proper fencing at 3.5 mtr from track centre of running track should be erected to ensure that no infringement of moving dimension takes place. Suitable lighting arrangements should also be done.

(i) Working in existing railway station area for modification of existing siding / line must be done after approval of plan and with permit to work from Railway.

(j) Modification to road surface at existing level crossings which may cause interruption to road traffic should be executed as per approved plan with the approval of concerned local authorities.

(k) Launching of girders for construction of ROB / rail flyover / modification to existing ROBs should be done as per approved plan and scheme with permission to work from Railway / road authorities.

(l) For construction of new bridge over canal / extension of existing bridge over canal approval of respective authorities should be taken before undertaking work.

37.2 Safe working of contractors-A large number of men and machinery are deployed by the contractors for construction work, bridge rebuilding etc. It is therefore essential that adequate safety measures are taken for safety of trains as well the workforce. The following measures should invariably adopt:

(i) The contractor shall not start any work without the presence of DFCC supervisor or his representative and contractors supervisor at site.

(ii) Wherever the road vehicles and/or machinery are required to work in the close vicinity of railway line, the work shall be so carried out that there is no infringement to the railway's schedule of dimensions. For this purpose the area where road vehicles and/or machinery are required to ply, shall be demarcated and acknowledged by the contractor. Special care shall be taken for turning / reversal of vehicles / machinery without infringing the running track. Barricading shall be provided wherever justified and feasible as per site conditions.

(iii) The look out and whistle caution orders shall be issued to the trains and speed restriction imposed where considered necessary. Suitable flagmen / detonators shall be provided where necessary for protection of trains.

(iv) The supervisor / workmen should be counseled about safety measures. A competency certificate to the contractor's supervisor as per proforma annexed shall be issued by APM WHICH WILL BE VALID ONLY FOR THE WORK WHICH IT HAS BEEN ISSUED.

(v) The unloaded ballast / rails / sleepers / other P. way materials after unloading along track should be kept clear off moving dimensions and stacked as per the specified heights and distance from the running track.

(vi) Supplementary site instructions, wherever considered necessary, shall be issued by the Engineer in Charge of DFCC.

(vii) The Engineer in-charge shall approve the methodology proposed to be adopted by the contractor, with a view to ensure safety of trains, passengers and workers and he shall also be ensure that the methods and arrangements are actually available at site before start of the work and the contractor's supervisors and the workers have clearly understood the safety aspect and requirements to be adopted / followed while executing the work.

There shall be an assurance register kept at each site, which will have to be signed by both.i.e. DFCC Supervisor or his representative as well as contractor's supervisor as a token of their having understood the safety precautions to be observed at site."

38.0 Batching Plant/Casting Yard

i. The batching plant/casting yard shall be effectively planned for smooth flow of unloading and stacking the aggregates reinforcements and cement, batching plant, transport of concrete, casting the segment, stacking the segment and loading the segments to the trucks. As far as possible the conflicts should be avoided.

ii. The batching plant/casting yard shall be barricaded and made as a compulsory PPE zone.

iii. If in case of material unloading area is not maintainable as PPE zone, the same shall be segregated properly and made as a non-PPE zone with appropriate barricading.

iv. Electrical system shall also be suitably planned so that location of diesel generator, if any, location of DBs, routing of cables and positioning of area lighting poles/masts does not infringe on any other utility and pose danger.

v. Drainage shall be effectively provided and waste water shall be disposed after proper treatment.

vi. 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.

vii. Manual handling of cement shall be avoided to a larger extent. Whenever it is absolutely necessary the workmen shall be given full body protection,

hand protection and respiratory protection as a basic measure of ensuring better health.

viii. The PPEs provided to cement handling workmen shall conform to international standards.

ix. Access roads and internal circulation roads shall be well laid and maintained properly at all time.

x. Non-adherence to any of the above provision shall be penalized as per relevant penalty clause.

39.0 Personal Protective Equipment (PPEs)

39.1 The contractor shall provide required PPEs to workmen to protect against safety and/or health hazards, Primarily PPEs are required for the following protection

i. Head Protection (Safety helmets)
ii. Foot Protection (Safety footwear, Gumboot, etc.)
iii. Body protection (High visibility clothing (waistcoat/jacket), Apron, etc.)
iv. Personal fall protection (Full body harness, Rope-grab fall arrester, etc.)
v. Eye Protection (Goggles, Welders glasses, etc.)
vi. Hand Protection (Gloves, Finger coats, etc.)- electrical hand gloves, acid/ chemical handling hand gloves
vii. Respiratory Protection, (Nose mask, SCBAs, etc.)
viii. Hearing Protection (Ear plugs, Ear muffs, etc.)

39.2 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 Employer shall procure PPE and safety appliances meeting International standard.

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

39.4 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 requirements.

All employees of the Contractor including workmen	**Traffic marshals**
i. Hard hat with company Logo ii. Safety boots iii. Hi-visibility waistcoat covering upper body and meeting the following requirements as per BS EN 471:1994 a. Background in fluorescent orange-red in colour b. Two vertical green strips of 5 cm wide on front side, covering the torsi at least 500 cm2. c. Two diagonal strips of 5 cm wide on back in an 'X'. d. Horizontal strips not less than 5 cm wide running around the bottom of the vertical strip in front and 'X' pattern at back. e. the bottom strip shall be at a distance of 5 cm from the bottom of the vest. f. Strips must be retro reflective and fluorescent. g. Waistcoat shall have a side adjustable fit and a side and front tear-away feature on vests made of nylon.	i. Hard hat with reflective tape ii. Safety boots iii. Hi-visibility jacket covering upper body and meeting the following requirements as per BS EN 471:1994 a. Background in fluorescent orange-red in colour 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 5 cm from the bottom of the sleeve. c. Two vertical green strips of 5 cm wide on front side covering the torso at least 500 cm2. d. Two diagonal strips of 5 cm wide on back in an 'X' pattern covering at least 570 cm2. e. Horizontal strips not less than 5 cm wide running around the bottom of the vertical strip in front and 'X' pattern at back. f. The bottom strip shall be at a distance of 5 cm from the bottom of the vest. g. Strips must be retro reflective and fluorescent.

39.4.1 Colour code for helmets

Safety Helmet Colour Code (every helmet should have the LOGO* affixed/printed)	**Person to use**
White	DFCCIL Staffs
Grey	All Designers, Architect, Consultants, etc.
Violet	Main Contractors (Engineers/Supervisors)
Blue	All Sub-Contractors (Engineers/Supervisors)
Red	Electricians (Both Contractor and Sub-contractor)
Green	Safety professionals (Both Contractor and Sub-contractor)
Orange	Security Guards/Traffic marshals
Yellow	All workmen
White (With "VISITOR" sticker)	Visitors

Note: LOGO*

1. Logo shall have its outer dimension 2”X2” and shall be conspicuous.
2. Logo shall be either painted or affixed.
3. No words shall come either on Top/Bottom of Logo
   Logo of the corresponding main contracting company for their employees and sub-contracting company for their employees shall only be used.

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

39.6 The contractor shall not pay any cash amount in lieu of PPE to the workers/sub-contractors and expect them to buy and use during work.

39.7 The contractor shall at all time maintain a minimum of 10% spare PPEs and safety appliances and properly record and show to the Employer during the inspections. Failing to do so shall invite appropriate penalty as per the provisions of the contract.

39.8 It is always the duty of the contractor to provide required PPEs for all visitors. Towards this required quantity of PPEs shall be kept always at the security post.

40.0 Visitors to site

40.1 No visitor is allowed to enter the site without the permission of the Employer. All authorized visitors should report at the site office. 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.

40.2 All visitors shall be accompanied at all times by a responsible member of the site personnel.

40.3 The contractor shall be fully responsible for all visitors safety and health within the site.

OCCUPATIONAL HEALTH AND WELFARE

PART- III
OCCUPATIONAL HEALTH AND WELFARE

41.0 Physical fitness of workmen

41.1 The contractor shall ensure that his employees / workmen subject themselves to such medical examination as required under the law or under the contract provision and keep a record of the same.

41.2 The contractor shall not permit any employee/workmen to enter the work area under the influence of alcohol or any drug.

42.0 Medical Facilities

42.1 Medical Examination:

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

a) The contractor shall maintain the confidential records of medical examination or the physician authorized by the Employer.

b) No construction worker is charged for the medical examination and the cost of such examination is borne by contractor employing such worker.

c) The medical examination shall include:-

1) Full medical and occupational history.

2) Clinical examination with particular reference to

i. General physique;

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

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

iv. Audiometry test for workers / employees having complaint; otherwise at random for those who are exposed to high noise level.

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

vi. Lung function test for workers / employees having complaint; otherwise at random for those who are exposed to high noise level.

vii. Upper Limbs: - Adequate arm function and grip.

viii. Spine: Adequately flexible for the job concerned.

ix. Lower Limbs:-Adequate leg and foot concerned.

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

3) Any other tests which the examining doctor considers necessary

42.1.2 If the contractor fails to get the medical examination conducted as mentioned above, the employer will have the right to get the same conducted by through an agency with intimation to the contractor and deduct the cost and overhead charges.

42.2 Occupational Health Centre:

42.2.1 The contractor shall ensure at a construction site an occupational health centre, mobile or static is provided and maintained in good order. Services and facilities as per the scale lay down in of the BOCWR. A construction medical officer appointed in an occupational health centre possess the qualification as laid down in the BOCWR.

42.3 Ambulance van and room:

42.3.1 The contractor shall ensure at a construction site of a construction work that an ambulance van and room are provided at such construction site or an arrangement is made with a nearby hospital for providing such ambulance van for transportation of serious cases of accident or sickness of workers to hospital promptly and such ambulance van and room are maintained in good repair and is equipped with standard facilities specified in the BOCWR.

42.4 First-aid box:

42.4.1 The contractor shall ensure at a constructions at a one First-aid box for 100 workers

provided and maintained for providing First-aid to the workers. Every First-aid box is distinctly marked “First-aid” and is equipped with the articles specified in the BOCWR.

42.5 HIV/AIDS prevention and control:

42.5.1 The contractor shall adopt the Employer’s Policy on “HIV/AIDS Prevention and Control for Workmen Engaged by Contractors” and the copy of the policy is given in Appendix No. 4.

42.5.2 The Employer will engage a professional agency for implementing the guidelines laid down in the policy and communicate to the contractor.

42.5.3 The Contractor shall extend necessary support to the appointed agency by deputing the workmen to attend the awareness creation programmes.

42.5.4 The contractor shall also extend necessary organizational support to the appointed agency for the effective implementation of the Employers’ workplace policy on HIV/AIDS for workmen of the Contractors.

42.5.5 As laid down in the policy the contractor shall identify peer educators (1 for every 100 workers) and refer them for professional training to the Employers’ appointed agency for the purpose.

42.5.6 The peer educators on completion of the training shall serve as the focal point for any information, education and awareness campaign among the workmen throughout the contract period.

42.5.7 The peer educators will be paid a monthly honorarium as fixed by the Employer for rendering his services in addition to his regular duly.

42.5.8 The total number of peer educators (1 for 100 workers) shall always be maintained by the contractor.

42.5.9 In case if these peer educators leave the contractor by creating vacancy, then the contractor at his own expense train the new replacement peer educator from the Employers’ appointed agency for the purpose.

42.5.10 It is suggested to the contractor that due care should be taken to select the peer educators from among the group of workmen so that they remain with the contractor throughout the contract period.

42.6 Prevention of mosquito breeding:

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

i. 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.

ii. Still waters shall be treated at least once every week with oil in order to prevent mosquito breeding.

iii. 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.

iv. Water storage tanks shall be provided.

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

42.6.3 The contractor at periodic interval shall arrange to prevent mosquito breeding by fumigation/spraying of insecticides.

42.7 Alcohol and drugs:

42.7.1 Consumption of alcoholic drink and banned drugs by any work man/ woman at work site is strictly prohibited and this is punishable as per Government regulations. . The contractor shall ensure the same. Contractor shall carry out breathing analyser test for presence of alcohol on the workers at random, time to time.

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

43.0 Noise

43.1 The Contractor shall consider noise as an environmental constraint in his design, planning and execution of the Works and provide demonstrable evidence of the same on Employer's request. The contractor shall, at his own expense, take all appropriate measures to ensure that work carried out by the Contractor and by his sub¬contractors, whether on or off the Site, will not cause any unnecessary or excessive noise which may disturb the occupants of any nearby dwellings, schools, hospitals or premises with similar sensitivity to noise.

43.1.1 Without prejudice to the generality of the foregoing, noise level reduction measures shall include the followings:

i. the Contractor shall ensure that all powered mechanical equipment used in the Works shall be effectively sound reduced using the most modern techniques available including but not limited to silencers and mufflers.

ii. The Contractor shall construct acoustic screens or enclosures around any parts of the Works from which excessive noise may be generated.

43.1.2 The Contractor shall ensure that noise generated by work carried out by the Contractor and his sub-contractors during daytime and night time shall not exceed the maximum permissible noise limits, whether continuously or intermittently, as given in the BOCWR or project SHE Manual. The same may be varied from time to time by and at the sole discretion of the Employer, 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.

43.1.3 The noise monitoring requirements including monitoring locations are given in the project SHE Manual.

43.2 Control Requirements

43.2.1 Construction material should be operated and transported in such a manner as not to create unnecessary noise as outlined below:

i. Perform Work within the procedures outlined herein and comply with applicable codes, regulations, and standards established by the Central and State Government and their agencies.

ii. Keep noise to the lowest reasonably practicable level. Appropriate measures will be taken to ensure that construction works will not cause any unnecessary or excessive noise, which may disturb the occupants of any nearby dwellings, schools, hospitals, or premises with similar sensitivity to noise. Use equipment with effective noise-suppression devices and employ other noise control measures as to protect the public.

iii. Schedule and conduct operations in a manner that will minimize, to the greatest extent feasible, the disturbance to the public in areas adjacent to the construction activities and to occupants of buildings in the vicinity of the construction activities.

iv. The Contractor shall submit to the Employer a Noise Monitoring and Control Plan (NMCP) under contract specific Site environmental Plan. It shall include full and comprehensive details of all powered mechanical equipment, which he proposes to use during daytime and night time, and of his proposed working methods and noise level reduction measures. The NMCP shall include detailed noise calculations and vibration levels to demonstrate the anticipated noise generation and vibrations by the Contractor.

v. The NMCP prepared by the Contractor shall guide the implementation of construction activity. The NMCP will be reviewed on a regular basis and updated as necessary to assure that current construction activities are addressed. It may appear as a regular agenda item in project coordination meetings, if noise is an issue at any location in the contract.

43.3 Dust Control and Silicosis Exposure Reduction Strategy:

43.3.1 The Contractor shall ensure proper dust handling at work site as described in thr project specific Environment Management Plan and follow Silicosis Exposure Reduction Strategy as described at Annexure-I at the end of this document.

43.4 Occupational Noise :

i. Protection against the effects of occupational noise exposure should be provided when the sound levels exceeds the threshold values as provided in Project SHE Manual.

ii. When employees are subjected to sound levels exceeding those listed in the Table, feasible administrative or engineering controls should be utilized as given in this document and Project SHE Manual.

iii. If such controls fail to reduce sound levels within the levels of the table, personal protective equipment shall be provided and used to reduce sound levels within the levels of the table.

iv. When the daily noise exposure is composed of two or more periods of noise exposure of different levels, their combined effect should be considered, rather than the individual effect of each. Exposure to different levels for various periods of time shall be computed according to the formula and sample computation as given in project SHE Manual.

43.5 Vibration Level :

43.4.1 In locations where the alignment is close to historical / heritage structures, the contractor shall prepare a monitoring scheme prior to construction at such historical/ heritage sites shall be submitted to Employer for his approval. This scheme shall include:

i. Monitoring requirements for vibrations at regular intervals throughout the construction period.

ii. Pre-construction structural integrity inspections of historic and sensitive structures in project activity.

iii. Information dissemination about the construction method, probable effects, quality control measures and precautions to be used.

iv. The vibration level limits at work sites adjacent to the alignment shall conform to the permitted values of peak p velocity as given in EA report of the project.

44.0 Ventilation and Illumination

44.1 Ventilation :

44.1.1 The contractor shall ensure at a construction site of a construction work that all working areas are provided with ventilation system as approved by the DG/CIIBC and the fresh air supply in such tunnel is not less than 6m^3/min for each building worker employed underground in such tunnel and the free air flow movement inside such tunnel is not less than 9 m/min.

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

44.2 Illumination:

44.2.1 The contractor shall take every effort to illuminate the work site as per the Employer's requirement illustrated in general instruction **DFCCIL/SHE/GI/10.**

44.2.2 The contractor shall conduct a monthly illumination monitoring by lux meter for all the locations and the report shall be sent to the Employer within 7th of the next month and the same shall be reviewed during the monthly SHE committee meeting.

45.0 Radiation

45.1 The use of radioactive substances and radiating apparatus shall comply with the Govt. regulatory requirements and all subsidiary legislation.

45.2 Operations involving ionizing radiation shall only be carried out after having been reviewed without objection by the Employer's representative and shall be carried out in accordance with a method statement.

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

45.4 Radioactive substances will be stored, used or disposed shall be strictly in accordance with the Govt. Enactments.

45.5 The contractor shall ensure that all site personnel and members of the public are not exposed to radiation.

46.0 Welfare measures for workers

46.1 Latrine and Urinal Accommodation :

46.1.1 The contractor shall provide one latrine seat for every 20 workers up to 100 workers and thereafter one for every additional 5 workers. In addition one urinal accommodation shall be provided for every 100 workers.

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

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

46.1.4 Moving sites:

46.1.4.1 In case of works like track laying, the zone of work is constantly moving at elevated level or at ground level. In such cases mobile urinals with proper facility to drain the sullage shall be provided at reasonably accessible distance.

46.2 Canteen:

46.2.1 In every workplace wherein not less than 250 workers are ordinarily employed the contractor shall provide an adequate canteen conforming to Section 37 of BOCWA,

BOCWR and as stipulated in relevant of BOCWR the Charges for food stuff shall be based on 'no profit no loss' basis. The price list of all times shall be conspicuously displayed in such canteen.

46.3. Serving of tea and snacks at the workplace:

46.3.1 As per BOCWR, at construction work where a workplace is situated at a distance of more than 200m from the canteen provided under relevant Rule of BOCWR the contractor employing works shall make suitable arrangement for serving tea and light refreshment to such building works at such place.

46.4 Drinking water :

46.4.1 As per Section 32 of BOCWA the contractor shall make in every worksite, 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.

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

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

46.5 Labour Accommodation :

46.5.1 The contractor shall provide free of charges as near as possible, temporary living accommodation to all workers conforming to provisions of Section 34 of BOCWA. These accommodations shall have cooking place, bathing, washing and lavatory facilities.

46.6 Crèches :

46.6.1 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 yrs., conforming to the provisions of Section 35 of BOCWA.

ENVIRONMENTAL MANAGEMENT

PART- IV
ENVIRONMENTAL MANAGEMENT

47.0 Environment Management during construction shall include implementation of Environment Management plan and compliance of pollution control measures at work sites.

48.0 Major Statutory Environmental Acts, Rules, Standards are listed below:

(i) Environment (Protection) Act, 1986 and its amendments
(ii) EIA Notification, 2006
(iii) Air (Prevention and Control of Pollution) Act, 1981
(iv) Water (Prevention and Control of Pollution) Act, 1974
(v) Wildlife (Protection) Act, 1972 and its amendments
(vi) Forests (Conservation) Act, 1980
(vii) Coastal Regulation Zone Notification, 2011
(viii) The Wetlands (Conservation and Management) Rules, 2010
(ix) Tree Preservation Act or relevant Act of the concerned state
(x) Noise Pollution (Regulation and Control) Act, 2000 and its amendments
(xi) Public Liability Act, 1991
(xii) Explosive Act, 1884
(xiii) The Hazardous Wastes (Management, Handling and Transboundary) Rules, 2008
(xiv) Manufacture, Storage and Import of Hazardous Chemicals Rules, 1989
(xv) The Petroleum Rules, 2002 & Amendment Rules, 2011
(xvi) Ancient Monuments and Archaeological Sites and Remains (Amendment and Validation) Act, 2010 and National Monuments Authority (Conditions of Service of Chairman and Members of the Authority and Conduct of Business) Rules, 2011
(xvii) Minor Mineral and Concession Rules
(xviii) National Green Tribunal (Prevention and Protection) Rules, 2011

49.0 Air Quality

The Contractor shall take all necessary precautions to minimize fugitive dust emissions from operations involving excavation, grading, and clearing of land and disposal of waste. He shall not allow emissions of fugitive dust from any transport,

handling, construction or storage activity to remain visible in atmosphere beyond the properly line of emission source for any prolonged period of time without notification to the Employer.

49.1 The Contractor shall use construction equipment designed and equipped to minimize or control air pollution. The Contractor shall maintain evidence of such design and equipment and make these available for inspection by Employer.

49.2 If after commencement of construction activity, Employer believes that the Contractor's equipment or methods of working are causing unacceptable air pollution impacts then these shall be inspected and remedial proposals shall be drawn up by the Contractor, submitted for review to the employer and implemented.

49.3 In developing these remedial measures, the Contractor shall inspect and review all dust sources that may be contributing to air pollution. Remedial measures include use of additional/ alternative equipment by the Contractor or maintenance/ modification of existing equipment of the Contractor. Silicosis Exposure Reduction Strategy is placed at Annexure-I.

In the event that approved remedial measures are not being implemented and serious impacts persist, the Employer may direct the Contractor to suspend work until the measures are implemented, as required under the Contract.

49.4 Contractor's transport vehicles and other equipment shall conform to emission standards fixed by Statutory Agencies of Government of India or the State Government from time to time. The Contractor shall carry out periodical checks and undertake remedial measures including replacement, if required, so as to operate within permissible norms.

49.5 The Contractor shall establish and maintain records of routine maintenance program for internal combustion engine powered vehicles and equipment used on this project. He shall keep records available for inspection by Employer.

49.6 The Contractor shall cover loads of dust generating materials like debris and soil being transported from construction sites. All trucks carrying loose material should be covered and loaded with sufficient free board to avoid spills through the tail board or side boards.

49.7 The Contractor shall promptly transport all excavation disposal materials of whatever kind so as not to delay work on the project. Stockpiling of materials will only be allowed at sites designated by the Employer. The Contractor shall place excavation materials in the dumping/disposal areas designated in the plans as given in the specifications.

49.8 The temporary dumping areas shall be maintained by the Contractor at all times until the excavate is re-utilized for backfilling or as directed by Employer. Dust

control activities shall continue even during any work stoppage.

49.9 The Contractor shall place material in a manner that will minimize dust production. Material shall be minimized each day and wetted, to minimize dust production. During dry weather, dust control methods must be used daily especially on windy, dry days to prevent any dust from blowing across the site perimeter.

49.10 The contractor shall water down construction sites as required to suppress dust, during handling of excavation soil or debris or during demolition. The Contractor will make water sprinklers, water supply and water delivering equipment available at any time that it is required for dust control use. Dust screens will be used, as feasible when additional dust control measures are needed specially where the work is near sensitive receptors.

49.11 The Contractor shall provide a wash pit or a wheel washing and/or vehicle cleaning facility at the exits from work sites such as construction depots and batching plants. At such facility, high- pressure water jets will be directed at the wheels of vehicles to remove all spoil and dirt.

49.12 The Contractor shall design and implement his blasting techniques so as to minimize dust, noise, vibration generation and prevention of flying rock.

49.13 Blasting technique should be consistent not only with nature and quantity of rock to be blasted but also the location of lasting.

49.14 The contractor shall give preference to explosives with better environmental characteristics.

49.15 The Contractor shall protect structures, utilities, pavements roads and other facilities from disfiguration and damage as a result of his activities. Where this is not possible, the contractor shall restore the structures, utilities, pavements, roads and other facilities to their original or better, failing which the rectification/restoration work shall be carried out at the risk and cost of the contractor.

49.16 The Contractor shall submit to the Employer an Air Monitoring and Control Plan (AMCP) under contract specific Site Environmental Plan to guide construction activity in so far as it relates to monitoring, controlling and mitigating air pollution.

50.0 Water Quality

50.1 The Contractor shall comply with the Indian Government legislation and other State regulations in existence as they relate to water pollution control and monitoring. A drainage system should be constructed at the commencement of the Works, to drain off all surface water from the work site into suitable drain outlet.

50.2 The Contractor shall provide adequate precautions to ensure that no spoil or

debris of any kind is pushed, washed, falls or deposited on land adjacent to the site perimeter including public roads or existing stream courses and drains within or adjacent to the site. In the event of any spoil or debris from construction works being deposited or any silt washed down to any area, then all such spoil, debris or material and silt shall be immediately removed and the affected land and areas restored to their natural state by the Contractor to the satisfaction of the Employer.

50.3 Due to lowering of potable water supplies and subsequent contamination of ground water, the Contractor is not allowed to discharge water from the site without the approval of the Employer. The Contractor must comply with the requirements of the Central Ground Water Board for discharge of water arising from dewatering. Any water obtained from dewatering systems installed in the works must be either re-used for construction purposes and this water may subsequently be discharged to the drainage system or, if not re-used, recharged to the ground water at suitable aquifer levels. The Contractor must submit his proposals for approval of Employer, on his proposed locations of dewatering of excavation and collection of water for either construction re-use or recharge directly to aquifers. The Contractor's recharge proposals must be sufficient for recharging of the quantity of water remaining after deduction of water re-used for construction. During dewatering, the contractor shall monitor ground water levels from wells to ensure that draw down levels do not exceed allowable limits. The Contractor will not be permitted to directly discharge, to the drainage system, unused ground water obtaining from the excavation without obtaining approval of Employer or the Agency controlling the system.

50.4 The Contractor shall ensure that earth, bentonite, chemicals and concrete agitator washings etc. are not deposited in the watercourses but are suitably collected and residue disposed off in a manner approved by local authorities.

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

50.6 Any mud slurry from drilling, tunneling, diaphragm wall construction or grouting etc. shall not be discharged into the drainage system unless treatment is carried out that will remove silt, mud particles, bentonite etc. The Contractor shall provide treatment facilities as necessary to prevent the discharge of contaminated ground water.

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

50.8 The bentonite mixing, treatment and handing system shall be established by the contractor giving due regard to its environmental impacts. The disposal of redundant bentonite shall be carefully considered whether in bulk or liquid form. The disposal location will be advised and agreed with the relevant authorities.

50.9 The Contractor shall take measures to prevent discharge of oil and grease during spillage from reaching drainage system or any water body. Oil removal/interceptors shall be provided to treat oil waste from workshop areas etc.

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

51.0 Archaeological and Historical Site Preservation

51.1 The contractor shall seek to accommodate archaeological and historical site preservation concerns that may arise due to the construction of the project especially in close vicinity of such areas where such monuments may be located.

51.2 The contractor shall consult the Archaeological Survey of India (ASI) & / or National Monuments Authority on the advice of the Employer, to identify and assess construction effects and seek ways to avoid, minimize or mitigate adverse effects on such monuments.

51.3 Adverse effects may include reasonably foreseeable effects caused by the construction that may occur later in time, be farther removed in distance or those that alter, howsoever temporarily, the significance of the structure.

52.0 Landscape and Greenery

52.1 As far as is reasonably practicable, the Contractor shall maintain ecological balance by preventing deforestation and defacing of natural landscape.

52.2 The Contractor shall, so conduct his construction operations, as to prevent any avoidable destruction, scarring or defacing of natural surroundings in the vicinity of work.

52.3 Where destruction, scarring, damage or defacing may occur as a result of operations relating to Permanent or Temporary works, the same shall be repaired, replanted or otherwise corrected at Contractor's expense. All work areas shall be smoothened and graded in a manner to conform to natural appearance of the landscape as directed by the Employer.

52.4 A suggested list of trees/shrubs suitable for planting and landscaping is found in Employer's Project Environmental Assessment Report.

53.0 Felling of Trees

53.1 The contractor shall identify the number and type of trees that are required to be felled as a result of construction of works and inform the Employer.

53.2 All trees and shrubs, which are not specifically required to be cleared or removed for construction purposes, shall be preserved and shall be protected from any damage that may be caused by Contractor's construction operations and equipment. The contractor shall not fell, remove or dispose of any tree or forest produce in any land handed over to him for the construction of works except with the previous permission obtained from the Forest Department.

53.3 The Employer shall arrange permission from the forest department for trees to be felled or transplanted. The Employer will permit the removal of trees or shrubs only after prior approval.

53.4 Special care shall be exercised where trees or shrubs are exposed to injuries by construction equipment, blasting, excavating, dumping, chemical damage or other operation and the Contractor shall adequately protect such trees by used of protective barriers or other methods approved by the Employer. Trees shall not be used for anchorage.

53.5 However, before tree felling, Contractor shall ensure from the Employer that permission of Competent Authority was obtained for cutting of the trees. It is to be noted that permission of higher authority may be required for tree felling in case the same are within specially notified area (e.g., permission of tree cutting in Taj Trapezium Zone is required to be obtained from Hon'ble Supreme Court Green Bench).

54.0 Fly Ash

54.1 The Employer may require the contractor to use fly ash as a percentage substitution of cement, in concrete for certain structures and works.

54.2 In all such uses of Fly Ash, the contractor shall maintain a detailed record of usage of Fly Ash. The contractor shall also collect related details and provide it to the Employer.

54.3 The reporting details on consumption of Fly Ash are to be developed in consultation with the Employer.

55.0 Waste

55.1 The contractor is required to develop, institute and maintain a Waste Management Programme (WMP) during the construction of the project for his works, which may

include:-

55.2 Identification of disposal sites.

55.3 Identification of quantities to be excavated and disposed off.

55.4 Identification of split between waste and inert material

55.5 Identification of amounts intended to be stored temporarily on site location of such storage.

55.6 Identification of intended transport means and route.

55.7 Obtaining permission, where required, for disposal.

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

55.9 The Contractor shall handle waste in a manner that ensures they are held securely maintain and clean waste storage areas regularly.

55.10 The Contractor shall remove waste in a timely manner and disposed off at landfill sites after obtaining approval of local authority.

55.11 Burning of wastes is prohibited. The Contractor shall not burn debris or vegetation or construction waste on the site but remove it in accordance with 50.1 above.

55.12 The Contractor shall make arrangement to dispose of metal scrap and other saleable waste to authorized dealer and make available to the Employer on request, records of such sales.

56.0 Hazardous Waste Management

56.1 If encountered or generated as a result of Contractor's activity, then waste classified as hazardous under the "Hazardous Wastes (Management, Handling and Transboundary) Rules", 2008 shall be disposed off in a manner in compliance with the procedure given in the rules under the aforesaid Act.

56.2 Chemicals classified as hazardous chemicals under "Manufacture, Storage and Import of Hazardous Chemical Rules", 1989 shall be disposed off in a manner in compliance with the procedure given in the rules under the aforesaid Act.

56.3 The contractor shall identify the nature and quantity of hazardous waste generated as a result of his activities and shall file a "Request for Authorization" along with a map showing the location of storage area.

56.4 Outside the storage area, the contractor shall place a 'display board', which will display quantity and nature of hazardous waste, on date. Hazardous Waste needs

to be stored in a secure place.

56.5 It shall be the responsibility of the contractor to ensure that hazardous wastes are stored, based on the composition, in a manner suitable for handling, storage and transport. The labeling and packaging is required to be easily visible and be able to withstand physical conditions and climatic factors.

56.6 The contractor shall approach only Authorized Recyclers or purchasers of Hazardous Waste for disposal of Hazardous Waste, under intimation to the Employer.

56.7 Submittal of all environment related documents and records pertaining to monitoring and trend analysis on key parameters such as but not limited to consumption/ efficient use of resources such as energy, water, material such as cement, fly ash, iron and steel, recycle/reuse of waste etc. that shall have demonstrated continual improvement in the implementation of Environmental management system. Failure to do so the employer shall impose appropriate penalty as indicated under penalty clause.

57.0 Energy Management

57.1 The contractor shall use and maintain equipment so as to conserve energy and shall be able to produce demonstrable evidence of the same upon Employer's request.

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

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

57.3 The contractor shall design site offices maximum daylight and minimum heat gain. The rooms shall be well insulated to enhance the efficiency of air conditioners and the use of solar films on windows may be used where feasible.

58.0 Environment and Forest Clearance

58.1 Standard requirement & procedures for obtaining environmental, forest, Wildlife Sanctuary / National Park, CRZ, ASI clearances are described below.

58.1.1 Environmental Clearance: DFC project does not require prior environmental clearance in accordance to the EIA Notification, 2006.

58.1.2 Consent to operate construction equipment under Air Act, Water Act, Hazardous

Waste will be required from State Pollution Control Board / Committee as per relevant Act/ Rule. Hazardous wastes shall be disposed in accordance to the Rules.

58.1.3 Clearance for Wildlife Sanctuary, Bird Sanctuary, National Park: Where DFC alignment is passing through any wildlife or National Park or within its buffer zone of 10 km radius from its boundary, clearance is required from Hon'ble Supreme Court through State Forest Dept. & MoE&F. Proposal for clearance shall be processed first by state CWLW, followed by State Board for Wildlife (SBWL). SBWL recommendation shall be considered by National Board for Wildlife (NBWL) in MoE&F. After clearance from NBWL, the proposal has to be submitted to Central Empowered Committee (CEC) of Hon'ble Supreme Court. Once the proposal is cleared by CEC, they will seek formal permission of Hon'ble Supreme Court's designated Judge/ Bench and convey the decision to Project Authority, which in this case is DFCCIL.

58.1.4 Wetland: Project activity in the notified wetland is restricted as per The Wetlands (Conservation and Management) Rules, 2010. The Rules have listed wetlands across the country and the Rules are applicable to those wetlands only. In other words, this Rules are applicable for notified wetlands.

58.1.5 Eco-sensitive zone: In case DFC alignment is passing through any notified eco-sensitive zone, clearance is required from the concerned Eco-sensitive Authority or State Govt.

58.1.6 Tree cutting: Permission for tree felling has to be obtained from Forest Dept. under Tree Protection Act of the State. Compensatory tree plantation has to be undertaken as directed. In case of special notified area like Taj Trapezium Zone: In case of DFC passing through TTZ, permission for tree cutting within the area may be obtained from Hon'ble S.C. Green Bench.

58.1.7 Forest clearance: Forest clearance for all recorded forest areas (reserved, protected, social etc.) is to be obtained from the Forest Dept. In case of diversion of forest land is measured more than 5 Ha. but within 40 Ha., MoE&F Regional office may grant permission provided they have duly constituted FAC. Otherwise, the proposal will be cleared by MoE&F New Delhi. Compensatory afforestation as directed by the authority has to be undertaken in consultation with them.

58.1.8 NOC for ASI structure: ASI is responsible for protection of ASI monument within its protected boundary wall. In the buffer zone outside boundary wall up to 300m, National Monuments Authority is responsible for grant of NOC. While no new construction or re-construction within first 100m 'Prohibited' zone from the boundary wall is allowed, permission may be obtained from NMA for the project falling within next 200m 'Regulated' zone on case to case basis.

58.1.9 CRZ clearance: Clearance is required for the project area falling within CRZ

depending on CRZ category under the Coastal Regulation Zone Notification, 2011. In case the project activity is listed in the notification, permission can be granted by State CZMA. If not, the proposal shall be processed by MoE&F after forwarded by the State CZMA. Incidentally, CRZ clearance for railway project may be obtained from MoE&F.

58.1.10 Mangroves: Cutting of mangroves requires clearance under FCA 1980. However, in certain state like Maharastra, first clearance under FCA 1980 is required from State Forest Dept. and NOC from Mumbai High Court.

58.1.11 Quarry & Burrow pit: According to the circular issued by MoE&F, lease of minor minerals including quarrying irrespective of land size, may be granted by the State Govt. authority but after environmental clearance from MoE&F.

58.1.12 Any other statutory environmental notification issued by MoE&F time to time.

PENALTY AND AWARDS

PART- V
PENALTY AND AWARDS

59.0 Charges to be recovered from contractor for unsafe act or violation of condition

59.1 DFCCIL aims to build an image of one of the best safety conscious organization. Any reportable accident (fatality/injury) results in loss of life and/or property damage but also damages the reputation of the organization. Most of the accidents are avoidable and caused preliminary due to contractors negligence. Hence DFCCIL shall recover the cost of damages from the contractors for every reportable incident (fatality /injury).

59.2 In addition every DFCCIL work site is exposed to public scrutiny as the work is executed just on the right-of-way. Any unsafe act/unsafe condition observed by public further damages DFCCIL reputation. Because of the non-voluntary compliance of contractors to the condition of contract on SHE and project SHE manual. DFCCIL has introduced an enforcement system design to influence the contractor's decision making and risk management process in favor of compliance rather than non conformance.

59.3 The following table indicates the Safety, Health and Environment violations (unsafe act/unsafe condition) that will warrant charges to be recovered from contractors. Penalties shall be applied to the contractor following repetitive failure to comply with the SHE manual or employer's direct instructions. Where awarded by the employer penalties shall be deducted from the contractor's running bill.

Sl. No.	Topic	Unsafe Act/Unsafe Condition	Deductible Amount
1.	SHE Policy & Plan	i. SHE Policy a. non-compli ance of clause 4.1 b. Inadequate coverage, not signed c. Not displayed at prominent locations ii. SHE Plan: a. Not as per Employers' content and coverage b. Delay in submission c. Not updated as per employer's instruction as per clause 4.4 d. Copies not provided to all required supervisors/ engineers	Rs. 5000 per single violation, compounded to a maximum of Rs. 25000 at any single instance. Rs. 1,00,000 per single violation, compounded to a maximum of Rs. 2,00,000 at any single instance.

Sl. No.	Topic	Unsafe Act/Unsafe Condition	Deductible Amount
2.	SHE Organization	i. Not complying to the minimum manpower requirements as mentioned in General Instruction DFCCIL/SHE/001/MPR/281105 ii. Not filling up the vacancies created due to SHE personnel leaving the contractor within 14 days. iii. iii. SHE organization not provided with required Audio-visual and other equipment as per General Instruction DMRS/SHE/012/AVE/281105 iv. Employing through outsourcing agencies and SHE personal are not in the payroll of the main contractor v. Disobedience/improper conduct of any SHE personnel. vi. Chief SHE Manager not reporting directly to CPM of contractor.	i. Rs. 100000 per month for first month and Rs. 200000 for subsequent months ii. Rs. 50000 per month for first month and Rs. 100000 for subsequent months For items iii, iv, v and vi, Rs. 50000 for first violation and Rs. 100000 for subsequent violations
3.	SHE committees	i. Failed to formulate or conduct SHE committee meeting for any month ii. Contractor and Sub-contractor representatives not attending SHE Committee meetings. iii. Failed to conduct Site inspection before conducting SHE committee meeting iv. Failed to send SHE Committee Meeting minutes or Agenda to Employer in time. v. Non-adherence of clause 7.7.1. vi. Non-adherence of Clause 7.9.	i. Rs. 100000 for the first violation and Rs. 500000 for the subsequent violations ii. Rs. 5000 to the contractor of the member who had not attended the meeting for first violation and Rs. 25000 for subsequent violations. For item iii, iv, v, and vi, Rs. 25000 for first violation and Rs. 50000 for subsequent violations
4.	ID card	i. non-adherence of clause 8.1, 8.2 and 8.3	Rs. 100000 for first violation and Rs. 200000 for subsequent violations.

Sl. No.	Topic	Unsafe Act/Unsafe Condition	Deductible Amount
5.	SHE Training	non complying to the requirements as mentioned in conditions of contract on SHE and project SHE manual with regard to: a. Induction training not given b. Supervisor/engineer/ manager training not conducted as per clause 9.6 c. Refresher training as per clause 9.7 and 9.11 not conducted d. Tool-box talk not conducted as per clause 9.8. e. Skill development training not conducted as clause 9.9 f. Daily Safety Oath not conducted as per clause g. Top management behavior based SHE training conducted	For item a to g Rs. 50000 for first violation on and Rs. 100000 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 10.0. ii. Non compliance of clause 10.3.6	Rs. 50000 for first violation and Rs. 100000 for subsequent violations
7.	SHE audit	Internal Audit: MARS i. Not conducted as per SHE Plan ii. iReport not sent to Employer Action not taken for any month External Audit iv Not conducted as per SHE Plan v Report not sent to Employer vi Action not taken for any month	For item i. to iii. Rs. 50000 for first violation and Rs. 100000 for subsequent violations. For item iv to vi Rs. 100000 for first violation and Rs. 200000 for subsequent violations.
8.	SHE Communication	i. Important days to be observed for SHE awareness as furnished by employer not observed ii. Posters as furnished by Employer not printed and displayed	i. Rs. 10000 for first violation and Rs. 50000 for subsequent violations ii. 200000 per contract.
9.	SHE Submittals	i. Non compliance of clause 13.1 ii. Non compliance of clause 13.2 iii. Non compliance of clause 13.3	For item i. Rs. 50000 for first violation and Rs. 100000 for subsequent violations For item ii and iii Rs. 100000 for first violation and Rs. 200000 for subsequent violations

Sl. No.	Topic	Unsafe Act/Unsafe Condition	Deductible Amount
10.	Injury and Incidence reporting	i. Fatal accidents ii. Injury accident iii. Abnormal delay in reporting accidents of willful suppression of information about any accidents/dangerous occurrence as per clause 14.1.4 iv. Delay in informing about any accidents/ dangerous incidents. v. Non-compliance of the clause 14.4	i. Rs. 500000 for first fatality and Rs. 100000 for every subsequent fatality. ii. Rs. 100000 for first grievously injured person and Rs. 200000 for every subsequent grievously injured person (grievous injury as defined by Workmen Compensation Act) iii. Rs. 100000 for first violation and Rs. 200000 for subsequent violations for items iv and v Rs. 50000 for first violation and Rs. 100000 for subsequent violations
11.	Emergency Preparedness plan	Non – compliance of the clause 15.1, 15.2, 15.3, 15.4, 15.5 and 15.6	Rs. 100000 for non-compliance of any of the clauses
12.	Housekeeping	i. Housekeeping maintenance register not properly maintained up to date ii. Surrounding areas of drinking water tanks/ taps not hygienically cleaned/maintained iii. Office, stores, toilet/urinals not properly cleaned and maintained. iv. Required dustbins at appropriate places not provided / not cleaned. v. Stairways,gangways, passageways blocked. vi. Lumber with protruding nails left as such vii. Openings unprotected viii. Excavated earth not removed within a reasonable time. ix. Truck carrying excavated earth not covered/tyres not cleaned. x. Vehicles/equipment parked/ placed on roads obstructing free flow of traffic. xi. Unused surplus cables/steel drums lying scattered xii. Scraps lying scattered xiii. Wooden scraps, empty wooden cable xiv. Water stagnation leading to mosquito breeding	Rs. 10000 per single violation Compounded to a maximum of Rs. 100000 at any single instance

Sl. No.	Topic	Unsafe Act/Unsafe Condition	Deductible Amount
13.	Working at height/ Ladders and Scaffolds	i. Not using or anchoring Safety Belt ii. Not using Safety Net iii. iii.Absence of life line or anchorage point to anchor safety belt iv. Non-compliance of clause 18.17. v. Using Bamboo ladders. vi. Painting of ladders vii. Improper usage (less than 1m extension above landing point, not maintaining 1:4 ratio) viii. Aluminum ladders without base rubber bush. ix. Usage of broken/week ladders. x. Usage of re-bar welded ladders. xi. Improper guardrail, toe board, barriers and other means of collective protection xii. Improper working platform xiii. Working at unprotected fragile surface xiv. .Working at unprotected edges.	Rs. 10000 per single violation Compounded to a maximum of Rs. 100000 at any single instance
14.	Lifting appliances and gear	i. Non availability of fitness certificate as per clause 21.3 ii. Documents not displayed on the machine or not available with the operator as per clause 21.4 iii. Maximum Safe Working Load not written on the machine as per clause 21.5 iv. Non compliance of 21.6 v. Non compliance of 21.7 vi. Automatic safe load indicator not provided or not in working condition as per clause 21.8 vii. Age of the operator less than 21 years or without any licence and non-compliance of other item as per clause 21.9 viii. Non-compliance of 21.10 ix. Non-compliance of any of the items mentioned regarding rigging requirements as per clause 21.11. x. Failure to submit method statement in case of all critical lifting. xi. Person riding on crane. xii. Creating more noise and smoke xiii. Absence of portable fire extinguisher in driver cabin xiv. Fail to guard hoist platform xv. No fencing of hoist rope movement area xvi. Hoist platform not in the horizontal position	Rs. 50000 per single violation Compounded to a maximum of Rs. 500000 at any single instance

Sl. No.	Topic	Unsafe Act/Unsafe Condition	Deductible Amount
15.	Launching operation	Non-adherence of any of the provisions mentioned in clause 22.2	Rs. 50000 for first violation and Rs. 100000 for subsequent violations.
16.	Site Electrical safety	i. Non-compliance of clause 26.1.1 ii. iNon-compliance of clause 26.2.4, 26.2.5 iii. Non-compliance of clause 26.3.1 iv. iNon-compliance of clause 26.7, 26.8 and 26.9.1 v. Non-compliance of clause 26.10 and 26.13 vi. Non-compliance of clause vii. Exposed electric lines (fermentative damage) and circuits in the workplace viii. Inserting of bare wires into the socket ix. Improper grounding for the electrical appliances x. Electrical cables running on the ground xi. Non-compliance clause 27.0	Rs. 10000 per single violation compounded to a maximum of Rs. 100000 at any single instance
17.	Hand tools and Power tools	Non-compliance of clause 28.0	Rs. 10000 per single violation compounded to a maximum of Rs. 100000 at any single instance.
18.	Gas cutting	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 conditions. iv. Fail to put cylinders in a cylinder trolley. v. Damaged hose. vi. Using domestic LPG cylinders. vii. Fail to store cylinder 6.6m away from fire prone materials. viii. Fail to use hose clamps ix. Fire extinguisher not placed in the vicinity during operation.	Rs. 10000 per single violation compounded to a maximum of Rs. 100000 at any single instance.
19.	Welding	i. Voltameter and Ammeter not working ii. Improper grounding and return path. iii. Damaged welding cable iv. Bare openings in the cable. v. Non-availability of separate switch in the transformer vi. Non-availability of main switch control to switch off power to the welding unit. vii. Usage of reinforcement rod as return conductor viii. Damaged holder ix. Fire extinguisher not placed in the vicinity during operation.	Rs. 10000 per single violation compounded to a maximum of Rs. 50000 at any single instance.

Sl. No.	Topic	Unsafe Act/Unsafe Condition	Deductible Amount
20.	Fire precaution	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.	Rs. 5000 per single violation compounded to a maximum of Rs. 25000 at any single instance.
21.	Excavation, Tunneling and confined space	i. Non-compliance of clause 34.1.1 ii. Non-compliance of clause 34.2.3 iii. Non-compliance of clause 34.3	For any item from I & ii Rs. 10000 per single violation compounded to a max of Rs. 50000 at any single instance. Rs. 10000 per first violation and Rs. 50000 for subsequent violations.
22.	Work Permit system	i. Non-compliance of clause 35.2 ii. Non-compliance of clause 21.11.9	For item I & ii Rs. 50000 per first violation and Rs. 100000 for subsequent violations
23.	Traffic	i. Non-compliance of clause 36.4.1 ii. Non-compliance of clause 36.8.3 iii. Non-compliance of clause 36.9.2 iv. Non-compliance of clause 36.9.3 v. Non-compliance of clause 36.9.7 vi. Non-compliance of clause 36.9.8	Rs. 100000 per first violation and Rs. 200000 for subsequent violation
		a. Barricades i. Not cleaned ii. Not in alignment iii. Not numbered iv. Not painted v. Red light/ reflector nor working vi. Damage not repaired vii. Not secured properly viii. Barricade inspector not employed ix. Potruding part/ portion not repaired x. Barricade maintaining register not properly maintained	Rs. 25000 per single violation compounded to a max of Rs. 100000 at any single instance

Sl. No.	Topic	Unsafe Act/Unsafe Condition	Deductible Amount
		b. Contractor vehicle i. Over loading of vehicles ii. Unfit drivers or operators iii. Unlicencsed vehicles iv. Absence of traffic marshals v. Absence of reversing alarm vi. Absence of fog light (at winter) 1. vii Power/hand brakes not in working condition.	Rs. 25000 per single violation Compounded to a maximum of Rs. 100000 at any single instance
		c. Splashing of Bentonite on roads/ non cleaning of tyres of dumpers and transit mixers i. Mishandling of bentonite like splashing of bentonite outside specified width of barricading ii. Non-cleaning of tyres of dumpers and transit mixers before leaving the site and thereby creating a traffic safety hazard to road users.	For item i. and ii. a. Rs. 100000 on first observation. b. Rs. 200000 on second observation. c. Rs. 300000 on third and subsequent observations.
24.	Batching plant/Casting yard	Non-adherence of any of the provision mentioned in clause 38.0	Rs. 10000 for single violation compounded to a maximum of Rs. 100000 at any single instant.
25.	PPE	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 vi. Using for other operation (e.g. Using safety helmet for storing materials or carrying water from one place to other) vii. Not conforming to BIS standard viii. Non-compliance of clause 39.6, 39.7 and 39.8	From item i. to vi. Rs. 200 per single violation For item vii. Rs. 10000 for first violation and Rs. 50000 for subsequent violations For item viii. Rs. 50000 for first violation and Rs. 100000 for subsequent violations.

Sl. No.	Topic	Unsafe Act/Unsafe Condition	Deductible Amount
26.	Occupational Health	i. Fail to conduct Medical examination to workers. ii. Absence of ambulance van & room iii. Workers not having ID card iv. Inadequate number of toilets v. toilets not cleaned properly vi. Absence of water facilities for toilets and washing places vii. Toilet placed more than 500m from the work site. viii. Absence of drinking water ix. Absence of first-aid person in work site. x. Absence or inadequacy of first- aid box. xi. Misuse of first-aid box. xii. First-aid box not satisfy the minimum xiii. Smoking inside the construction site xiv. Drink and drive or work. xv. Excessive noise and vibration xvi. Canteen not provided xvii. Food stuff not served on no loss no profit basis. xviii. Creche not provided. xix. Accommodation not provided as per BOCWA xx. Fumigation / insecticides not sprayed to prevent Mosquito breeding xxi. Non-compliance of clause 44.1 and 44.2	Rs. 10000 per single violation compounded to a maximum of Rs. 100000 at any single instance.
27.	Labour welfare measures	i. Non-adherence of Labour Welfare provisions of BOCWA ii. Fail to register establishment and display the registration number & certificate at work place iii. Absence of workers register and records iv. Absence of muster-roll and wages register v. Fail to display an abstract of BOCWA and State BOCWR	Rs. 10000 per single violation compounded to a max of Rs. 50000 at any single instance.
28.	Environmental Management	i. Tyre wash facility not provided ii. Spillage from vehicles not arrest iii. Air monitoring not practiced iv. Noise monitoring not practiced v. The values of air monitoring and noise monitoring not with in acceptable limits vi. Dust control measures at sites not practiced vii. Improper disposal of debris/residues	Rs. 10000 per single violation compounded to a maximum of Rs. 50000 at any single instance

Sl. No.	Topic	Unsafe Act/Unsafe Condition	Deductible Amount
29.	Working near existing railway track	i. To start work without erecting barricading as per requirement. ii. To start work in station area without permit to work or without approved plan. iii. To launch girder for RFO/ROB without approved plan and work permit. iv. Infringment of moving dimension by any vehicle / construction equipment with running train causing disruption of traffic, injury to passenger / fatal incidence.	Rs. 500000 for first violation and Rs. 1000000 for subsequent violation.

59.4 Without limiting to the unsafe acts and or conditions mentioned above in clause 59.3 the Employer shall have the right to deduct charges for any other unsafe act and or condition depending upon the gravity of the situation on a case-to-case basis. The charges shall be in comparison with that of the similar offence indicated in clause 59.3.

60.0 Stoppage of work

60.1 The employer shall have the right to stop the work at his sole discretion, if in his opinion the work is being carried out in such a way that it may cause accidents and endanger the safety of the persons and/or property, and / or equipment. In such cases, the contractor shall be informed in writing about the nature of hazards and possible injury/accident.

60.2 The contractor shall not proceed with the work until he has complied with each direction to the satisfaction of Employer

60.3 The Contractor shall not be entitled for any damages/compensation for stoppage of work, due to safety reasons and the period of such stoppage of work shall not be taken as an extension of time for Completion of the Facilities and will not be the ground for waiver of levy of liquidated damages.

61.0 Awards

The following categories will be considered for awards as per the scheme in practice of Employer

i. For every safe million man hour working without any reportable incidents.
ii. Zero fatality contracts.
iii. 100% adherence to voluntary reporting of all accidents throughout the currency of contract.
iv. Safest project team of the year.
v. Best SHE team of the year.
vi. Safest Contractor of the year.

APPENDICES

Appendix No. 1

Memorandum of Understanding between Dedicated Freight Corridor Corporation of India Ltd and the Contractor for safe execution of contract work

This memorandum of Understanding is made and executed by and between DFCCIL, a Company registered under the Companies Act. 1956 and having its registered office at 5th Floor Pragati Maidan Metro Station Complex New Delhi -110001 or their authorized representative(s), hereinafter referred to as "EMPLOYER" (which expression shall wherever the context so requires or admits be deemed to mean and include its successors in business and assigns) of the one party

AND

M/s _____ having its registered office at _____ _____ hereinafter

referred to as the "CONTRACTOR" (which expression shall wherever the context so requires or admits be deemed to mean and include its successors in business and assigns) of the other party.

WITNESSETH THAT

WHEREAS the EMPLOYER gives highest importance to the occupational safety, health and environment during execution of work, seeks cooperation from the CONTRACTOR in this endeavour.

Thus, this Memorandum of Understanding is for promoting the safety, health and environment aspects required to be followed at workplace/site and will be applicable to any site job to be done by the CONTRACTOR.

AND

WHEREAS the CONTRACTOR has read all the terms and conditions of the EMPLOYER and whereas the CONTRACTOR has studied the following documents:

a. Tender Documents, including Notice Inviting Tender, General Conditions, Special Conditions.
b. Conditions of Contract on Safety, Health and Environment and Safety, Health and Environment Manual of DFCCIL.
c. Building and Other Construction Workers (Regulations of Employment and Conditions of Service) Act 1996, Central Rules 1998 .and Building and Other Construction Workers Welfare Cess Act 1996 and Rules1998
d. Indian Electricity Act 2003 and Rules 1956.
e. The Factories Act, 1948
f. Corresponding International/Bureau of India Standard Codes.

The amendments to any of the above rules and any other rules & regulations or procedures, circulars, notices & advices laid down by the EMPLOYER from time to time.

Now it is hereby AGREED AND DECLARED by and between the EMPLOYER and the CONTRACTOR as Follows:

Clause - I The CONTRACTOR shall abide by the terms and conditions stipulated in Condition of Contract on Safety, Health & environment and Safety, Health & Environment Manual of DFCCIL.

Clause - II The CONTRACTOR shall undertake full responsibility for safe execution of job at work place/site and safety of his personnel and members of public.

Clause - III Without giving any prior notice, the EMPLOYER shall from time to time be entitled to add/or amend any or all terms and conditions with a view to improving safety and occupational health of personnel and safety of work, with immediate effect and the same shall be binding on the CONTRACTOR. The contractor agrees to implement all such amendments, which shall be laid down by the EMPLOYER.

Clause - IV Besides following the guidelines, safety rules and regulations, safety codes given in various safety procedures/documents mentioned above, the CONTRACTOR shall also prepare detailed method statement which includes job safety analysis wherever there are complicated and hazardous/high risk working involved and get it approved from Employer before execution of work. The Contractor shall follow Works Manual of the Employer, Material Safety Data Sheet (MSDS) of chemicals and Instruction Manual of equipment for safe handling.

Clause - V Any negligence or violation in implementing any of the provision of the conditions of contract on Safety, Health & Environment and DFCCIL project Safety, Health & Environment Manual shall be viewed seriously and the contractor is liable to compensate the employer for the loss of reputation. The cost of damage shall be fixed on case-to-case basis.

In witness thereof the Parties hereto by representatives duly authorized have executed this Memorandum of Understanding on day of_____20____

Signed on	Signed on
For and on behalf of DFCCIL	For and on behalf of Contractor
---	---
Signature:	Signature:
Name:	Name:
Title:	Title:

Appendix No. 2

Safety, Welfare and Occupational Health requirements as per BOCW Act 1996 and Rules 1998.

(This list has been prepared in chronological order with primary importance to Section of Act and secondary importance to Rules)

S - Refers relevant Sections in BOCWA R –
R - Refers relevant Rules in BOCWR C –
C - Refers relevant Chapter No. in BOCWR

Sl. No.	Items	Relevant Sections / Rules in BOCWA and BOCWR (Rule Number indicated here is from Delhi BOCWR as reference. Relevant Rules of concerned State BOCWR shall be applicable)
1.	Registration of establishment	S - 7, R - 23 to 27
2.	Display of registration certification at workplace	R - 26 (5)
3.	Hours of work	S-28, R-234 to 237
4.	Register of overtime	S-28, S-29, R-241(1) form XXII (119)
5.	Weekly rest and payment at rest	R-235
6.	Night shift	R-236
7.	Maintenance of workers registers and records	S-30 R-238 (119)
8.	Notice of commencement and completion	S-46 R-239
9.	Register of persons employed as building workers	R-240
10.	Muster roll and wages register	R-241(1)(a); FORM XIX, XX, XXI (120)
11.	Payment of wages	R-248
12.	Display of notice of wages regarding	R-249
13.	Register of damage or loss	R-241(1)(a); Form XIX, XX, XXI
14.	Issue of wages book	R-241(2)(a); Form XXII
15.	Service certificate for each workers	R-241(2)(b); Form XXIV
16.	Display an abstract of BOCWA and BOCWR	R-241(5)
17.	Annual return	R-242; Form XXV
18.	Drinking water	S-32
19.	Latrines and Urinals	S-33 R-243
20.	Accommodation	S-34

Sl. No.	Items	Relevant Sections / Rules in BOCWA and BOCWR (Rule Number indicated here is from Delhi BOCWR as reference. Relevant Rules of concerned State BOCWR shall be applicable)
21.	Creches	S-35
22.	First-aid boxes	S-36, R-231 and Schedule III
23.	Canteens	S-37 R-244
24.	Food stuff and other items served in the canteens	R-245
25.	Supply of tea and snacks in work place	R-246
26.	Food charges on no loss no profit basis	R-247
27.	Delhi BOCW welfare Board Rules	R-250 to 296
28.	Safety committee	S-38 R-208
29.	Safety officer	S-30, R-209 and Schedule VII
30.	Reporting of accidents and dangerous occurrences	S-39, R-210
31.	Procedure for inquiry in to the causes of accidents	R-211
32.	Responsibility of employer	S-44 R-5
33.	Responsibility of Architects, Project engineer and Designers	R-6
34.	Responsibility of workmen	R-8
35.	Responsibility for payment of wages and compensation	S-45
36.	Penalties and procedures	S-47, S-55
37.	Excessive noise, vibration etc.	R-34
38.	Fire Protection	R-35
39.	Emergency action plan	R-36
40.	Fencing of motors	R-37
41.	Lifting of carrying of excessive weight	R-38
42.	Health, Safety and Environmental Policy (of DFCC is available on website)	R-39
43.	Dangerous and Harmful Environment	R-40
44.	Overhead protection	R-41
45.	Slipping, Tripping, Cutting, Drowning and Falling Hazards	R-42
46.	Dust, Gases, Fumes, etc.	R-43
47.	Corrosive substance	R-44
48.	Eye Protection	R-45
49.	Head Protection and other protection apparel	R-46, R-54
50.	Electrical Hazards	R-47
51.	Vehicular traffic	R-48
52.	Stability of structure	R-49
53.	Illumination	R-50; R-124
54.	Stacking of materials	R-51

Sl. No.	Items	Relevant Sections / Rules in BOCWA and BOCWR (Rule Number indicated here is from Delhi BOCWR as reference. Relevant Rules of concerned State BOCWR shall be applicable)
55.	Disposal of debris	R-52
56.	Numbering and marking of floors	R-53
57.	Lifting appliances and gears	C-VII; R-55 to 81
58.	Runways and Ramps	C-VII; R-82 to 85
59.	Working on or adjacent to water	C-IX; R-86 to 87
60.	Transport and earthmoving equipment	C-X; R-88 to 95
61.	Concrete work	C-XI; R-96 to 107
62.	Demolition	C-XII; R-108 to 118
63.	Excavation and Tunnelling works	C-XIII; R-119 to 168
64.	Ventilation	R-153
65.	Construction, repair and maintenance of step roof	C-XIV; R-169 to 171
66.	Ladders and step ladders	C-XV; R-172 to 174
67.	Catch platform and hoardings, chutes, safety belts and nets	C-XVI; R-175 to 180
68.	Structural frame and formworks	C-XVII; R-181 to 185
69.	Stacking and unstacking	C-XVIII; R-186 to 187
70.	Scaffold	C-XIX; R-188 to 205
71.	Cofferdams and Caissons	C-XX; R-206 to 211
72.	Explosives	C-XXI; R-212 to 213
73.	Piling	C-XXII; R-214 to 222
74.	Medical Examination for building and other construction worker, Crane operator an Transport vehicle drivers	R-81; R-223(a)(iii) and Schedule XII
75.	Medical examination for occupational health hazards	R-233(a)(iv)
76.	Charging of workers for medical examination	R-223(b)
77.	Occupational health centres and Medical	R-225 and Schedule X
	officers	& XI
78.	Ambulance van & room	R-226 & 227 and Schedule IV & V
79.	Stretchers	R-228
80.	Occupational health service for building workers	R-229
81.	Medical examination for occupational health hazards	R-223(a)(iv)
82.	Emergency care services and emergency treatment	R-232
83.	Panel of experts and agencies	Central Rule 250 Delhi Rule 297
84.	Power of inspectors	Central Rule 251 Delhi Rule 298

Appendix No. 3

SITE SHE PLAN

Contract No.
Contractor's Name:
Project Name:

1.	**Project Highlights** i. Title of the content ii. Contractor Number iii. Brief scope of work iv. Location map/key plan v. Period of the project
2.	SHE Policy
3.	Site SHE Organization Chart Chart indicating reporting of SHE personnel
4.	Roles & Responsibility i.Project Manager ii.Construction Manager iii.Construction Supervisors iv.SHE Committee Members v.SHE Incharge vi.Site Engineers vii.First Line Supervisors viii.Sub-contractors
5.	SHE Committee i. Details - Chairman, Members, Secretary and Employer's representative ii. Procedures for effective conduct of meeting
6.	SHE Training
7.	Subcontractor Evaluation, Selection and Control
8.	SHE Inspection
9.	SHE Audit
10.	Accident and Near-miss or Dangerous Occurrence Investigation and Reporting Procedures
11.	Occupational Health Measures
12.	Labour Welfare Measures
13.	Risk assessment and mitigation procedures

14.	**Safe Work Procedures:** i. Work at height ii. Structural steel erection iii. Launching of segment iv. Floor, wall openings & stairways v. Welding, cutting & bracing vi. Lifting appliances vii. Work permit system viii. Electrical equipment ix. Mechanical equipment x. Excavation xi. Fire prevention xii. Hazardous chemical & solvent xiii. Ionising radiation xiv. Lighting xv. Abrasive blasting
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 Management
21.	Emergency Management
22.	Visitors and Security arrangement

Appendix No. 4

WORKPLACE POLICY ON HIV/AIDS PREVENTION & CONTROL FOR WORKMEN ENGAGED BY CONTRACTORS

"Being mobile in and of itself is not a risk factor for HIV infection. It is the situations encountered and the behaviours possibly engaged in during mobility or migration that increase vulnerability and risk regarding HIV/AIDS."

UNAIDS, Technical update on Population, Mobility and AIDS, February 2001, p-5

Dedicated Freight Corridor Corporation of India Ltd. recognizes HIV/AIDS as a developmental challenge and realizes the need to respond to it by implementing regular HIV/AIDS prevention programmes and creating a non-discriminatory work environment for HIV infected workmen engaged by contractors. For the purpose of making conscientious, sensitive and compassionate decision in addressing the realities of HIV/AIDS, DFCCIL has established these guidelines based on ILO code of practice on HIV/AIDS.

- Creating awareness through professional agency using IEC (Information, Education and Communication) package specially designed for migrant workers.
- Institutional capacity building by training the project implementation team, Safety, Health & Environment (SHE) Managers, establishing linkages for deficient diagnosis and treatment of the affected workers, effective monitoring of implementation and documentation for further learning.
- Establishing peer educators by selecting them in consultation with contractors and training them through professional agencies so that they become focal point for any information, education and awareness campaigns among the workmen throughout the contract period.
- Promotion of social marketing of condoms.

GENERAL INSTRUCTIONS

MINIMUM MANPOWER REQUIREMENTS OF SHE ORGANIZATION BASED ON CONTRACT VALUE

	1	2	3	4	5	6
Contract Value (Rs. In Cr.)	**Chief SHE Manager/ Head**	**Sr. SHE Manager**	**SHE Manager**	**Safety Steward**	**Sr. SHE Electrical Engineer**	**SHE Electrical Engineer**
Up to 2	-	-	1	Refer Note 1	-	1
>2 -10	-	1	Refer Note 1		1	Refer Note 2
>10 - 25	1	Refer Note 1			1	
>25 - 100	1				1	
>100 - 250	1				1	
>250	1				1	

	7	8	9	10	11	12	13
Contract Value (Rs. In Cr.)	**SHE(Fire) Engineer / Sr. SHE(Fire) Engineer**	**O.H. Officer with noshing assistants (refer note 3)**	**Env Engineer**	**Sr. SHE (Traffic) Engineer (refer note 4)**	**Barricade maint. Squad (refer note 4)**	**House keeping squad**	**Labour welfare officer**
Up to 2	-	-	-	-	Refer note 5	Refer note 6	-
>2 -10	-	1 (PT)	1	1			1
>10 - 25	1	1 (PT)	1	1			1
>25 - 100	1	1 (PT)	1	1			1
>100 - 250	1	2 (FT)	1	1			1 (with support Staff)
>250	2	2 (FT)	1 (with support staff)	1			1 (with support Staff)

Note:

1. Adequate, qualified and trained SHE Professionals with required support staff to be deployed at each worksite at each shift.
2. Adequate, qualified and trained Electrical Engineers/supervisors to be deployed at each worksite at each shift.

3. (PT) means Part-Time and (FT) means Full-time
4. Senior SHE (Traffic) Engineer Post and Barricade Manager (including the staff) Posts are applicable to contracts where the work has to be executed either below or over the right-of-way like Viaduct, Tunnel Contracts wherein erection and maintenance of barricades are paramount important.
5. One Barricade Manager supported by required supervisors and workmen
6. One Housekeeping Manager supported by required supervisors and workmen

General Instruction: **DFCCIL/SHE/GI/02**

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

Sl. No.	Designation	Qualification	Experience (in Years)
1.	Chief SHE Manager / Head, SHE	Any of the following: i. 1 Year full time course in Industrial Safety from CLI under DG FASLI Min. of Labour after Graduation in Engineering from a recognized University ii. Post Graduate Diploma in Industrial Safety & Environmental Management (PGDISME) from National Institute of Industrial Engineering, Mumbai. iii. M.E. in Industrial Safety from NIT, Trichy, iv. M.E. in Industrial Safety from Mepco Schlenk Engineering College, Sivakasi, Tamil Nadu v. B.E.(Fire) from National Fire Services College and 1 year Course on Industrial Safety from CLI. vi. B.E. in Fire and Safety Engg. From Cochin / Indore University vii. B.E./ B.Arch with one year full time advanced Safety diploma from NICMAR, Hyderabad. viii. B.E./B.Tech., with one other equivalent State and Central Govt. recognized full time Degree/ Diploma in Safety. ix. International qualifications like CSP (Certified Safety Professional), NEBOSH, MIOSH, MSISO etc.	2 {or all category except (iv) and 5 yrs for category (iv)}
2.	Senior SHE Manager (Refer Note 3)	1. As given in Sl. No.1 or the following categories: i. B.Sc. (Physics/Chemistry/Maths) with one year Full Time advanced Safety diploma from NICMAR, Hyderabad. ii. B.Sc./Diploma in Engg. With advanced Safety Management Diploma from CLI/RLI/ Mumbai/Chennai/ Kolkata and Kanpur. iii. B.Sc. (Physics/Chemistry/Maths) with One year Full Time diploma in Safety Engineering offered by West Bengal State Technical Education Departments and similar courses by other states. iv. Any Graduate or diploma holder with 7 years of work experience in full fledged SHE department of any Public Sector/Leading Private Sector/MNC/with prior approval of employer on a case to case basis	2 {for category (i), (ii) and (iii) only}
3.	SHE Manager (Refer Note 3)	i. Degree in Science/Diploma in Engineering with Govt. recognized safety diplomas from Correspondence course of NICMAR, Annamalai University, National and State Productivity Councils, other state Technical Education Boards etc. ii. Any Graduate or diploma holder with 5 years of work experience in full fledged SHE department of any Public Sector/Leading Private Sector/MNC/ with prior approval of employer on a case to case basis	2 (for category (i) only)

Sl. No.	Designation	Qualification	Experience (in Years)
4.	Safety Steward (refer note 3)	Basic SHE related certificate	2
5.	Sr. SHE Electrical Manager	Degree in Electrical Engg. And Govt. recognized electrical licence	2
6.	SHE Electrical Manager	Diploma in Electrical Engg. And Govt. recognized electrical licence	1
7.	Sr. SHE (Fire) Manager	Any of following: i. B.E.(Fire) from National Fire Services College Nagpur ii. B.E.(Fire & Safety) from Cochin / Indore University	2 for category (i) & (ii) only
8.	SHE (Fire) Manager	Diploma in Fire or industrial safety	1
9.	OH officer	MBBS degree / Diploma in industrial/ occupational health	1
10.	Environment Manager	Masters degree in Environmental Management/ Environmental Engineering/ Environmental Science	2
11.	Sr. SHE Traffic Engineer	PG Degree/ Diploma in traffic / transportation engineering/ planning	1
12.	House keeping squad Manager	Dip. In engineering	1
13.	Barricade Manager	Dip. In engineering	1
14.	Labour Welfare Officer	Degree/ PG Diploma after graduation in Labour welfare/ industrial relation	2

Note

1. In extraordinary case where the candidate had earlier worked in DFCCIL projects, he/ she can be considered for following posts:
   i. Sr. SHE Manager
   ii. SHE Manager
   iii. Safety Steward
   Subject to qualification & number of years of experience on a case to case basis even they may not possess prescribed qualification.
2. In all cases other than the list at 1 above, candidate with experience irrespective of DFCCIL can apply.

MINIMUM REQUIREMENTS OF THE SHE MONITORING AND AUDIO-VISUAL EQUIPMENT

1. For the purpose of minimum requirements of audio-visual and other equipment the contracts are categorized into following groups:

   Contract value (initial contract value) Rs. In Cr.

	Group
Up to 25	A
>25 – 100	B
>100-250	C
>250	D

2. Every contractor falling into above groups shall provide the following minimum required audio visual aids for conducting monthly safety committee and other post review meeting of all fatal and major incidences effectively. These audio-visual equipment are a must for conducting periodical in-house safety presentations in the training programme.
3. In addition to the above portable land held digital sound level meter (SLM) and protable hand held digital lux meter are also provided.

Sr. No.	SHE monitoring audio-visual equipment	Equipment required for Group			
		A	B	C	D
1	SLM	1	1	1	1
2	Lux Meter			1	1
3	Lap top computer with standard configuration including multi-media facilities	1	1	1	1
4	Colour printer	1	1	1	1
5	Computer projector with screen	1	1	1	1
6	Overhead projector	1	1	1	1
7	35mm camera for accident investigation photo	1	1	1	1
8	Digital camera with flash of min 4 mega pixel & video facility	1	1	1	1
9	Digital still camera with flash of min 4 mega pixel	1	1	1	1
10	Portable loud speaker / loud hailer for tool box talk	1	1	1	1

Sr. No.	SHE monitoring audio-visual equipment	Equipment required for Group			
		A	B	C	D
11	Mobile phone/ walkie-talkie	For all managers, engineers, supervisors working in SHE			
12	Accident investigation kit 3. Kit will contain following: a. Chalk piece for marking b. Measuring tape: • Flexible 2m length • Metal foot scale • Metal tape 30m c. Equipment tag d. Multi-purpose flash light e. Barrier tape 20m length f. Accident investigation form having checklist g. Papers for recording witnesses' statements & other notings h. Emergency phone numbers	1	1	1	1

SHE ORIENTATION TRAINING FOR WORKMEN: TOPICS FOR FIRST DAY AT WORK

1. Hazard identification procedure: Hazard on-site
   - Fall
   - Falling object
   - Working at a height
   - Earth work
   - Excavated trench
   - Electricity
   - Machinery
   - Handling of materials/ chemicals
   - Transport
   - Fire hazard
   - House keeping

2. Personal Protective equipment
   - What available?
   - Where available?
   - How to obtain?
   - Correct use & care

3. Occupational health (OH)
   - Site welfare facility
   - Potential health hazards
   - First aid / CPR

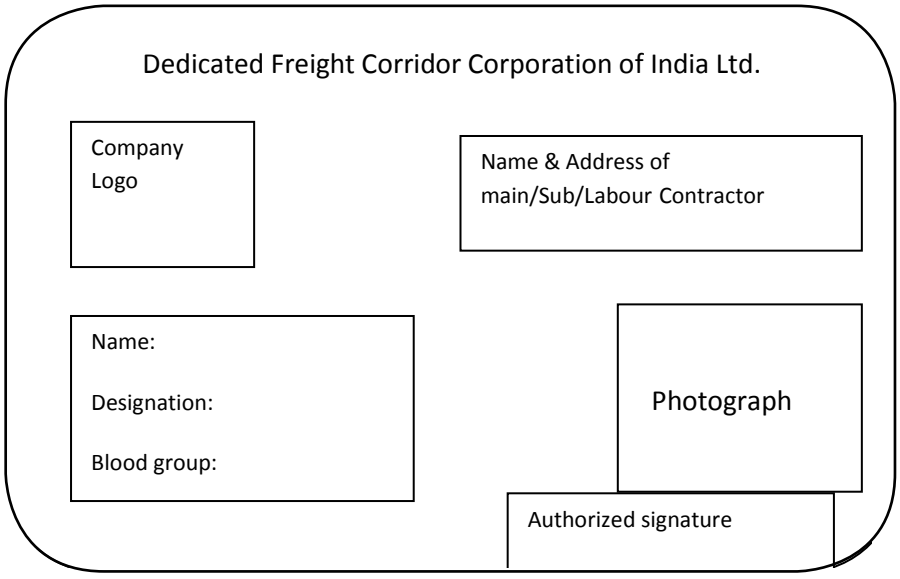
4. Duties of Contractor
   - Brief outline of Contractor's responsibilities as per the law
   - Contractor's accident prevention policy
   - DFCCIL's SHE Manual
   - Building and Other Construction Workers Act/ Rules on welfare

5. Employer's duties
   - Brief outline of Employer's responsibilities as per the law
   - Explanation of how new employee fit into Contractor's plan for accident prevention (induction & orientation)

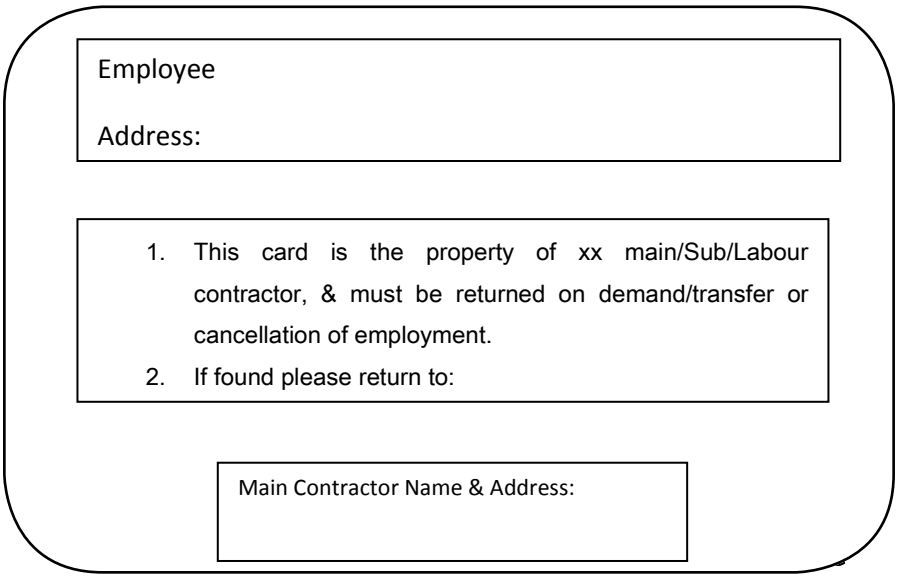
ID CARD FORMAT

(85 mm x 55 mm)

Front side of ID Card:



Back side:



SHE TRAINING DETAILS FOR MANAGERS AND SUPERVISORS

1. The Law and Safety	**2. Policy and Administration**
Statutory requirement Appropriate regulations Duties of Employer and employee	Effect of incentive on accident prevention Human relations Consultation Safety Officer: duties, aims, objectives SHE Policy
3. Safety and the Supervisor	**4. Principles of Accident Prevention**
Safety and efficient production go together Accidents affect morale and public relations	Attitudes of management, supervision and operations Methods of achieving safe operations Accident and injury causes
5. Site Inspection	**6. Human Behavior**
The role of management. Hazard Identification Procedure. Records results Follow-up procedures Feedback	Motivating agencies Individual behavior Environmental effects Techniques of persuasion
7. Site housekeeping	**8. Health**
Site organization Relationship of site housekeeping to accident occurrence Site access Equipment storage Material stacking Materials handling	Medical examination Hazard to health on site Sanitation and welfare Protective clothing First Aid/CPR
9. Personal Protective Equipment	**10. Electricity**
Eye, face, hands, feet and legs, Respiratory protective equipment, Protection against ionizing radiation	Appreciation of electrical hazards Power tools Arc welding Low voltage system Lighting and power system on sites ELCB, RRCB, Grounding/Ground fault circuit interrupters (GFCIs)

11. Oxygen and Acetylene Equipment	**12. Equipment**
Cylinder storage and maintenance Condition and maintenance of valves, regulators, and gauges Condition and maintenance of hoses and fittings Pressures	Accidents related to moving parts of machinery Appreciation of principles of guarding Importance of regular maintenance
13. Transportation	**14. Excavations**
Transport to and from site Hazard connected with site transport Competent drivers Dumpers Tipping trucks Movement near excavation	Method of shoring Precautions while shoring Precautions at edge of excavations Removal of shoring Sheet steel piling, excavator operation
15. Working platforms, ladders, and Scaffolding	**16. Cranes and other lifting machines**
Hazards connected with the use of ladders Maintenance and inspection Type of scaffold Overloading Work on roofs Fragile material Openings in walls and floors Use of safety belts and nets, full body harness	Licensing, certification and training required for operation of cranes Slinging methods Signaling Access to cranes(s) Maintenance and examination Ground conditions Hazards and accident prevention methods connected with the use of different types of cranes/heavy equipment Crane Lift Plan for all lifts
17. Lifting Tackle	**18. Fire Prevention and Control**
Slings - single and multi-legged Safe working loads (SWLs) Safety hooks and eyebolts Cause of failure Maintenance and examination	Principle causes determining fire Understanding fire chemistry Fire fighting equipment Fire fighting training
19. Communications	
Effective methods of communication (particular interest to non-English speaking workers) Method and preparation of reports Safety committees Safety meeting	

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.)**
March	Red Cross Month
4th March	National Safety Day
7th April	World Health Day
14th April	Fire Safety Day
April 18 to 22	Earth Week
20th April	Earth Day
20th April	Noise Awareness Day
28th April	ILO World Day for Safety and Health at Work Day
May 1 to 7	Emergency Preparedness Week
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

General Instruction: **DFCCIL/SHE/GI/08**

MINIMUM REQUIREMENTS OF SHE COMMUNICATION POSTERS/ SIGNAGES/ VIDEO

1. For purpose of minimum requirements of SHE communications, posters/ signages/ video, the contracts are categorized into following groups:

Contract Value (Rs. In Cr.)	**Group**
Up to 25	A
>25- 100	B
>100-250	C
.250	D

2. Every contractor falling under above groups shall prepare a SHE communication plan as a part of site specific SHE Plan and include following minimum requirement posters/ signages / video as applicable. In case ready made posters are available in any category from National Safety Council or any other safety organization, the same may be procured and displayed. In case ready made posters are not available, the contractor shall make necessary arrangements to get posters designed, printed on their own. All these are to be detailed in the SHE Plan and approval shall be obtained from the Employer before display.

Table No. 1 – Minimum No. of Posters

Sr. No.	**Poster title**	**Min no. Of concepts in each title**	**No. of poster/ signage/ video for group**			
			A	**B**	**C**	**D**
1.	Safety culture	5	Each 10	Each 50	Each 75	Each 100
2.	Daily safety oath	1 English 1 Hindi	Each 100	Each 200	Each 500	Each 1000
3.	Mandatory use of PPE					
a.	Signage like PPE zone, non PPE zone, Helmet area etc.	2 types of metal sheet to be mounted at different locations	Each 25	Each 50	Each 75	Each 200
b.	Helmet	5	Each 25	Each 50	Each 75	Each 200
c.	shoe	5	Each 25	Each 50	Each 75	Each 200
d.	Goggles & ear protection	5	Each 25	Each 50	Each 75	Each 200

Sr. No.	Poster title	Min no. Of concepts in each title	No. of poster/ signage/ video for group			
			A	B	C	D
e	Full body harness	5	Each 25	Each 50	Each 75	Each 200
f.	Hi-Vi jacket	5	Each 25	Each 50	Each 75	Each 200
4.	Emergency Management Plan	5	Each 25	Each 50	Each 75	Each 200
5.	Working at height	10	Each 25	Each 50	Each 75	Each 200
a.	Ladder, stairway, scaffold- signage to display 'Safe', 'unsafe', fit for use', avoid use' etc.	5 types	Each 25	Each 50	Each 75	Each 200
6.	Site electricity	5	Each 25	Each 50	Each 75	Each 200
7.	Crane safety	5	Each 25	Each 50	Each 75	Each 200
8.	Sling	5	Each 25	Each 50	Each 75	Each 200
9.	Rigging procedure	5	Each 25	Each 50	Each 75	Each 200
10.	Excavation	5	Each 25	Each 50	Each 75	Each 200
11.	Occupational health (mosquito control, HIV/ AIDS awareness, dust control, noise control, no smoking/ spitting) etc.	10	Each 25	Each 50	Each 75	Each 200
12.	First aid	3	Each 25	Each 50	Each 75	Each 200
13.	Labour welfare measures	5	Each 25	Each 50	Each 75	Each 200
14.	Importance of safety handbook	1	Each 25	Each 50	Each 75	Each 200
15.	Traffic safety	5	Each 25	Each 50	Each 75	Each 200
16.	Environmental pollution monitoring	5	Each 25	Each 50	Each 75	Each 200
17.	Video on PPE use in Hindi- 15 minutes	1	-	-	-	1

Note: Item mentioned at sr. no. 17 above is video whereas items at sr. no. 3 a & 5 A are metal signage board and rest are all posters.

Table No. 2 : Size of Posters / Signages

Sr. No.	Item	Size
1.	Poster-standard	17”x22”- 135 GSM 4 colour printing
2.	Poster – special (wherever required)	17”x22”- Card laminated FA poster
3.	Poster – 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 board	Strictly as per IRC spec.

Table No. 3 : Safety signage colour code (IS: 9457)

Sr. No.	Type of signage	Colour
1.	Mandatory	Blue
2.	Danger	Yellow
3.	Prohibitory	Red
4.	Safe	Green

General Instruction: **DFCCIL/SHE/GI/09**

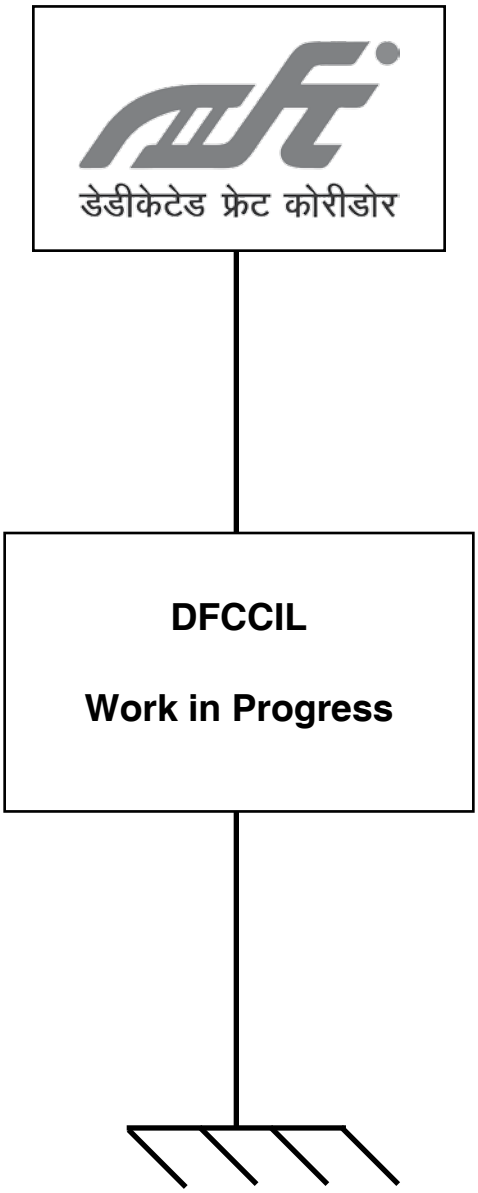
EXPERTS/AGENCIES FOR SHE SERVICES

Sl. No.	Organization	Services
1.	Bureau Veritas India Pvt. Ltd. B-21 & 22, First Floor, Sector-16 N0IDA-201301 (U.P.) Phone: 0120-2515055 Fax: 0120-2515248 E-mail: enp.delhi@in.bureauveritas.com	External SHE Audit SHE Management/ Technical Training
2.	Central Labour Institute Post box No: 17851 Sion, Mumbai-400022 Tele: 022-4092203, Fax: 022-4071986 E-mail: cli@dgfasli.nic.in	SHE Management/ Technical Training
3.	Construction Industry Development Council 801, 8th Floor, Hemkunt Chambers, 89, Nehru Place, New Delhi - 110019	SHE Management/ Technical Training
4.	Delhi Productivity Council 1E/10, Swami Ramtirath Nagar New Delhi - 110055 Tele: 23522835	SHE Management/ Technical Training
5.	Det Norske Veritas AS, 203, Savitri Sadan 1, 11 Preet Vihar Community Centre, New Delhi - 110092 Phone: 011-22531502/2253/1503 22427688/22531278 Fax: 011-22530247 Email: www.dnv.com	External SHE Audit SHE Management/ Technical Training
6.	Dr. A.V. Baliga Memorial trust Link House Bagadur Shah Zafar Marg Press Area New Delhi-110002, Phone: 011-23311119	HIV/AIDS awareness
7.	Dr. Cris Research Centre for Occupational Health :& Safety 306, Guru Arjuna Dev Bhawan, Ranjit Nagar Copmplex, New Delhi - 110008 Phone : 9810040406 Fax 011-25702929 Email: team@drcris.com Web: www.drcris.com	Ambulance Room & Van Communication material First-aid box First aid Training HIV/AIDS awareness Medical facilities SHE Orientation Training
8.	National Safety Council of India Plot No. 98A, Institutional Area, Sector 15, CBD Belapur Navi Mumbai 400 614 Tele: 022-27579924-27 Email: nsci@giasbm01.vsnl.net.in	Posters, Leaflets, Safety Training etc.

MINIMUM LIGHTING REQUIREMENTS

Sl. No.	Facility or Function	Luminance - 1x (lm/ft²)
1.	Administrative areas (Offices, drafting and meeting rooms, etc.	540 (50)
2.	Construction areas • General Indoor • General outdoor • Tunnel and general underground work areas (minimum 110 lux required at tunnel and shaft heading during drilling, mucking and scaling)	 55 (5) 33 (3) 55 (5)
3.	Access way • Exit ways, walkways, ladders, stairs	110 (0)
4.	Maintenance/Operating areas / shops • Vehicle maintenance shop • Carpentry shop • Outdoors field maintenance area	325 (30) 110 (10) 55 (5)
5.	Mechanical/electrical equipment rooms	110 (10)
6.	Hoists, Elevators, freight and passenger	215 (20)
7.	Warehouses and storage rooms/areas • Indoor stock room, active / bulk storage • Indoor rack storage • Outdoor storage	110 (10) 270 (25) 33 (3)

DFCCIL WORK IN PROGRESS SIGN BOARD



FORMS

Form No. : DFCC/ SF/01

FORMATION OF SITE SHE COMMITTEE	
Contract No.	
Contractor Name	
Contract Title	

CIRCULAR

Committee

The following SHE committee is constituted with immediate effect:

Chairman:

Secretary:

Members:

1.
2.
3.
4.
5.

Periodicity

The committee will meet at least once in a month on the day (specify date)

Agenda

Secretary will circulate agenda of the meeting at least two days in advance of the schedule date of the meeting.

Circulation

Gist of the meeting will be minute in the standard format and circulated to the following under the signature of the secretary

1. Chairman
2. Members
3. DFCCIL Representatives
5. Others concerned

Date:

Signed by:-----

CHAIRMAN OF THE COMMITTEE

Form No.: DFCC/ SF/02

MINUTES OF THE COMMITTEE MEETING	
Contract No.	
Contractor Name	
Contract Title	
Meeting No.	
Date of Meeting	
Location of Meeting	

Members present	Invitees	Members absent

No. of Copies	Name/Dept.	No. of Copies	Name/Dept.	No. of Copies	Name/Dept.
Prepared by:		Location:		Date:	

MINUTES OF SHE MEETING				
Item No.	**Description of Discussion**	**Action By**	**Target**	**Remarks**
1	Complaints received from Clients and corrective and preventive action			
2	Review of MOM of previous meeting			
3	Observation from third party			
4	First-Aid cases/Reportable accident cases			
5	Future jobs and specific requirement			

6	Status of implementation of safety plan			
7	Sub contractor performance			
8	Analysis of first-aid cases			
9	Need for any specific system/training/ PPE's resources			
10	Observation of SHE committee during last walk down			

Next SHE Meeting is scheduled on:

Date: Chief Manager / Head of SHE (Signature & Name)
Date: Project Manager (Signature & Name)

Form No. : DFCC/SF/03

DFCCIL

COLD WORK PERMIT

(to be used for works other than Hot, Confined Space Entry or Electrical)

S.No._____

Work clearance from_ _____hrs of date_____ To _____hrs of date _____
(Valid for the shift unless renewed)

Issued to (Department / Section / Contractor) _____
Exact Location of work (Area / Unit / Equipment No. etc)_____
Description of work _____

THE FOLLOWING ITEMS SHALL BE CHECKED BEFORE ISSUING THE PERMIT
(Tick mark in the appropriate box. Checklist items marked with asterisk (*) shall be complied by receiver)

S. No.	Item	Done	Not Reqd.	S. No.	Item	Done	Not Reqd.
1	Equipment / Work Area inspected			6	Equipment water flushed		
2	Surrounding area checked, cleaned and covered			7	Equipment properly steamed/ purged		
3	Equipment blinded/ disconnected / closed / isolated / wedge opened			8	Proper ventilation and lighting pro-vided		
4	Equipment properly drained and depressur-ized			9*	Area cordoned off & caution boards / tags provided.		
5	Equipment electrically isolated and tagged vide Permit No. -------			10	Gas test: HCs / Toxic etc. HCs = % LEL Toxicgas= ppm		

Remarks:

1. The activity has the following expected residual hazards (Tick the relevant items): Lack of Oxygen / H2S, Toxic Gases / Combustible gases / Pyrophoric Iron / Corrosive Chemicals / Steam – Condensate / Others _____
2. Following additional PPE to be used in addition to standards PPE (Helmet, Safety Shoes, Hand gloves, Boiler suit) Face Shield/ Apron/ Goggles/ Dust Respirator/ Fresh Air Mask/ Lifeline/ Safety Belt/ Airline/ Earmuff etc.
3. Additional precaution if any_____

Issuer Name & Designation	**Issuer Signature**	**Receiver Name & Designation**	**Receiver Signature**

Clearance renewal:

Date	Time		Additional precautions if any, Otherwise mention "NIL"	Issuer's Name, Designation & Signature	Receiver's Name, Designation and Signature
	From	To			

Closing of the work permit:

Receiver: Certified that the subject work has been completed / stopped and area cleared			Issuer: Verified that the job has been completed and area cleared and is safe from any hazard.		
Date & Time	Name & Designation	Signature	Date & Time	Name & Designation	Signature

General Instructions:

1. The work permit shall be filled up carefully and accurately in clear handwriting ensuring that complete information is provided in all the sections / subsections. Sketches should be provided wherever possible to avoid miscommunication.
2. Appropriate safe guards and required personnel protective equipment (PPEs) shall be determined by a careful analysis of the potential hazards and the operations to be performed prior to starting the work.
3. Requirement of standby personnel from Contractor / SHE team if any shall be mentioned in the additional requirement.
4. In case of fire alarm / siren, all work must immediately be stopped.
5. For renewal of work clearance, the issuer shall ensure that the conditions are satisfactory for the work to continue. If the conditions have changed, it may be necessary to issue a new permit or amend the existing permit.
6. This clearance on the same permit can be renewed / extended up to a maximum of seven calendar days.
7. This permit must be available at work site at all times.
8. This permit shall remain valid for 12 hours of the day of issue/ renewal
9. On completion of the work, the permit shall be closed.

Form No. : DFCC/SF/04

DFCCIL

HOT WORK PERMIT FOR
HOT WORK / ENTRY TO CONFINED SPACE

S.No._____

Work clearance from _____hrs of date_____To_____hrs of date _____
(Valid for the shift unless renewed)

Issued to (Department / Section / Contractor) _____

Exact Location of work (Area / Unit / Equipment No. etc. _____

Description of work _____

THE FOLLOWING ITEMS SHALL BE CHECKED BEFORE ISSUING THE PERMIT
(Tick mark in the appropriate box. Checklist items marked with asterisk (*) shall be complied by receiver)

S. No.	Item	Done	Not Reqd.	S. No.	Item	Done	Not Reqd.
A	General points			B	For Hot work / Entry to confined Space		
1	Equipment / Work Area inspected			1	Proper ventilation and Lighting providing		
2	Surrounding area checked, cleaned and covered			2	Proper means of exit / escape provided		
3	Sewers, manholes, CBD etc and hot surfaces nearby covered			3	Standby personnel provided from Process / Maint / Contractor / Fire / Safety dept.		
4	Considered hazard from other operations and concerned persons alerted.			4	Checked for oil and Gas trapped behind the lining in Equipment		

5	Equipment blinded/ disconnected / closed / isolated / wedge opened			5*	Shield provided against spark		
6	Equipment properly drained and depressur-ized			6*	Portable equipment / nozzles properly grounded		
7	Equipment properly steamed / purged			7*	Standby persons provided for entry to confined space		
8	Equipment water flushed						
9	Iron sulfide removed / kept wet			C	For Vehicle Entry		
10	Equipment electrically isolated and tagged vide permit no.			1*	Spark Arrestor on the mobile equip-ment / vehicle provided.		
11	Gas test : HCs = %LEL Toxic gas = ppm, O2 = %						
12*	Running water hose / Fire extinguisher pro-vided. Fire water system available.			D	For Excavation works		
13*	Area cordoned off and Precautionary tags / Boards provided.			1	Clearance obtained for excavation / road cutting / Dyke cut-ting from concerned dept.		

REMARKS:

1. The activity has the following expected residual hazards (Tick the relevant items): Lack of Oxygen / H2S, Toxic Gases / Combustible gases / Pyrophoric Iron / Corrosive Chemicals / Steam – Condensate / Others
2. Following PPEs to be used in addition to standards PPEs (Helmet, Safety Shoes, Hand gloves, Boiler suit): Face Shield / Apron / Goggles / Dust Respirator / Fresh Air Mask / Lifeline / Safety Belt / Airline / Earmuff etc.
3. Additional precautions if any:._____

Issuer Name & Designation	Issuer Signature	Receiver Name and Designation	Receiver Signature

Clearance renewal:

Date	Time		Additional precautions if any, Otherwise mention “NIL”	Issuer's Name, Designation & Signature	Receiver's Name, Designation and Signature	Receiver's Name, Designation and Signature
	From	To				

Closing of the work permit:

Receiver: Certified that the subject work has been completed / stopped and area cleared			Issuer: Verified that the job has been completed and area cleared and is safe from any hazard.		
Date & Time	Name & Designation	Signature	Date & Time	Name & Designation	Signature

General Instructions:

1. The work permit shall be filled up carefully and accurately in clear handwriting ensuring that complete information is provided in all sections / subsections and none of column is left blank. Sketches should be provided wherever possible to avoid miscommunication.

2. Appropriate safe guards and required personnel protective equipment shall be determined by a careful analysis of the potential hazards and the operations to be performed prior to starting the work.
3. In case of fire alarm / siren, all work must immediately be stopped.
4. Only certified vehicle / engines and permitted type of electrical equipment and tools are allowed in operating areas.
5. Welding machines should be located in non-hazardous and ventilated areas.
6. No hot work should be permitted unless the explosive meter reading is Zero.
7. When a person is entering confined space, the receiver must keep minimum two standby-designated persons at the manhole or entry point.
8. Before box up of any vessel manhole cover, ensure that no men / materials are inside the vessel.
9. For renewal of work clearance, the issuer shall ensure that the conditions are satisfactory for the work to continue. If the conditions have changed, it may be necessary to issue a new permit or amend the existing permit.
10. This clearance shall remain valid for 12 hours on the date of issue/ renewal.
11. This permit must be available at work site at all times.
12. On completion of the work, the permit must be closed and kept as record.

Form No. : DFCC/SF/05

DFCCIL

ELECTRICAL ISOLATION / ENERGISATION PERMIT

Section-A: Isolation Permit. S.No._____

Request for Isolation: Date: _____

Time:_____

Department / Section / Area issuing the permit _____

Equipment number to be isolated: _____

Name of the equipment / circuit to be isolated: _____

The above-mentioned equipment / circuit shall be de-energized and isolated from all live conductors to carry out the maintenance work by _____ section / for operational requirement.

_____	_____	_____
Issuer Name	Designation	signature

Certificate of Isolation: Date:_____ Time: _____

Certified that Equipment / Circuit no. _____ of _____ plant has been electrically isolated by switches / isolators / links / fuses (tick as applicable) and the danger tag is put on the supply panel. Actions in respect of electrical isolation have been recorded in the electrical shift logbook.

_____	_____	_____
Name of Authorized Person	Designation	Signature

Section-B: Energisation Permit. Sl.No._____

Request for Energisation: Date: _____Time:_____

Department / Section / Area issuing the Permit _____

Equipment number to be energized: _____

Name of the equipment / circuit to be energized:_____

Work on the above mention equipment / circuit has been completed and all the applicable permits closed. This equipment / circuit may be energized.

_____	_____	_____
Issuer Name	Designation	Signature

Certificate of Energisation: Date: _____Time: _____

Certified that Equipment / circuit No._____ of _____ plant has been electrically energized and the danger tag removed from the supply panel. This is also recorded in the electrical shift logbook.

_____	_____	_____
Name of Authorized Person	Designation	Signature

Form No. : DFCC/SF/06

COMPETENCY CERTIFICATE

Certified that Shri _____ P. way supervisor of M/s _____ has been examined regarding P.way working on _____ work. His knowledge has been found satisfactory and he is capable of supervising the work safety.

Employer/
Authorized Representative

ANNEXURES

Annexure-I

Silica Exposure Reduction Strategies

PART 1 – GENERAL APPLICATION

1.1 Description

A. This addendum specifies minimum environmental health and safety equipment, practices and procedures to minimize exp osures to airborne silica dust during quarry operations, stone crushing, transport, and site construction. The scope of this section is limited to dust controls and employee protection in these environments.

B. This addendum shall take precedence over overlapping requirements in the Technical Specification unless otherwise stated.

C. This document is an integral part of the contract and the contractor has the responsibility to fully implement it. Any request to deviate from any specified requirement shall be made in writing to the project sponsor.

D. This addendum supplements all local, regional and national laws and regulations concerning the location, environmental emissions, and occupational safety in these operations. If regulatory requirements are more stringent, or require more frequent verification than outlined in this standard, then the regulatory provisions shall take precedence and become the de facto requirement in that jurisdiction.

E. Contractor(s) shall provide a copy of the licensing documentation (NOC/ Consent to Establish) for each facility from where they purchase crushed stone including each quarry, stone crusher mill, and hot mix plant indicating they meet all applicable requirements.

1.2 General Site Requirements Quarries:

- Operator must establish a reliable source of water with adequate capacity and pressure to run all dust suppression systems at the quarry site;
- Operator must establish a reliable source of power for all mechanical equipment at the stone quarry site;

- Residential areas and temporary employee housing must be located a minimum of 100 meters from any quarrying operations;
- Stone drilling, cutting and conveying operations shall be equipped with either continuous wet suppression system or dry dust collectors designed and operated per minimum requirements below.
- Dust controls in quarries must include water fed compressed air drilling equipment, enclosed screens; enclosed transfer points, covered conveyors, and chutes.
- Wet the surface of rock materials with a hose before blasting operations.

1.3 General Site Requirements Stone Crusher Mills and Hot Mix Plants:

A. Contractor shall submit a detailed plan for any temporary stone crusher or hot mix plant sites intended to be utilized for this project. The plan shall show adjacent areas within 100 meters and depict all structures and roadways. All temporary sites must meet all requirements specified in this addendum and must obtain a Consent to Establish/ (NOC) from the applicable authorities.

B. Temporary or permanent stone crusher sites or hot mix plants must meet all of the following requirements:

- Site must be at least 250 meters from National and State Highways and 500 meters from schools, educational institutions and religious places.
- Establish green belt zone as required by applicable local requirements;
- Residential areas and temporary employee housing must be located a minimum of 200 meters from any stone crushing equipment or operations;
- Operator must establish a reliable source of water with adequate capacity and pressure to run all dust suppression systems installed at the stone crusher site;
- Operator must establish a reliable source of electricity for powering all mechanical equipment and pollution controls installed at the stone crusher site;
- Crushing, screening, and conveying operations shall be equipped with either continuous wet suppression system or dry dust collectors designed and operated per minimum requirements below.
- Crushing, screening, and conveying operations must be enclosed with sheet metal or other rigid material. Do not use cloth or plastic enclosures.
- Roadways inside the crusher mill shall be metalled, paved or otherwise treated with chemical suppressants for dust suppression.
- Waste dust materials from stone crushing operations shall be stored in closed

containers or closed structures.

- Lorries exiting the site must be cleaned with shovel and broom to minimize dust being tracked off site.
- Minimize drop heights to storage piles;
- Windbreak walls that are at least six times longer than its height shall be in place.
- Regularly remove and safely dispose of waste materials (rock dust) from the plant site in covered lorries;
- Fugitive emissions including emissions from stockpiles, conveyors and other areas shall be minimized as far as practicable. Emissions from these sources shall be substantially free from visible dust emission.

1.4 General Site Requirements Construction Sites:

The following requirements shall be implemented during the following operations:

- Stockpiling;
- Earth moving/ earth works, grading, and leveling;
- Transfer from stock pile to work site;
- Final placement; and
- Laying the track.

- Operator must establish a reliable source of water with adequate capacity and for all dust suppression required at the construction site;
- Regularly remove and safely disposing of waste materials (rock dust) from the site in covered lorries;
- Waste dust materials from stone crushing operations if used for fill shall be covered within 4 hours;
- Minimize spillage of raw materials. Promptly clean up all spillage and accumulations of dust.
- Fugitive emissions including emissions from stockpiles and other areas shall be minimized as far as practicable. Emissions from these sources shall be substantially free from visible dust emission.

1.5 General Environmental Protection:

The Contractor shall take steps to protect the environment and surrounding populations from silica dust hazards. Ensure that the water required for dust suppression operations is sourced from a supply that will not impact the quality or availability of water in the surrounding environment. Follow all State requirements for siting criteria and obtain consent from applicable state pollution control board. Ensure that emissions, surface

discharges and site closure practices shall comply with all applicable laws including but not limited to:

- The water (prevention and control of pollution) act 1974; no. 6 of 1974.
- The air (prevention and control of pollution) act, 1981; no. 14 of 1981.

Part 2 - Technical Requirements to Minimize Airborne Dust Emissions

2.1 General

The handling of raw materials, products, wastes or by-products should be carried out as to minimize the release of airborne dust. Use Table 1 below for guidance in employing dust suppression methods.

Table 1: Feasible Control Measures for Open Dust Sources
Fugitive Emission Control Measure

Source	Enclosures	Wet uppression	Chemical tabilization	Green Belt	Surface Cleaning	Wind Break Walls
Unpaved roadways and staging areas		X	X			
Storage piles	X	X	X			X
Stone crushing operations	X	X		X	X	X
Paved roadways and staging areas					X	
Exposed areas	X	X	X	X	X	X
Batch drop operations	X	X				X
Continuous drop operations	X	X				X

2.2 Wet Methods: Water spray Dust Suppression Systems for Stone Crushing Mills

Details of system components for all stone crusher facilities:

A. Minimum number and locations of pressure spray nozzles:
   - 1 nozzle on the top of the crusher
   - 2 nozzles at the delivery point of crushing material
   - 1 nozzle on the bottom of the vibrator screen or rotary screen
   - 2 nozzles within the storage hopper
   - 1 nozzle at the delivery point of raw materials
   - 1 nozzle at the bottom of the dust hopper

B. A water pump with adequate motor horsepower and discharge pressure as required for optimal performance of spray nozzles.

C. Covered water storage tank, with a manhole type maintenance provision. The cover should prevent atmospheric dust from entering the tank. The tank can be located at the ground level. Water from a bore well or other source could be pumped to fill the tank periodically.

D. Centrifugal monoblock type self-priming pump capable of delivering 3 to 5 kg/cm2 pressure and 72 liters per minute.

E. 100 stainless steel mesh online water filter with two parallel cells. Parallel cells should be set up in order for to allow connections to be reversed such that one cell undergoes backwash cleaning while the other cell is in operation. Only filtered water should be supplied to the spray nozzles.

F. Chemical surfactants or wetting agents may be added to water used in the spraying systems.

G. All spraying systems used for dust suppression shall be maintained in good condition. The flow rate and operating pressure of the spraying liquid/solution shall be sufficient to suppress dust emissions from the corresponding sources. The spraying system shall be able to cover the areas of emission points concerned.

H. All water spray equipment shall be operational during all stone crushing operations at the site.

I. No domestic showers, sprinklers, or other general water spray devices may be substituted for pressure misting nozzles. Nozzles may be hollow cone, solid cone or fan type.

2.3 Dry Methods: Dust Extraction Systems for Stone Crusher Mills/ Hot Mix Plants

Details of system components:

A. Minimum requirements for dry dust capture and collection systems:

- Hood or enclosure to capture emissions;
- Dust collector that separates particulates (e.g. centrifugal dust collectors); and
- Duct to transport particulates in air stream from dust collector to air pollution control device (e.g. baghouse).

B. Capture hoods shall be installed over all crusher units and screens. Enclosures shall surround all sources of dust to the extent possible.

C. Dust collector shall be connected in-line via an enclosed duct to a cyclone and baghouse for dust removal.

D. Air handling system shall be a suitable size to prevent the escape of untreated airborne dust. Maintain minimum airflow as per design. A minimum draft velocity of 1 meter/ second shall be maintained through all open hoods.

E. Inspect bag filters routinely and at least once per month for damage and clean, repair or replace as needed.

2.4 Dust Containment Enclosures for Stone Crusher Mills and Hot Mix Plants:

Particulate emissions shall be controlled by installing dust containment enclosures at the following locations:

A. Primary crusher discharge area

Enclosure shall cover discharge areas to all conveyor belts or secondary crusher.

B. Vibratory screen

All vibratory screens shall be totally enclosed. Screen houses shall be rigid and reasonably dust tight with self-closing doors or close-fitted entrances and exits for access. Where conveyors pass through the screen house, flexible covers should be installed at entries and exits of the conveyors to the housing.

C. Conveyor belts (optional)

The enclosures should be complete from all the four sides and roof. There should not be any open windows/openings etc. Any opening should be kept closed during

operation. The gaps should be sealed using gaskets or wool type packing etc. Crusher enclosures shall be rigid and be fitted with self-closing doors and close-fitting entrances and exits. Where conveyors pass through the crusher enclosures, flexible covers should be installed at entries and exits of the conveyors to the enclosure.

D. Inlet hopper

The inlet hopper shall be enclosed on three sides.

E. Rotary dryer

The plant rotary dryer in a hot mix plant.

Malfunctioning or breakdown of equipment leading to abnormal emissions shall be dealt with promptly. In any case, the abnormal emission due to equipment failure shall be stopped as soon as practicable. The dust collection system shall be routinely inspected and maintained in good condition and shall be used as required. The owner shall conduct an inspection of the dust control system at least once per month.

2.5 Minimize Fugitive Dust From Roadways and Stock Piles

Minimize fugitive dust emissions from all sites where crushed rock is stored. Particulate emissions from unpaved roads and stock piles shall be controlled with the application of suitable compounds to minimize the control of dust. Petroleum-based products, waste oils or other waste products shall never be used for this purpose. Acceptable compounds for this purpose include:

- Acrylic polymers;
- Solid recycled asphalt;
- Chloride compounds (calcium chloride and magnesium chloride);
- Lignin compounds (lignin sulfate and lignin sulfonate powders);
- Natural oil resins (soybean oil); and
- Organic resin emulsions.

Contractor shall provide a product information sheet prepared by the manufacturer or distributor indicating the chemical composition, application instructions, and other environmental, safety and health considerations 30 days in advance of its intended application to Engineer's Representative. The product information shall be reviewed and approved in writing before the contractor proceeds to apply it on the project site.

2.6 Minimize Fugitive Dust From Heavy Equipment and Road Transport Vehicles

Minimize fugitive dust emissions from all vehicles when loading, unloading and operating vehicles on project sites, staging areas, or stone crusher mills. Settled dust and particulate emissions from lorries used to transport stone or waste products generated in stone crushing operations, and other heavy construction vehicles, shall be minimized in accordance with the following practices:

Lorries shall be filled with the material using wet methods. Load waste fine materials and powders onto tankers or closed trucks through a lengthy sleeve attached to the spout to minimize drop height and dust release.

Lorries once filled with stone or other waste materials shall be covered before leaving the site. A single layer impermeable tarp shall be placed over the entire load and secured with rope or other tension bar.

Designate a decontamination area that is required to be used by all vehicles before exiting the site. This area shall be covered with an impervious tarp. Use wet methods to wipe all accessible exterior surfaces of vehicles and tires.

Impose strict speed limits for all vehicles operating on service roads, loading areas, or staging areas.

2.7 Minimize Fugitive Dust During Rock Quarry Operations

Particulate emissions shall be controlled during drilling, blasting, loading, and hauling with wet methods using surfactants applied in either water or foam spray.

Dust controls for stone drilling shall use water fed into the compressed air to suppress the dust.

2.8 Work Practices for Reducing Employee Exposures

This section pertains to all activities with potential for dust exposure to workers employed in quarries, stone crusher units, hot mix plants, and construction sites.

Use wet methods where feasible to reduce dust emissions from working surface or equipment.

Use a gentle spray or mist to moisten settled dust particles. When washing large quantities of dust from a surface, increase the water force only after pre-wetting all the dust with a gentle spray.

Use only the minimum amount of water needed to get the job done without creating runoff.

Rewet surfaces as necessary to control dust.

Part 3 - Technical Requirements for Worker Medical Surveillance

3.1 General

This section pertains to workers employed in quarries, stone crusher units, and hot mix plants.

3.2 Medical Monitoring

Medical monitoring shall be conducted for each worker before the start of work and at least at annually thereafter. Examination shall as a minimum meet requirements as set forth below:

Examination

1. The employer shall ensure that all medical examinations and procedures are performed by a licensed physician, and are provided at no cost to the employee and at a reasonable time and place.

2. Persons employed under the licensed physicians may administer the pulmonary function testing, chest x-ray or other testing procedures required by this section if adequately trained by an appropriate academic or professional institution.

3. A physical examination directed to the pulmonary system, including a chest x-ray to be administered and pulmonary function tests of forced vital capacity (FVC) and forced expiratory volume at one second (FEV(1)). Interpretation and classification of chest roentgenograms shall be conducted in accordance with ILO classification system. Interpretation of the chest x-ray shall be conducted under the ILO Classification of Radiographs of Pneumoconiosis by a reader trained under this protocol. Evaluate chest x-ray for possible tuberculosis because people exposed to silica have increased susceptibility.

   Report from Medical Examination: A report must be submitted from all medical examinations conducted within the last 12 months to document compliance with this medical surveillance requirement for each worker employed in quarries and stone crusher units. Submit, at a minimum, for each worker the following:

4. Name and Employee Identification Number

Physician's Written Opinion from examining physician including at a minimum the following:

- Whether worker has any detected medical conditions that would place the worker at an increased risk of material health impairment from exposure to silica.
- A statement that the worker may wear a negative pressure respirator or any recommended limitations on the worker or on the use of personal protective equipment such as respirators.
- Statement that the worker has been informed by the physician of the results of the medical examination and of any medical conditions that may result from dust exposure.

3.3 Record Keeping

1. The employer shall establish and maintain accurate records of medical surveillance to include the physician's written opinion on each employees health status.
2. Records shall be maintained for at least the duration of the contract period.
3. A copy of the each employee's records must be provided to the affected employee who has undergone the medical surveillance stipulated above within 30 days of the date of the examination.

Part 4 - Requirements for Employee Training

4.1 General

A. This section pertains to all workers employed in quarries, stone crusher units, hot mix plants, and any construction workers using powered tools or equipment to cut, grind, core, or drill concrete or masonry materials. The training provided under this section shall be provided to workers at no cost to these employees and in a language understood by workers at each training program. The course shall be taught by an environmental health and safety specialist with adequate education, experience and training.

B. Incorporate general information about silica dust hazards in all orientation and site training sessions covering health or safety aspects.

4.2 Training Topics

The employer shall provide training on the following topics to all employees prior to their

assignment to jobs where the employer will be conducting these operations during this project:

A. The potential health hazards of exposure to airborne silica dust including silicosis, tuberculosis, lung cancer, chronic obstructive lung disease (COPD) and decreased lung function.

B. Methods used by the employer to control employee exposures to airborne silica dust including wet or dry methods for stone crushing, drilling, cutting, local exhaust ventilation systems, and isolation of the process from employees by means of distance, enclosure, or other means, as applicable.

C. Proper use and maintenance of dust reduction systems, including the safe handling and disposal of waste materials.

D. The importance of good personal hygiene and housekeeping practices when working in proximity to silica dust including:
   - Not smoking tobacco products; appropriate methods of cleaning up before eating, and appropriate methods of cleaning clothes.
   - Avoiding, to the extent practical, activities that would contribute significantly to exposure to airborne dusts.

Part 5 – WORKER PROTECTION

5.1 General

Contractors shall supply respirators and other specified safety equipment to all workers employed in quarries, stone crusher units, hot mix plants, and any construction workers using powered tools or equipment to cut, grind, core, or drill concrete or masonry materials as described below:

A. Do not eat, drink, smoke, chew gum or smoke tobacco in the work area. To eat, drink, chew, or smoke, workers shall follow the procedures described below and leave the work area.

B. Provide workers with a clean source of water for a facility to wash hands and face with soap and water. This should be done before eating, smoking or drinking and at the end of the day before going home. Hand washing facilities shall be set up adjacent to the work area.

C. Engineering and work practice controls must be used whenever the possibility exists that employees may be exposed to silica including during stone crushing and construction operations.

D. The use of compressed air, dry sweeping, or any cleaning method that would cause elevated silica dust air concentrations are prohibited.

5.2 Respiratory Protection

Minimum Respiratory Protection: Require that the minimum level of respiratory protection used be Respirator Class FFP3 under European standard EN 143 or N99 under the U.S. National Institute for Occupational Safety and Health (NIOSH) classification. Respirators shall be single use disposal respirators for dusts or reusable half-face air-purifying respirators with high efficiency particulate air filters.

Require that a respirator be worn by anyone in a Work Area at all times during any operation. Do not allow the use of surgical masks or other types of disposable respirators not specified above for any purpose.

Fit testing shall be conducted on any reusable air-purifying respirator assigned to the worker.

Only assign respirators to workers medically approved to wear negative pressure respirators as per the physicians written opinion following an annual medical examination as per the requirements in Part 3 of this addendum.

5.3 Protective Equipment

Do not allow workers to leave the work place wearing any clothing or equipment worn during the work shift. Provide the following:

A. Eye Protection: Provide eye protection as needed for the type of work being performed.

B. Shoes: Provide shoes to all workers and require that they be worn at all times in the Work Area.

C. Hearing protection: Provide all workers at all quarries, stone crushing sites, and hot mix plants and all other workers exposed to loud noise with ear plugs or other suitable hearing protection.

Part 6 - EMISSION AND AMBIENT AIR LIMITS

6.1 General

Contractors shall conduct all required emissions monitoring as required to prove compliance with all applicable State Pollution Control Board Regulations and the limits specified within this section. This section applies to all permanent and temporary stone crushing mills and hot mix plants.

6.2 Suspended Particulate Matter (SPM)

The Suspended Particulate Matter (SPM) at a distance of 40 meters from a stone crusher unit in a cluster should be less than 600 micro-grams per cubic metre (ug/Nm3).

The concentration of total particulate matter in any contained emissions to air, for example the bag filter exhaust air outlet, shall not exceed 150 micro-gram per cubic metre (150 ug/Nm3). The introduction of dilution air to achieve the emission concentration limits shall not be permitted.

Monitoring of the 24-hour average concentration of the total suspended particulate and/or respirable suspended particulate in ambient air shall be conducted at the site boundary and/or any other locations to be agreed by the Authority. SPM sampling shall conform to the United State Environmental Protection Agency's Reference Method for the Determination of Suspended Particulate Matter in the Atmosphere (High-volume Method) and shall be conducted at a frequency of not less than once every 6 months.

Part 7 – Chain-of-custody for Crushed Stone

7.1 General

Contractor shall maintain records of suppliers for each load of crushed stone brought to the construction site with the procedures as outlined below. Such records shall be collected at a central location at least monthly during the duration of the project and be available for inspection by Engineer's Representative.

7.2 Supplier Validation

Contractor shall maintain records of all suppliers and all internally sourced supplies of crushed stone brought to the construction site to include:

- Name of supplier;
- Location of stone crusher operation;

- Location and name of the quarry;
- Proof of registration and consent from the applicable Mining Department;
- Proof of registration and consent for operation from applicable Pollution Control Board;
- The supplied material size and quantity (by weight or volume);
- Date and specific location material was brought to site.

Part 8 – Restoration of temporary stone crusher sites

8.1 General

This section applies to the removal of any temporary stone crusher sites established and used during the duration of the project. During operation all temporary operations shall meet the requirements specified in Parts 1 and 2 above.

8.2 Equipment removal

Temporary equipment shall be cleaned before being taken down and prepared for off-site transport. Clear off all temporary structures and garbage.

8.3 Site restoration

Remove all debris and visible accumulations of dust from ground surfaces. Cover all bare soil surfaces with vegetation or pavement to reduce exposure to residual silica dust.

Annexure-II

National Safety Day (4th March) – History & Background

The Labour Ministers' Conference in its 22nd Session held in 1962 recommended:

" A conference on 'Safety in Factories' should be convened and the question of setting up a National Safety Council for conducting a campaign on accident prevention should be considered".

The President's first conference on Industrial Safety organized in Delhi from 11th to 13th December, 1965 by the Ministry of Labour and Employment, Government of India in cooperation with the State Governments, Employers' Organisations, Trade Unions and Institutions concerned had affirmed "There is a consensus of opinion in favour of setting up National and State Safety Councils".

The 24th Session of the Stading Labour Committee accepted the proposal concerning the constitution of the National Safety Council (NSC) in February, 1966. Accordingly, National Safety Council (NSC) was set up by the Ministry of Labour, Government of India on 4th March, 1966 to generate, develop and sustain a volunantary movement on Safety, Health and Environment (S,H & E) at the National level.

It was registered as a society under Societies Registration Act, 1860 and subsequently as a Public Trust under Bombay Public Trust Act 1950. It is an apex non-profit making, tripartite body, registered under the Societies Registration Act 1860 and the Bombay Public Trust Act 1950.

The foundation day of the National Safety Council of India is observed as National Safety Day since 1972. Focus of the Day to have accident & incident free industrial activities and spread Safety & Occupational Health awareness among all citizens & workers across the country.

डेडीकेटेड फ्रेट कोरीडोर

Dedicated Freight Corridor Corporation of India Limited

(A GOVERNMENT OF INDIA ENTERPRISE)

Corporate Office : 5th Floor, Pragati Maidan, Metro Station Building Complex, New Delhi-110001
Phone : 91-11-23454700 Telefax : 91-11-23454701
Website : www.dfccil.org