SAFETY MANUAL
FOR PORT USERS OF MUMBAI PORT

MUMBAI PORT AUTHORITY
मुंबई पत्तन प्राधिकरण

PREFACE

Port premise is challenging place to work, here loading, unloading and transport of bulk cargo, machineries, liquid, gas, solid, hazardous, non-hazardous, essential, non-essential etc. in a quick, energy efficient, cost effective manner is done on 24X7 in all types of weather. These makes port an exciting but also a potentially high-risk place to work in as it involves various types of risks. Therefore, it's very important to take appropriate safety measures while working in port premise to manage these risks to safeguard the man and material. Further it was observed that many of the previously occurred accidents could have been prevented just by following the safety guide lines/taking necessary safety precautions. Thus, to avoid such unhappy events safety practice should integrate in to a culture.

Therefore, the safety manual is prepared and promulgated with a view to increase the Safety awareness amongst the port users and to safeguard the man and material. This manual contains written Safety instructions, Standard operating procedures (SOP), Do's and Don'ts, checklists, Various work permits, etc. and some basic recommendations. The recommendations included, will help in judging various unsafe conditions. Which do exist during working in Port Premises. Our aim is to work as safe as possible.

The Statutory Rules, Procedures, recommendations, etc. are to be complied by all the port users with scrupulously at Mumbai Port Authority.

FOREWORD

Mumbai Port recognize safety as a core value and is committed to provide a safe and healthy environment to the dockworkers. In adherence to our commitment, I introduce this Port Safety Manual. This is a comprehensive guide designed to enhance safety practices within our port operations and to develop sustainable safety culture with commitment to maintain a safe environment with continual improvement.

This manual serves as a valuable resource, outlining protocols, procedures, and best practices to mitigate risks and ensure a safe working environment for all personnel involved in port operations. By following these guidelines set forth in this manual, we can minimize accidents, prevent injuries, and safeguard the integrity of our operations.

As Chairperson, I urge every member of our port community to familiarize themselves with the contents of this manual and to prioritize safety in all aspects of their work. Together, let us continue to uphold the highest standards of safety and ensure the well-being of everyone involved in port operations.

Rajiv Jalota, IAS
Chairperson, MbPA

MESSAGE

The working environment in port is complex, where dockworkers are engaged in multifaceted nature of jobs that involves various types of risks. If appropriate safety measures are not taken, it can lead to untoward incidences. Therefore, at Mumbai port workplace safety is paramount and we are firmly of the belief that there cannot be any compromise on safety.

As Chairman of Safety Committee for the Port of Mumbai, I have been chairing meetings of this committee, where issues related to Safety Health & Welfare of Dock Workers are discussed & reviewed. During these meetings, it was observed that, many of the previously occurred accidents could have been prevented just by taking necessary safety precautions, for which, this Safety Manual will be the guiding factor for Dockworkers, their Supervisors as well as their Employees.

Each section of this manual has been designed/formulated to empower dockworkers with the knowledge and tools necessary to prioritize safety in every aspect of work. This manual will serve as a comprehensive guide regarding Safety Rules & Regulations, Protocols, Procedures, and Best practices that needs to be followed at Mumbai port.

Safety is more than just following rules; it is about fostering a culture of responsibility and accountability wherein each one of us plays a vital role in creating a safe environment for ourselves and those around us. Therefore, I urge all the stakeholders to proactively observe all safety guidelines and support for fostering of safety culture.

Adesh Titarmare, IAS

Dy. Chairperson, MbPA
& Chairman DSC, MbPA

ORGANISATION BRIEF

Mumbai Port has long been the principal gateway to India and has played a pivotal role in the development of the national economy, trade & commerce and prosperity of Mumbai city in particular. Mumbai Port, earlier known as Bombay Port, lies midway (Latitude 18° 56.3' N, Longitude 72° 45.9' E) on the West coast of India on the natural deep-water harbor of Mumbai. The harbor spread over 400 square kilometers (150 sq m) is protected by the mainland of Konkan on its east and the island of Mumbai on its west. The harbour opens to the Arabian Sea to the south.

Though Mumbai Port is traditionally designed to handle general cargo, over the years, the port has adapted to changing shipping trends and cargo packaging from break bulk to unitization / palletization and containerization. Besides, it has also developed specialized berths for handling POL and chemicals. For decades, Mumbai Port was India's premier port. Even today, with the development of other ports, it caters to 8.61 percent of the country's sea-borne trade handled by Major Ports of the country in terms of volume. It caters to 16.07 percent of POL Traffic handled by Major Ports.

The port is administered by the Mumbai Port Authority (MbPA), an autonomous body wholly owned by the Government of India.

FACILITIES AT MUMBAI PORT:

Indira Dock: Indira Dock, commissioned in 1914, has 21 berths and 5 berths along the harbour wall, with a designed depth of 7.5 metres and 9.14 metres respectively.

Marine Oil Terminals Jawahar Dweep (MOT JD): At Jawahar Dweep Oil Terminal crude oil and petroleum products are handled. At this terminal there are 5 jetties JD1, JD2, JD3, JD4 & JD5 for handling large crude oil. All these jetties are connected to Oil Refineries/storage tanks by a network of pipelines.

OPL Pir Pau: At Pir-Pau, chemicals and petroleum products are handled. There are 3 jetties viz. Old Pir Pau, New Pir Pau (NPP) and New Pir Pau 2(NPP2). At Old Pir Pau only lube/base oil barges are handled. Chemicals, LPG and other petroleum products are handled at NPP & NPP2. These jetties are also connected to Oil Refineries/storage tanks by a network of pipelines.

Bunders: Besides the wet docks, there are along the harbour front a number of bunders and open wharves where the traffic carried by barges/sailing vessels are handled.

Dry Dock: The port has one dry dock, inside the Indira Dock, viz**.** Hughes Dry Dock which is 304 metres long.

Storage: There are transit sheds at most of the berths and a number of warehouses in the Port area for storage of uncleared cargo and pre-shipment storage of export cargo

The port has a total of 63 anchorage points at mid-stream

Ballard Pier Extension has a passenger terminal, including immigration clearance facilities for crews and passengers of cruise liners and VTMS tower. Offshore Container Terminal berth for handling of vessels.

MUMABI PORT AUTHORITY
SAFETY MANUAL FOR PORT USERS OF MUMBAI PORT

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CHAPTER 1: GENERAL

1.1 SAFETY POLICY

मुंबई पत्तन प्राधिकरण
Mumbai Port Authority

सुरक्षा नीति

मुंबई पोर्ट एक सुरक्षित और स्वस्थ कार्य वातावरण प्रदान करने के लिए प्रतिबद्ध है। हमारी स्वास्थ्य और सुरक्षा मानदंड / प्रक्रियाएं असुरक्षित स्थितियों और व्यवहारों को बिल्कुल भी बर्दाश्त नहीं करने पर आधारित हैं। हम लागू नियामक सुरक्षा और स्वास्थ्य आवश्यकताओं को प्राप्त करके इसे पार करने का प्रयास करते हैं। उच्चतम मानकों को स्थापित करके, हम निरंतर सुधार के साथ एक स्वस्थ और सुरक्षित कार्य वातावरण बनाए रखने की प्रतिबद्धता के साथ स्थायी सुरक्षा संस्कृति विकसित करने की आशा करते हैं।

हमारी प्रतिबद्धता को पूरा करने के लिए, मुंबई पत्तन प्राधिकरण,

- सभी कर्मचारियों और बंदरगाह उपयोगकर्ताओं को चोट-मुक्त कार्यस्थल प्रदान करने के लिए प्रभावी सुरक्षा उपायों और प्रक्रियाओं को विकसित करने, लागू करने और मूल्यांकन करने का प्रयास करें।
- कार्यस्थल के खतरों की पहचान करने के लिए सुरक्षा तंत्र में लगातार सुधार करें और नियंत्रणों के पदानुक्रम को लागू करते हुए जोखिम को प्रभावी रूप से समाप्त करना या कम करें।
- गोदी परिचालन क्षेत्र में प्रत्येक हितधारक को कार्य स्थल पर चोट मुक्त वातावरण विकसित करने और कार्यान्वित करने के लिए जिम्मेदारी लेने और साझा करने के लिए प्रोत्साहित करें।
- जागरूकता पैदा करें और सुरक्षा दिशानिर्देशों और प्रक्रियाओं, कर्तव्यों और जिम्मेदारियों पर सभी संबंधितों को प्रशिक्षण प्रदान करें।
- कर्मचारियों, बंदरगाह उपयोगकर्ताओं, ठेकेदारों और आगंतुकों के लिए हमारी नीतियों, दिशानिर्देशों और मानकों को संप्रेषित और प्रचारित करें।

दिनांक: 02.03.2023

श्री राजीव जलोटा, आई.ए.एस.
अध्यक्ष

SAFETY POLICY

Mumbai Port is committed to providing a safe and healthy work environment. Our health and safety norms / procedures are based on zero tolerance of unsafe conditions and behaviours. We strive to achieve this by endeavouring to exceed the applicable regulatory safety and health requirements. By setting the highest standards, we hope to develop sustainable safety culture with commitment to maintain a healthy and safe work environment with continual improvement.

To meet our commitment, the Mumbai Port Authority will,

- Endeavor to develop, implement and evaluate effective safety measures and procedures to provide all employees and port users an injury-free work place.
- Continually improve Safety mechanism to identify workplace hazards and exercise due diligence by effectively eliminating or minimizing the risks by applying the hierarchy of controls.
- Encourage every stakeholder in dock operational area to commit and share responsibility to develop and implement an injury free environment at work place.
- Create awareness and provide training to all concerned on safety guidelines and procedures, duties and responsibilities.
- Communicate and promulgate our policies, guidelines and standards to employees, port users, contractors and visitors.

DATE: 02.03.2023

SHRI RAJIV JALOTA, I.A.S.
CHAIRPERSON

1.2 SAFETY ORGANIZATION AT MUMBAI PORT:

A Safety Cell has been constituted as per the provisions of 'The Dock Workers' (Safety, Health and Welfare) Regulation, 1990, for the enforcement of safety regulations in the docks and other cargo handling areas. The Safety Cell is located at 4th Floor, Ambedkar Bhavan, Indira Dock and has the following set-up.

i. Dy. Manager (Safety) Tel. No. 022 6656 5067
ii. Senior Safety Officer Tel. No. 022 6656 5078
iii. Safety Officers Tel. No. 022 6656 5071 / 5066

The safety organisation also includes the Port Fire Section and the Pollution control cell under the DC Department.

1.3 SAFETY REGULATORY AUTHORITY

Deputy Director (Safety), Inspectorate of Dock Safety, Mumbai is the safety enforcement/regulatory Authority for the Port. The Office of Inspectorate of Dock Safety is located at Operations Service Centre Building, Opp. GPO, P. D'mello Road, Mumbai.

Dy. Director (O)	Ins. of Dock Safety	Tel.No.022 6656 5511
Asstt. Director	Ins. of Dock Safety	Tel.No.022 6656 5558
Ins. of Dock Safety Office (Direct)		Tel. No.022 2269 2180

1.4 GOVERNMENT ACTS AND RULES APPLICABLE AT MUMBAI PORT:

The following Central Government and Maharashtra State Government Acts and Rules covering occupational Safety and Health, Environment Protection, Handling of inflammable and explosive substances are applicable for working in the port.

- Safety and Health:

  1. The Dock Workers' (Safety, Health and Welfare) Act, 1986.
  2. The Dock Workers' (Safety, Health and Welfare) Regulations, 1990.
  3. The Occupational Safety, Health and Working Conditions Code, 2020.
  4. The Petroleum Act, 1934
  5. The Petroleum Rules, 2002 and Amendment thereof.
  6. The Explosive Act, 1884
  7. The Explosive Rules, 2008 and Amendment thereof.
  8. The Gas Cylinder Rules, 2016 and Amendment thereof.
  9. The Manufacture, Storage and Import of Hazardous Chemical Rules, 1989.
  10. The Petroleum and Natural Gas Regulatory Board (Technical Standards and Specifications including Safety Standards for Petroleum Installations) Regulations, 2020.
  11. The Building and Other Construction Worker's (Regulations of Employment and Conditions of Service) Act, 1996.
  12. Maharashtra Building and Other Construction Workers (Regulation of Employment and Conditions of Service) Rules, 2007.
  13. The Motor Vehicle Act, 1988
  14. The Maharashtra Motor Vehicle Rules, 1989
  15. The Central Motor Vehicles Rules, 1989
  16. The Central Electricity Authority (Measures relating to Safety and Electric Supply) Regulations, 2010.
  17. International Maritime Dangerous Goods Code, 2020. (IMDG Code)
  18. OISD-STD-156-Fire Protection Facilities for Port Handling Hydrocarbons

19. OISD-STD-139-Design, Construction, Inspection and Maintenance of offshore pipelines & facilities and Requirement of deep water pipelines.

20. OISD-STD-188-Corrosion Monitoring and Control of offshore & onshore pipelines.

- Environment
  - i) The Water (prevention and control of pollution) Act 1974 as amended upto 1988.
  - ii) The Water (prevention and control of pollution) Rules 1975 as amended upto 1989.
  - iii) The Maharashtra Water (prevention and control of pollution) Rules1983.
  - iv) The Air (prevention and control of pollution) Rules1981 as amended upto 1987.
  - v) The Air (prevention and control of pollution) Rules 1982.
  - vi) The Maharashtra Air (prevention and control of pollution) Rules1983.
  - vii) The Environment (Protection) Act 1986.
  - viii) The Environment (Protection) Rules 1986 as amended upto1993.
  - ix) The Hazardous Waste (Management of Handling) Rules 1989.
  - x) The Central Motor Vehicle Rules 1989.
  - xi) The Manufacture, Storage and Import of Hazardous Chemicals Rules 1989.

1.5 SAFETY COMMITTEE AND ITS FUNCTIONS:

The Dock Safety Committee Constituted under Reg.114 of the DW(SH&W) Reg.1990. Headed by Deputy Chairman of the Port. The committee Constituted by the Chairman of the port and include port officials, representatives of port users, the recognized labour unions and the Chief Inspector.

As per requirement the committee meets in every quarter.

The decisions and recommendations of the safety committee shall be complied with by the port authorities, port users and the employers of dock workers.

The main functions of the safety committee are :

(a) to investigate into the causes of accidents and unsafe practices in dock work and to suggest remedial measures;
(b) to stimulate interest, of employers and workers in safety by organising safety weeks, safety competitions, talks and film shows on safety, preparing posters or taking similar other measures;
(c) to go round the dock with a view to check unsafe practices and detect unsafe conditions and to recommend remedial measures for their rectification;
(d) to organise training programmes for the supervisory staff and workers;
(e) to look into the health hazards associated with handling different types of cargoes and to suggest remedial measures Including use of proper personal protective equipment; and
(f) to suggest measures for improving welfare amenities inside the docks and other miscellaneous aspects of safety, health and welfare in dock work.

1.6 OBLIGATIONS TO EMPLOYERS AND WORKERS:

1.6.1 THE EMPLOYER'S GENERAL OBLIGATIONS AS PER REG.116 OF THE DW(SH&W) REG.1990:

(1) The employer shall take all necessary steps, which, considering the kind of work, working conditions and the worker's age, sex, professional skill and other qualifications, are reasonably necessary for protecting the worker from being exposed to risks of accidents or injury to health at work.

(2) The employer shall make sure that the work place, its approaches and means of access conform to these regulations and are also otherwise in a safe condition.

(3) The employer shall take into account the workers training skill and experience when workers are set to work. A worker shall not be assigned a work for which he has not received sufficient instructions regarding possible dangers and precautions in the work, taking into account his training, skill and experience.

1.6.2 OBLIGATION OF WORKERS IN DOCKS AS PER SECTION 11 OF THE DW(SH&W) ACT 1986:

1. No dock worker shall
   a. Wilfully interfere with or misuse any appliance , convenience or other thing provided in connection with any dock work for the purpose of securing the health, safety, and welfare of dock workers.
   b. Wilfully and without any reasonable cause do anything likely to endanger himself or others and
   c. Wilfully neglect to make use of any appliance convenience or other thing provided in connection with any dock work for the purpose of securing the health, safety and welfare of dock workers.
2. If any dock worker contravenes any of the provisions of sub section (1) of section 11 of the DW(SH&W) act 1986 he shall be punishable with imprisonments for a term which may extend to three months or with fine which may extend to one hundred rupees or with both.

1.7 REQUISITE COMPLIANCE BEFORE DEPLOYMENT OF DOCK WORKER:

1.7.1 SAFETY TRAINING:

The employer shall not allow their employee to perform activities with respect to which the latter does not have the required qualifications or skills, or the sufficient knowledge of the rules and principles of occupational safety and health. No worker shall be allowed to work in docks without safety training. The training shall be carried out during working hours. The employee should receive a certificate or acknowledgement indicating the successful completion of the training.

The training shall comprise of :

- Initial Induction training
- On the job training
- Special Job specific training
- Periodic training.

Relevant records of employees trained shall be maintained in a register.

Mumbai Port’s employees are provided safety training periodically at Port Management Training Centre.

The details of the **TRAINING REQUIREMENTS** are as follows:

(a) Workers shall undergo training, awareness, and competence building to carry out safe work in each respective department.

(b) The training shall be done at various levels as follows:

(i) Induction or Initial Training – Induction/orientation for new workers before being deployed to job/role execution, or initial training for those who are already employed who have not had the induction training;

(ii) Refresher Training – Updating of significant safety-related developments and changes, and review of safety-critical components of equipment, safety aspects of the process, PPE, etc.;

(iii) Specialised Training – To provide information and develop familiarity on the specific hazards and controls for hazardous chemicals and dangerous activities, to workers entering such tasks;

(iv) Role-change Training – For those who are assigned a role change with no change in the equipment, process, PPE, etc., but with different or increased responsibilities; and,

(v) Briefing Sessions – Short 'Toolbox Meetings' to update workers on latest safety-related developments, and demonstrate or review use of special PPE, etc.

(c) The training and briefing shall:

(i) Cover the provisions of The Dock Workers (Safety, Health & Welfare) Act 1986 and rules & regulations made there under;

(ii) Be delivered by trainers who have had the proposed training (or their approved equivalent) themselves, and, have had hands-on experience with the process, equipment, products, PPE and all safety requirements therefore, for a period of at least two years, or have approved trainer-training in the particular module they teach; and,

Sr. No.	*Level*	*Duration*	*Topics to be covered*
(i)	Induction or Initial Training	8 Hours minimum	i. Port overview ii. Main processes and products iii. Duties and responsibilities iv. SOP, SWP, Permit-to-work and other formal actions v. Hazardous materials and processes vi. Engineering controls and safeguards provided and PPE vii. Incident and accident reporting process viii. Fire hazards ix. Escape routes and procedures x. First-aid and emergency procedures xi. Welfare facilities available to workers
(ii)	Refresher and Specialised Training	8 Hours minimum	i. Updating with improvements on safety and health during previous year ii. Review of previous year's performance and lessons learnt iii. Summary review of critical safety procedures and PPE

			iv. Basic description of hazards involved v. Standards and rules shall be followed vi. Specific information on equipment, process, safety measures, signs to watch out for etc. vii. Specific first-aid and emergency procedures

1.7.2 MEDICAL EXAMINATION:

MEDICAL EXAMINATION of dock workers as per Reg.107 of the DW(SH&W) Reg.1990.

(1) It shall be ensured that all dock workers undergo medical examination.-

(a) before he is employed for the first time; or is being selected or trained for the operation of lifting appliances and transport equipment;

(b) periodically, at such intervals as may be considered necessary by the Chief Inspector in view of the risks inherent In the dock work and the conditions under which the dock work is performed.

(2) (a) Wherever considered necessary the medical examination shall also, include X-ray and pathological laboratory examination and

(b) the medical examinations prescribed under sub-regulation 1 (a), (b) and 2 (a) above shall be in accordance with Schedule XI of DW(SH&W) Reg.1990 and no dock worker shall be charged for the same.

(3) In the case of dock workers exposed to special occupational health hazards, the periodical medical examination shall include any special investigation deemed necessary for the diagnosis of occupational diseases.

(4) The details of the medical examination shall be suitably recorded and shall be made available on demand.

Orders Issued by DGFASLI related to Medical Examination of Dock Workers

Vide DGFASLI's order no. 45/6/95-DS dated 27.11.1995, the periodicity of medical examination has been decided by the chief inspector of Dock Safety. In exercise of the powers conferred by sub-regulation 1(b) of Regulation 107 of the Dock Workers (Safety, health and Welfare) Regulations, 1990, framed under the Dock Workers (Safety, health and Welfare) Act, 1986. The periodicity of the medical examination in case of dock workers mentioned other than at Sr. no.1 of Schedule-XI of Dock Workers (Safety, health and Welfare) Regulations, 1990 are as follows:

i. At the time of initial employment
ii. After illness or injury affecting his/her illness
iii. once in every 3 years up to the age of 40 years and
iv. thereafter, once in every 2 years during the service period

Also vide DGFASLI's order no. 45/6-D/97-DS dated 18.11.1998, it should be ensured that the medical examination of dock workers is carried out only by doctors of port hospital or from amongst the doctors empanelled by the chief inspector of dock safety. Also, vide the said order; half yearly statements of medical examination is to be submitted by the employers of

dock workers to the chief inspector of dock safety and inspector dock safety by 15th of January/July every year.

In short, The periodicity of the medical examination for dock workers is as follows :

i) At the time of initial employment

ii) After illness or injury affecting his/her illness

iii) and the Periodicity mentioned below :

Sr. No.	Category of Dock Workers	Periodicity of Medical Examination **up to the age 40**	Periodicity of Medical Examination **after the age 40**
1	Drivers / operators of lifting appliances and transport equipment	Once in every 2 years	Every year
2	Other than mentioned at Sr. No. 1	Once in every 3 years	Once in every 2 years

1.7.3 PROVISION OF REQUISITE PPEs:

The employer shall provide and shall ensure that each affected employee uses the appropriate personal protective equipment (PPE) for the eyes, face, head, extremities, torso, and respiratory system, including protective clothing, protective shields, protective barriers, personal fall protection equipment, and lifesaving equipment, meeting the applicable provisions of this Subpart, wherever employees are exposed to work activity hazards that require the use of PPE

For further details on Personal Protective Equipment (PPE) refer chapter on PPEs.

1.8 FIRST AID:

First aid kits incorporating all the necessary medicines are available at all sheds and offices. If required may be taken from the adjacent shed's Shed Superintendent or from nearby office.

1.9 ACCIDENT'S AT WORKPLACE:

1.9.1 UNDERSTANDING ABOUT ACCIDENT:

i. ACCIDENT:
An unintended occurrence arising out of and in the course of employment of a person and resulting in injury.

ii. Disabling Injury (Lost Time Injury) - An injury causing disablement extending beyond the day of shift on which the accident occurred.

iii. Non-disabling Injury - An injury which requires medical treatment only, without causing any disablement whether of temporary or permanent nature.

iv. Reportable Disabling Injury (Reportable Lost Time Injury) - An injury causing death or disablement to an extent as prescribed by the relevant statute.

v. Death - Fatality resulting from an accident.

Frequency Rate - The frequency rate shall be calculated both for lost time injury and reportable lost time injury as follows:

$$F.R - \frac{\text{Number of lost time injury x 1 000 000}}{\text{Man-hours worked}}$$

Severity Rate - The severity rate shall be calculated from mandays lost both of lost time injury and reportable lost time injury as follows:

$$S.R - \frac{\text{Man-days lost due to lost time injury x 1 000 000}}{\text{Man-hours worked}}$$

Incidence Rate

General incidence rate is the ratio of the number of injuries to the number of persons during the period under review. It is expressed as the number of injuries per 1 000 persons employed.

The incidence rate may be calculated both for lost-time injuries and reportable lost-time injuries as follows:

$$\text{Lost-time injury incidence rate} = \frac{\text{Number of lost-time injuries x 1 000}}{\text{Average number of persons employed}}$$

1.9.2 CAUSES OF ACCIDENT:

In Port premise loading, unloading and transport of bulk cargo, machineries, liquid, gas, solid, hazardous, non-hazardous, essential, non-essential etc. is being done on 24X7 in all types of weather. These makes port a potentially high-risk place to work in as it involves various types of risks. Therefore, everyone entering the port should be aware about these hazards / risks and appropriate control measures should be taken by each individual while entering/working in docks.

Following are the list of hazards associated with working in docks, If necessary precautions are not taken to overcome these hazard then accident may cause:

i. Working at Height
   (a) Person fall
   (b) Object falling from height
   (c) Striking against object
   (d) Dashing of object.
ii. Falling of objects while handling of cargo.
iii. Slip & trips.
iv. Stuck by swinging object.
v. Caught in between two objects.
vi. Run over or dash by moving vehicle or moving equipment.
vii. Lack of Pedestrians access.
viii. Fatigue due working in open area over prolong period.
ix. Noise from equipment & engines.
x. Contact or Release of Hazardous or asphyxiate substance / confined space.
xi. Mooring hazard; if person getting caught in line of rope.
xii. Drowning due to falling in dock basin or open sea.
xiii. Flying particles
xiv. UNSAFE CONDITIONS: This situation could potentially lead to an accident by someone. These are as follows:
   (a) Bad, Inadequate, Reflected lighting and Glare
   (b) Bad ventilation
   (c) Machinery having
      i) Unsafe revolving speed

ii) Unsafe feed
iii) No guards

(d) Inadequate / No. Guarding.
(e) Failure of material /Equipment
(f) Unsafe procedure / Method /Planing.
(g) Faulty machinery
(h) Broken or damaged tools and equipments
(i) Poor maintenance
(j) Badly stored dangerous materials
(k) Fire/explosion.
(l) Noise
(m) Unsafe clothing / Dress/ Apparel /Out-fit
(n) Over Crowding
(o) Slippery floors.
(p) Uneven Floors
(q) United work place
(r) Electric Spark
(s) Excessive heat

xv. UNSAFE ACT

It is an act by the employee which is not in line with safety norms instructions and procedures. About 90 percent of accidents are caused due to unsafe acts. These are as follows:

Human condition

(a) In attendance / negligence while working unsafe position / posture.
(b) Carelessness.
(c) Unsafe use of tools, use of wrong tools.
(d) Improper use of equipment.
(e) Working / operating without authority / Order/Instruction.
(f) Working with unsafe procedure. Working on parts in motion. Unsafe sacking / mixing positioning of materials/substances.
(g) Inexperience.
(h) Failure to use Safety equipment's or personal protective equipment.
(i) Improper dress.
(j) Lack of supervision.
(k) Lack of training
(l) Distracting / Teasing / Abusion /Stating etc.
(m) Horse play
(n) Fatigue or ill-health
(o) Thoughtlessness
(p) Boredom

1.9.3 CONSEQUENCES OF ACCIDENTS:

(i) Costs of accidents:

Every accident at work has a cost associated with it and that is why it is important to manage safety on the job. Many employers believe that the insurer will pick up the costs of an accident, and that is why they pay their insurance. The costs that are involved are both direct and indirect, however the employee who has injured will be the one who suffers more.

a) Direct costs of an accident:

Direct costs are those costs that are accrued directly from the accident. They are quite easy to calculate, and include the medical

costs incurred and the compensation payments made to the injured workers. Direct costs are usually insurable by businesses.

b) Indirect costs of an accident:

Indirect costs are the less obvious consequences of an accident that can be costed. While the indirect costs created by accidents are hidden, they too must be paid from profits from the sale of products. They are more difficult to calculate and tend not to be insured.

Examples of total cost of accidents (agency – wise) are as follows:

Effect to Injured Person - Nature of Injury (minor, serious or fatal), endurance of physical pain & sufferings of injury, loss of incentives of that day as well as in leave period of accident, effect of injury on his day to day activity off the job as well as on his work, loss of his moral & its effect on productivity and in case of serious injury reduced life expectation as he may try to compare his existing routine with routine before injury, Mental anguish, lost time with family and friends.

Effect to Family Members of injured - Effect on future or career of family members due to loss of wages, loss of time of family members during accompanying injured family member, disturbance of routine, loss of time friends & relatives of victim during their visit to injured.

Cost to MbPA - Payment of Compensation, payment of sick pay, cost incurred for medical treatment, cost incurred for transportation of injured to Hospital, loss of working time of vessel / workers / staff / port users / equipment deployed, damage to cargo/equipment/vessel/property, cost of repair of cargo/equipment, lower moral of co-workers and its effect on productivity, time required replacement of injured person and efficiency of new person, loss of productivity, overtime cost/deployment of private labour, failure to meet deadlines and time, manpower required for makeup, legal cost, expenditure on emergency supplies/procurement, resources required for cleanup and startup of operations interrupted by an accident, loss of time of investigating Agencies i.e. officers of Police/Dock Safety/Port safety, time spent by staff during investigation process, time consumed by staff for administrating benefits claims, cost of fines/penalties, cost incurred for expertise, effect on subsequent processes, cost of remedial measures.

Cost to other Stake holders - Effect on Shipping Agent, CHA, Ship Owners, Ship Crew, Importer or Exporter, Transporters, insurance company, etc. involved in accidents.

Cost to End Users - Delay in delivery of consignment and effect of that on their process.

Cost to Nation - Increase in price of manufactured product, loss of GDP.

c) The uncalculated costs of an accident

Now, we have read about direct and indirect costs associated with workplace accidents. But, there are other costs that are difficult or impossible to measure that may have a “fatal” impact on the success

of the company. We're talking about the unknown or uncalculatable costs of workplace accidents: **moral and reputation.**

When a serious accident or fatality occurs in the workplace, a very basic, negative message may be sent to employees: "management does not care." The message may be subtle, but it may be there. In many instances, employee morale suffers, and this usually negatively impacts the quantity and quality of the work they perform. Employee turnover usually increases after a serious accident, and always after a fatality.

Another factor that might affect the long-term success of the company is that of reputation. What do employees and the members of the local community think about a company that does not keep its workplace safe and healthful? What message about the company does the family of accident or fatality victim send to their relatives, friends, and neighbours? Will a company with a poor accident record maintain competitive advantage when hiring the best qualified people? The reputation of a company is a reflection of its public image and must be considered as an important factor influencing its success.

Thus, accidents are much more expensive that most employers realize. Visualizing the total cost of an accident is much like viewing an iceberg from above and below its surface. Like an iceberg, the cumulative cost of an accident is more than meets the eye. Therefore, the key to preventing workplace accidents and the impact of their resulting costs is to create and maintain an effective safety and loss control program. A loss control program protects your business against not only financial losses but also the loss of good workers and overall worker morale. Investing in a visible, working accident prevention program benefits everyone in the organization from top to bottom.

(ii) To the workers:

- Pain from injury
- Loss of Incentives

(iii) Direct Losses:

- Loss of Limb
- Loss of earning capacity
- Expenditure from medical treatment
- Compensation

(iv) Indirect Loss:

- No peace of mind in the family
- Frustration in life
- Future plans upset
- Loss to the family if death or disablement occurs

(v) Social Loss:

- Children becomes orphans
- Loss of parent of son/daughter
- Burden of Society

1.9.4 ACCIDENT PREVENTION:

Every accident ultimately results into a loss of men/machinery/material. An accident occurs due to unsafe acts & unsafe conditions. Therefore, it is the collective responsibility to confirm the implementation of the necessary measures for accident prevention.

There are five ways in which an accident can be prevented: -

(i) Engineering a) Plan job b) Proper design c) Clearance of passage
(ii) Enforcement a) Safety work procedure b) Safety specification c) strict compliance d) work permit system
(iii) Evaluation a) Inspection b) Safety Audit c) Investigating the reason for accidents.
(iv) Education a) Safety Training b) Safety Film Show c) First Aid Training and Demonstration d) Fire Fighting training e)Safety Exhibition
(v) Enthusiasm a) Safety Award Scheme b) Safety Performance in accident rating c) Safety Competitions d) safety suggestions.

1.9.5 ACCIDENT REPORTING:

As per Regulations 91 of the Dock Workers (Safety, Health and Welfare) Regulations, 1990, it is mandatory on the part of port users (all employers) to report accidents involving their employees while carrying out duties inside the port. The accident shall be reported to the area in-charge immediately in Form-XII.

Each and every accident that occurred in our port is investigated and therefore, it is essential on part of every port users to co-operate and provide all evidences to the Investigation Officer during the course of investigation.

Whenever an accident occurs, the concern sectional / divisional head will furnish the details of the incident in the Accident Report Form i.e. Form XII to the Safety Management Cell of Mumbai Port Authority. The accident reports are examined by the respective Safety Officer for the correctness of information, checking for cause of injury and its nature along with the wearing of personal protective equipment's.

If the injured person did not report to duty for next 48 hours the said accident is considered to be REPORTABLE ACCIDENT which is further informed to respective Government Authorities such as Inspectorate of Dock Safety, etc.

As per The Dock Workers (safety, health & welfare) Regulations, 1990 the guidelines for reporting of the accidents as follows:

a) SOP for Accident or Dangerous Occurrence Reporting:

Sr. No.	Stage of Work	Activity	Responsibility
1	Identification of Accident Occurrence or Dangerous Occurrence (DO)	Accident – Any incident resulted in loss of life or disabled injured person from his work for rest of the day. Dangerous Occurrence – Any incident of i) Collapse or breakage or failure of lifting appliance, rope, loose gear, sling. ii) Collapse or subsidence of any wall, floor, roof, platform or means of access iii) any explosion or fire iv) Collapse, capsizing, toppling or collision of the transport equipment v) Spillage or leakage of dangerous goods vi) Breakage, buckling or damage of freight containers	Supervisor of the Work, which is being carried out thereat
2	Rendering First	Render first aid treatment to the	Supervisor of

	Aid and transportation of injured to the nearest Hospital	injured person and immediately transport him by available means to hospital or dispensary	the Work, which is being carried out
3	Intimation of accident or DO	**Within four hours** of occurrence give intimation of accident or DO by telephone or special messenger to i) Officials of Inspectorate of Dock Safety, Ministry of Labour & Employment, Govt. of India. ii) Safety Officer, Safety Management Cell, Mumbai Port Authority In case of any incident resulted into loss of life, then iii) Nearest Police Station iv) relatives of the victim	Supervisor of the Work, which is being carried out and same is to be ensured by his Officer
4	Not disturbing site of accident or DO	In case of failure of lifting appliance, loose gear or transport equipment OR fatality of person, then till the visit of concerned officials, the site shall not be disturbed, as far as practicable.	Supervisor of the Work, which is being carried out and same to be ensured by his Officer
5	Information Collection and preliminary identification of probable cause of accident or DO	By the observation of the accident site and information collected from injured person or eye witness, if any, indicate work, which was being carried out thereat and identify the probable cause for said incident.	Supervisor of the Work, which is being carried out
6	Reporting of Accident or DO in Form No. XII (Required by Regulation 91 of the Dock Workers (Safety, Health and Welfare) Regulations, 1990)	Fill up all information given in Form No. XII and submit **within 72 hours** of occurrence via email or by hand delivery to the office of i) Inspectorate of Dock Safety, Ministry of Labour & Employment, Govt. of India, OSC building, 3rd floor email – idsmumbai@dgfasli.nic.in ii) Safety Officer, Safety Cell, Mumbai Port Trust, 4th floor, Ambedkar Bhavan, Indira Dock email – safety.cell@mumbaiport.gov.in	Supervisor of the Work, which is being carried out and same is to be ensured by his Officer

b) Format of Form XII:

FORM XII

To be sent to the Inspector, Dock Safety
Address:

REPORT OF ACCIDENT OF DANGEROUS OCCURRENCE

[Required by Regulation 91 of the Dock Workers (Safety, Health and Welfare) Regulations, 1989 in pursuance of Sec. 22 of the Dock Workers (Safety, Health and Welfare) Act, 1986].

(See Instruction Overleaf)

1. Name of the Employer

2. Address of the Employer

3. Ship or other exact place where accident or dangerous occurrence happened.

4. Date, Shift and hour of accident or dangerous occurrence

5. (i) Name and address of injured person Date Shift Hour
Sex Age Year Occupation
No. Experience in the trade

(ii) Nature and extent of injuries, (e.g. fatal, loss of finger, fracture of legs)

(iii) By whom treatment was given?

(iv) Was the injured person disabled for more than forty-eight hours?

(v) Type and name of cargo handled.

6. Hour at which the injured person started work

7. Cause of accident or dangerous occurrence

8. Accident:

(a) If caused by machinery, state:

(i) Name of machine and part causing the accident.

(ii) if moved by mechanical power at the time.

(b) State exactly what the injured person was doing?

9. Dangerous occurrence:

(a) Nature of collapse or failure of lifting appliance.

(b) Nature of the breakage of rope, chain or other appliances.

(c) Name of collapse or failure of means of access to or from a ship.

(d) Nature of any other dangerous occurrence as counted under Regulation 90 other than 9 (a), 9 (b) and 9 (c) above.

Signature.....
Dated.....

(to be filled in by Inspector)

Port.....
Date of receipt.....
Accident/Dangerous Occurrence No.....
Causation.....
Sex.....
Remarks.....

c) <u>Instructions: For Reporting of Accidents and Dangerous Occurrences:</u>

I. Notice of any accident in a dock which either,
causes loss of life; or
   a) causes loss of life; or
   b) disables a person from work on which he was employed for the rest of the day or shift in which the accident occurred; shall forthwith be sent by telegram, telephone or special messenger within four hours of the occurrence to,-

      i. the Inspector:
      ii. the relatives of the workers when the accident causes loss of life to the dock worker or is likely to disable the dock worker from work for more than ten days; and
      iii. in the case of fatal accidents also to: the officer-in-charge of the nearest Police Station, and, the District Magistrate or if the District Magistrate by order so directs, the Sub-Divisional Magistrate.

II. In the case of accidents falling under Cl. (b) of sub- regulation (1) the injured person shall be given first-aid and thereafter immediately transferred to a hospital or other place of treatment.

III. Where any accident causing disablement subsequently results In the death of dock worker, notice in writing of the death shall be submitted to the authorities mentioned in sub-regulation (1) within 72 hours after the death occurs.

IV. The following classes of dangerous occurrences shall be reported to the Inspector, whether death or disablement is caused or not, in the manner prescribed in sub-regulation (1):

   a. collapse or failure of lifting appliances or conveyors or breakage or failure of rope, chains or other loose gears and lifting devices or overturning of cranes, used in dock work, falling of hatch boards or cargo from sling, displacement of hatch beams or coverings;
   b. collapse or subsidence of any wall, floor, gallery, roof, platform, staging or means of access;
   c. explosion of a receiver or vessel used for the storage, at a pressure greater than atmosphere pressure of any gas or gases (Including air) or any liquid or solid resulting from the compression of gas;
   d. explosion or fire causing damage to any place in the dock in which dock workers are employed;
   e. collapse, capsizing, toppling or collision of the transport equipment,
   f. spillage or leakage of dangerous goods and damage to their containers; and
   g. breakage, buckling or damage of freight containers.

V. If a failure of lifting appliance, loose gear and transport equipment has occurred, the concerned appliance, gear or equipment and the site shall, as far as practicable, be kept undisturbed until inspected by the Inspector.

VI. Every notice given under sub-regulation (1) and sub-regulation (4), shall be confirmed within seventy-two hours of the occurrence by submitting a written report to the inspector in Form XII and a proper acknowledgment obtained provided that in case of an accident under Cl. (b) of sub-regulation (1), such written report need be submitted only when the dock worker is

disabled from work on which he was employed for more than forty-eight hours from the time of accident.

1.9.6 ACCIDENT INVESTIGATION:

i. All accidents shall be enquired into with a view to find out causes and take remedial measures to prevent recurrences as well as for legal reporting of the accident and for publicizing the particular hazards among employees.

ii. Form XII received form the concern sectional / divisional head will along with the statement of eyewitness of accident will be used for investigation of the accident.

iii. The findings of the accident investigations will be sent to concerned head of department by the Safety Officer for taking corrective action and enforcing remedial measures.

iv. If required, Heads of the Department may form committees with specific terms and references to investigate in to certain accidents depending upon the seriousness of the accidents or occurrence.

1.10 SAFETY GUIDELINES / RULES FOR PORT VISITORS:

Working in Port premise is challenging as it involves various types of risks. Therefore, to manage these risks and to safeguard the man and material, all the port users should scrupulously compile with the following Safety Guidelines / instructions in port premises.

i. Safety is everybody's concern. It is the duty of every person entering in docks that he/she should take reasonable /adequate/upmost precaution / care in his/her work or function to safe guard his/her own life as well as of others or damage to property or environment.
ii. Observe all Rules & Regulations applicable for your work to ensure safety at work place and Not to wilfully as recklessly endangers safety & health of any person.
iii. No one should enter the docks under influence of alcohol or drugs.
iv. Do not smoke, cook or light fire & spit in docks.
v. Always wear appropriate personal protective Equipment (PPE) like Helmet, Safety Shoes, Hand gloves, Safety goggles etc.
vi. Ensure that PPE's shall be of good quality and conforming to respective IS standard, while entering in the operational area. Further employees shall maintain PPE's in good condition.
vii. Make proper use of all safety devices and guards provided.
viii. Practice good housekeeping.
ix. Do not leave tools on the floor or where they can fall on people below.
x. Do not leave your equipment / tools / vehicle unattended at any time.
xi. All stairways, platforms and walkways must be kept clean at all times.
xii. Where walkways are provided use them instead of short cuts and aalways walk alongside from right hand side of the road.
xiii. Loitering around operational areas /wharfs/ jetties / etc. is prohibited.
xiv. Do not walk under suspended or elevated load.
xv. Do not stand in swinging radius of any lifting appliances or near any equipment, while working.
xvi. Do not take rest or sleep near stack of cargo, on road, outside shed, transit area, yard, under vehicles or equipment, etc. Always take rest only in rest room only.
xvii. Before commencement of any work obtain work to permit and compile with all the requirements of permit.

xviii. No welding, cutting & grinding brazing or soldering without a Hot Work permit.
xix. Strictly follow all traffic Regulation/warning / traffic signs/caution signs.
xx. Maximum speed limit for vehicle is 20 km/h on roads & 8 km/h on wharf.
xxi. Drive very cautiously in the work area. Go slow and sound horn when approaching a blind corner.
xxii. Use of mobile phone while driving / working / walking is prohibited.
xxiii. No one expect driver (operator) is allowed to ride/drive any vehicle/fork-lift/ powered trolley /crane, etc.
xxiv. Park your vehicle in designated parking area only.
xxv. Never ride on any cargo handling equipment like crane, forklift, etc.
xxvi. Transporting or storing of petrol or corrosive chemicals in any open carrier is strictly prohibited.
xxvii. Report promptly any situation affecting the safety of any person, sustaining an injury on the job, however minor may be, to Supervisor / officer /etc. who will arrange for immediate medical aid.
xxviii. Report any injury or damage to properly or to environment or fire incident at once to the nearest shed superintendent.
xxix. Firefighting equipment is for fire use, keep it away from obstruction and misuse.
xxx. Action by person noticing the fire.
-Attempt to extinguish the fire with available firefighting equipment.
-operate fire alarm and/or inform fire station on telephone.
xxxi. In case of any emergency please contact operator on phone No. 66565656 or nearest Shed Superintendent for help and co-ordination.
xxxii. In case of any Emergency Evacuation, Or report at the nearest Gate.
xxxiii. For any safety guidance, you may approach the Safety Management Cell, at 4th floor, Ambedkar Bhavan.

1.11 ROAD TRAFFIC RULES AT MUMBAI PORT:

Following rules for road traffic are applicable to the vehicles entering the premises of Mumbai Port. These are in supplement to the Government rules applicable.

a) All the road traffic signals should be used by all drivers. The vehicular traffic must be to the left of the road except
b) The speed limit for all vehicles is **20 kms** per hour on **main roads** and 8 **kms** per hour on **the wharfs.**
c) There shall be no overtaking of one motor vehicle by another inside the factory except in the following cases:
   - **Crawlers:** These slow moving vehicles can be overtaken.
   - Fire Engine and Ambulance Van may overtake vehicles when on emergency duty.
d) The driver should be permitted to drive only the vehicle assigned to him. The driver of the vehicle should check his vehicle every day before using it and ensure that the vehicle is in good order. Any defects, if found, should be got rectified.
e) No one shall drive a motor vehicle on the factory roads unless he is licensed to drive that vehicle.
f) A vehicle must only be so loaded as to conform to the requirements of the Government rules. Overloading of veicles is strictly prohibited.
g) Persons must not attempt to board on or alight from a vehicle in motion. The driver must make sure before starting his vehicle that no one is alighting or boarding.
h) Vehicles must be started, stopped or turned gently and not suddenly.

i) Road must always be kept free of obstruction.
j) No vehicle should be parked in no parking zone.
k) Drivers must not leave their vehicles with engine running, nor leave or unauthorised person.
l) A vehicle turning about must always turn round on the right.
m) Triple riding on a motorcycle or a scooter is strictly prohibited.
n) For cargo handling equipment's like cranes, forklift, hydra, etc. i) Area equal to Swing Area of the Crane being operated shall be closed off to create a control zone, so that no unauthorized people are put in danger. ii) Crane outriggers shall be properly retracted while driving (slowly) along a road or a worksite. iii) The Sling ropes, hooks etc. shall be properly tied/secured/latched and the boom/jib should be properly secured while driving (slowly) along a road or a worksite.
o) Traffic accidents must be reported to the Safety Officer and Security, whether injuries are caused to person or not.

1.12 PUNITIVE ACTION:

At Mumbai Port the safety of men and material is at most important, therefore it's very important to take appropriate safety measures while working in port premise to safeguard the man and material. If it is observed that any dock worker violating safety norms / not taking necessary safety measures while working in the port premises and endangering lives of the other dock workers then on such dock worker penalty is levied for violation of Safety norms.

1.12.1 POLICY FOR MONITORING OF CONSUMPTION OF ALCOHOL AT WORKPLACE:

I) Purpose

In compliance with the 117 of the Dock Workers' (Safety, Health & Welfare) Regulations, 1990 to provide a safe work environment, the alcohol and drug misuse can endanger life, safety and health of the dock workers. Hence, Mumbai Port is committed for elimination of drug and alcohol misuse in the workplace.

II) Scope

This policy applies to every individual, who are entering at any workplace of Mumbai Port Authority, where dock work is carried out i. e. Docks, Container Fright Stations, Railway Operations, Bunders, Outlying areas, Jawahar Dweep, Pir Pau, On-board Crafts, Roads, Vehicles or Similar workplaces.
The Traffic department is responsible for administration of this policy.

III) Work Rules

1. Whenever any dock worker is carrying out dock work or operating any vehicle / craft / engine / lifting appliance / machinery in premises or is conducting any inspection / survey or providing any service; are prohibited from:

a. Using, possessing, buying, selling, manufacturing or dispensing an illegal drug
b. Being under the influence of alcohol or an illegal drug.
c. Possessing or consuming alcohol.

2. The presence of any detectable amount of any illegal drug, illegal controlled substance or alcohol in body system, while performing any work is prohibited.

3. It's mandatory for all individuals to report to management if any violation is observed against this Policy.

IV) Required Testing other than Periodic Testing

Reasonable suspicion

Dock workers are subject to testing based on, but not limited to, observations of apparent workplace use, possession or impairment *by at least two officers*. Management to use the reasonable suspicion observation checklist to document specific observations and behaviours that create a reasonable suspicion that dock worker is under the influence of illegal drugs or alcohol. Examples include:

- Odours (smell of alcohol, body odour or urine).
- Movements (unsteady, fidgety, dizzy).
- Eyes (dilated, constricted or watery eyes, or involuntary eye movements).
- Face (flushed, sweating, confused or blank look).
- Speech (slurred, slow, distracted mid-thought, inability to verbalize thoughts).
- Emotions (argumentative, agitated, irritable, drowsy).
- Actions (yawning, twitching).
- Inactions (sleeping, unconscious, no reaction to questions).

When reasonable suspicion testing is warranted, officer will meet with dock worker to explain the observations and the requirement to undergo alcohol test within one hour.

Post-accident

Dock workers are subject to testing, when they cause or contribute to accidents / incident that damage vehicle, machinery, equipment or property or that result in an injury to themselves or another person requiring medical attention. Checking of alcohol consumption of all persons involved in accident will be carried out by the in-charge of the work place i. e. officer or supervisor. In such cases, prime importance should be given to render first aid to the victim or injured person and to send him for further medical treatment.

V) Collection and Testing Procedures

Dock workers subject to alcohol testing are directed to provide breath specimens. Breath specimens will be tested by breath analyser equipment that identify if dock workers breath alcohol content (BAC) limit is 0.03% or 30 mg alcohol in 100 ml blood. If positive, then second breath specimen will be tested approximately 20 minutes later. The results of the second test will

be determinative. The positive test results generated on breath analyser will be considered as work rule violations and his / her will be stopped thereat.

VI) Periodic Checks :

i) Every Week, Sectional officer will carry out checks in their jurisdiction for detection of any cases of alcohol consumption and to submit monthly report of such checks to their HoD.

ii) Every Fortnight, a team comprising of officials from Traffic, CISF, Security Division and Safety Management Cell will carry random checks in the MbPA premises for detection of cases of alcohol consumption.

To conduct said visit, officer of Traffic department will be nominated, who will coordinate with other sections for visit and for further procedure after detection of alcohol.

VII) SOP (Standard Operating Procedure) for Testing of Serum Alcohol

Sr. No.	ACTIVITY	RESPONSIBILITY
1	After detection of positive display result on breath analyser the person should be stopped thereat.	Concerned Supervisor or Officer of the area.
2	Immediately or within one hour person detected for positive result should be send to Port Trust Hospital, Wadala for testing of serum alcohol level with letter (Format attached as Annexure - A) with one person accompanying him. Further, for escorting these persons from workplace to Wadala Hospital, one CISF guard will be taken. For Port Users requisite charges will be collected from the Agency who has issued DEP to that person	Concerned Supervisor or Officer of the area.
3	At hospital on casualty medical officer will collect the sample and will send to forensic lab within 24 hours for testing.	Medical Department
4	After collection of sample, a person will be counsel for alcohol de-addiction and alcohol withdrawal symptoms at hospital.	Medical Social Worker
5	After receipt of report from the forensic lab after 3 weeks by the hospital, it will be send to the concern section / department from where the letter for testing is received by the Medical Department and a copy will be given to the Safety Management Cell	Medical Department
6	If the test report is more than the prescribed limit of Serum Alcohol in blood sample, the sectional officer will initiate disciplinary proceeding against defaulter employees as per	Concerned Authorities

	the prevailing rules. In case of Port Users employee, the person detected positive will be blacklisted by DEP Section as per the prevailing policy and their employer will be cautioned. In case of defaulter is in tender working, then action will be initiated as per the tender condition. If such tender condition do not exist, then such condition shall be added by the concerned department.	

VIII) Equipment for testing at workplace

The specification for the breath analyser is attached as Annexure B. All departments will assess their requirement within one month to carry out checks and will place the indent with MM by following requisite procurement procedure

IX) Consequences

Any person who refuses to cooperate in required test either breath analyser or blood test will be treated as a positive test result and will result in further course of disciplinary action.

"Refuse to cooperate" means to obstruct the collection or testing process; to submit an altered, adulterated or substitute sample; to fail to show up for a scheduled test; to refuse to complete the requested testing forms; or to fail to promptly provide specimen(s) for testing when directed to do so, without a valid medical basis for the failure. Any dock worker, who leave the scene of an accident without justifiable ground prior to submission to alcohol testing will also be considered to have refused to cooperate and will automatically be subject to action

X) Confidentiality

Information and records relating to positive test results will be kept confidential to the extent possible. Such records and information may be disclosed among managers and supervisors on a need-to-know basis and may also be disclosed when relevant to a grievance, charge is raised by the applicant.

XI) Format of Letter for sending a person to the Mumbai Port Hospital, Wadala for Serum Alcohol testing

No. _____

To
The Chief Medical Officer,
Mumbai Port Hospital,
Wadala, Mumbai

Sub: Testing of Serum Alcohol in blood

During testing of breath sample at (------location) on (-----date) at (-----time) hrs., the breath analyser result of following person is found Positive. Therefore, it is requested to carry out the testing of Serum Alcohol in his/her blood. The details of person is as follows:

i) Name of the person –
ii) Name of the employer -
iii) Department / Section –
iv) DEP taken for defaulter by -
v) DEP No. / Identity Card No. –
vi) Name of the Supervisor / Tendering Executing Authority –
vii) Name of the accompanying person –

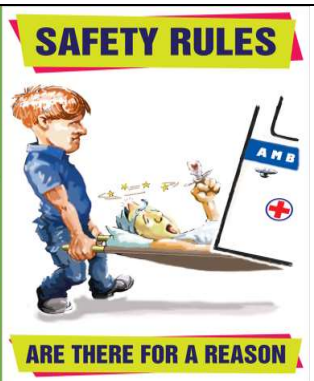
Signature with date
Name –
Designation –
Department / Section -
Contact number –

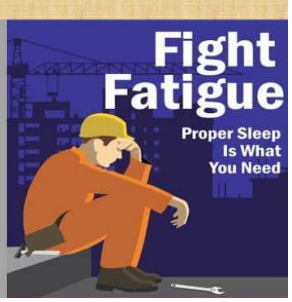
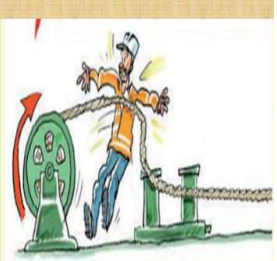
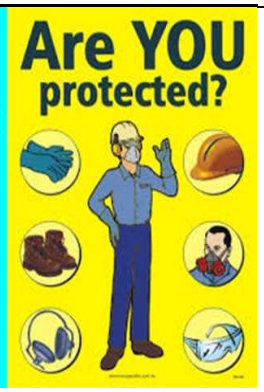
1.12.2 PUNITIVE ACTION FOR CONSMPTION OF ALCOHOL AT WORKPLACE:

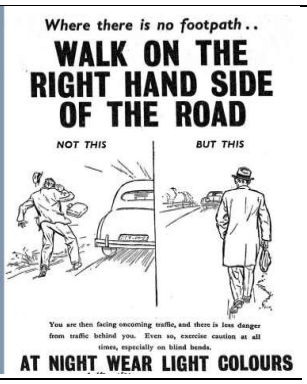
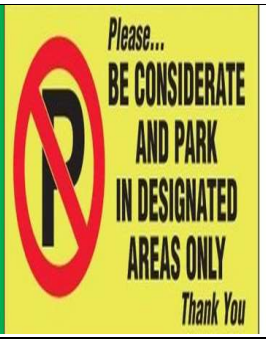
Following punitive action shall be taken for Offence /Misconduct committed by Individual.

Offence Committed	Gravity of Misconduct	Offence reported by	Offence reported to	Penalties / Punishment
Entered / Found in the docks under influence of alcohol / drugs	Major	Safety Cell/Shed Supdt. / Gate Inspector/CISF/ Security /MbPA Officers	Dy. Traffic Manager (Hamallage) / Sr. DTM (R)	Blacklisting of the person for 2 years and to issue show cause letter to the port user for Misconduct of their employee

1.13 SAFETY INDUCTION:

Sr. No.	Type of Hazard at workplace	Sr. No.	Type of Hazard at workplace
1	Observe all Rules and Regulations applicable for your work to ensure safety at workplace 	2	It is the duty of every person entering in docks that he/she should take reasonable /adequate/upmost precaution / care in his / her work or function to safe guard his/her own life as well as of others or damage to property or environment 
3	No one should enter the docks under influence of alcohol or drugs 	4	List of hazards associated with dock working are presented in brief. Hence, appropriate precaution/control measures should be taken by each individual while going to workplace or working in docks 
5	Workplace Hazard Falling of objects during handling of cargo 	6	Workplace Hazard Struck by swinging or moving object 
7	Workplace Hazard Get caught in between two objects 	8	Workplace Hazard Slips and trips 

9	**Workplace Hazard** Lack of Pedestrians access way or walkway 	10	**Workplace Hazard** Run over or dash by moving vehicle or moving equipment 
11	**Workplace Hazard** Fall of a person from height 	12	**Workplace Hazard** Contact with or Release of Hazardous or Asphyxiate substance in confined space or open area 
13	**Workplace Hazard** Drowning due to falling in dock basin or open sea 	14	**Workplace Hazard** Higher level of Noise from equipment and engines 
15	**Workplace Hazard** Fatigue or Stress due to working in open area or working over prolonged period 	16	**Workplace Hazard** Snapping back of *or* getting caught in line of mooring rope 
17	Always wear appropriate personal protective Equipment (PPE) like Helmet, Safety Shoes, Hand Gloves, Safety Goggles etc. during working in the operational area 	18	Do not walk or stand under suspended or elevated load 

19	Do not stand or walk through swinging radius of any lifting appliances or near any equipment, during their working 	20	Do not take rest or sleep near stack of cargo or on road or outside shed or transit area or yard, under vehicles or equipment, etc. Always take rest in rest room only 
21	Speed limit for vehicle is 20 km/h on roads and 8 km/h on wharf (entry for cargo vehicles only) 	22	Do not use of mobile phone while driving / working / walking in docks 
23	Strictly follow all traffic Regulations/ warnings/ traffic signs / caution signs, etc. 	24	Always walk alongside at right hand side of the road. Do not unnecessarily walk through any operational area/wharf 
25	Never ride on any cargo handling equipment like crane, forklift, trailer, etc. 	26	Park your vehicle in designated parking area only 
27	Do not smoke or cook or light fire and spit in docks 	28	No welding or cutting or grinding or brazing or soldering without a Hot Work permit 

29	Do not leave your vehicle / equipment unattended at any time 	30	Do not willfully or recklessly endangers safety and health of any person 
31	Practice good house keeping 	32	Please report any injury or damage to property or environment or any fire incident at once to the nearest shed superintendent 
33	If you required any medical attention or First Aid or fire extinguisher, please contact nearest shed superintendent. First Aid Box and fire extinguishers are available in each shed 	34	In case of any emergency please contact telephone operator on phone No. 66565656 or nearest Shed Superintendent for further help and co-ordination 
35	In case of any Emergency Evacuation, report at the nearest Gate 	36	For any safety guidance, you may approach Safety Cell, 4th floor, Ambedkar Bhavan, Blue Gate, Indira Dock 

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CHAPTER 2: CARGO HANDLING

At Mumbai Port handling of all types of cargo bulk cargo, machineries, liquid, gas, solid, hazardous, non-hazardous, essential, non-essential etc., non-essential etc. is done on 24X7 in all types of weather. These handling of cargo involves various types of risks. If appropriate safety measures are not taken then there is high probability of occurrence of accident. It was observed that many of the previously occurred accidents occurred previously could have been prevented just by following the Safe Operating Procedures(SOPs)/safety guide lines and taking necessary safety precautions. Thus, to avoid such unhappy events safety practice should integrate in to a culture.

Therefore, for various Cargo Handling Operations the Safe Operating Procedures (SOPs) are prepared to increase the Safety awareness amongst the port users. These Safe operating procedures (SOPs) will help in judging various unsafe conditions /unsafe operations. Which do exist during working in Port Premises.

2.1 SAFE OPERATING PROCEDURES (SOPs) FOR CARGO HANDLING OPERATIONS:

2.1 GENERAL SOP FOR HANDLING OF CARGO IN PORT

Planning:

a) Advance planning of Lifting Appliances, equipment, Loose Gears for appropriate capacity and other ancillary tools required for safe handling of cargo.

Before Commencement of Operation:

b) Inspection of tests and certificates of lifting appliances, loose gears, wire ropes, etc. for their adequacy of capacity.
c) Visual Inspection of lifting appliances, loose gears, wire ropes, etc. for their soundness.
d) Trial Operation of lifting appliances without any load for its smoothness or detection of any defects, etc.
e) Inspection of safe access of docks workers to their workplace i.e. deck, hold, ship crane, signalman, etc.
f) Ensure that experienced and skilled dock workers with sound health are deployed.
g) Inspection of stacking of cargo in hold or receiving of cargo on shore. On the basis of situation/condition thereat decide safe and proper method of handling.

At the Time of Commencement of Operation:

h) Impart Tool-Box Talk or explain Safety Precautions to be taken and potential dangers involved while handling of this cargo.
i) Provide appropriate PPEs to the dock workers and instruct them for their use.
j) Keep ready any emergency equipment required for rescue of person in case of any accident/ incident and emergency contact numbers or numbers of Responsible Persons f for advice.

During Operation:

k) Ensure that all dock workers are using PPEs provided to them.
l) Effective supervision to ensure that no dock worker is standing or

working in a danger zone of falling of cargo or any suspended load.

m) Regular monitoring of Stability of stacks inside hold due to cascading effect of handling. If unstable then take immediate necessary action to make it stable or cordon off the area of potential fall of cargo.
n) Ensure that during operation no unsafe stack or wing stack is created.
o) Ensure that always Safe access is maintained for emergency evacuation of dock workers.
p) Ensure that always enough space is maintained around stack of cargo or working area for smooth maneuvering for emergency vehicles like Ambulance, Fire Tender, etc.
q) No unauthorized entry or loitering in the working area.
r) No person is taking rest or sitting in the vicinity of cargo operation or stack.
s) Cargo is handling is taking place in safe manner.
t) Observe proper traffic discipline.
u) Prohibition of use of Mobile Phone, while working.
v) Maintain Good House Keeping and hygiene.
w) Proper securing and lashing of cargo of stack for accidental rolling/collapse as well as during transportation of cargo from handling point to offloading point.
x) Adequate illumination and ventilation is maintained at the working area.
y) No Hot Work or Smoking near cargo operation.

2.2 SOP FOR SAFETY IN HANDLING OF CARGO BY DEPLOYMENT OF PRIVATE MANPOWER

Purpose

This procedure outlines the requirements of the management of Mumbai Port Authority for handling of any cargo / consignment in docks / outlying area / Container Fright Station / Bunders / Mid-stream carried out by deployed private manpower by Shipping Agent / Stevedore / Man Power Supplier / Contractor / by any firm; to avoid accident and minimize adverse effects on health of workers working thereat.

The procedure provides general guidance for safe handling of cargo. Safety is integral part of duties assigned to each person working in the Port. As the working conditions in docks operation are dynamic in nature, therefore, any action / initiative needed, which is not covered in this SOP, but required to maintain safe working environment shall be taken.

Mandatory Requirement

Obligation of Employer of Dock work - As per provisions of the Dock Workers (Safety, Health and Welfare) Regulations, 1990, it is mandatory that any employer of dockworker shall deploy their dockworker only after he/she has undergone medical examination from Medical Practitioner empanelled by the Chief Inspector of Dock Safety. Further, requisite Safety Training has been given to him /her depending upon their nature of work and skill required for performance of their duties.

Obligation of dockworkers - Section 11 (1) of the Dock Workers (Safety, Health & Welfare) Act, 1986 regarding obligation of dockworkers stipulates that no dockworker shall:

a) Wilfully interfere with, or misuse, any appliances, convenience or other thing provided in connection with any dock work for the purpose of securing the safety, health and welfare of dockworkers;
b) Wilfully and without reasonable cause do anything likely to endanger himself or others.
c) Wilfully neglect to make use of any appliances, convenience or other thing provided in connection with any dock work for the purpose of securing the safety, health and welfare of dockworkers.

Personal Protective Equipment (PPE) - When working in MbPA operational area head, foot, and hand protection are needed for all dockworkers. Therefore, safety helmet. Safety shoes and nitrile coated hand gloves are required to be wear in proper way. Further, when harmful agents/dusty cargo is being handled, then suitable mouth protection and clothing should also be provided in addition to above PPEs. Protection for noise level needed to be provided to the workers, where noise level is beyond 80 decibels due to operation of appliances like forklift, ship and other cranes.

Guidelines - For detailed guidance, the requisite regulatory provisions under the Dock Workers' (safety, Health & Welfare) Regulations, 1990 shall be referred.

The MbPA has developed a 'Safety Zone' at MbPA website Portal (location - lower right corner). Under this zone various safety related material like Safety Checklist, SOPs, Hazard Identification and Risk Assessment (HIRA) sheets, Safety Guidelines for Port users, Emergency Contact numbers, Safety Induction for obtaining Dock Entry Permit, various Safety Posters, etc. are made available to users at one place. You are, requested to give wide publicity to this 'Safety Zone' amongst your members to make use of these documents for creating safety awareness amongst their employees and also use the Checklists, SOPs during their working in docks to help us to make Port Safe Workplace.

As most of the Dock entry Permits are generated on-line, therefore, if any employee/visitor of Port User is intending to enter in docks for any work, then he/she should be instructed by his employer to go through the Safety Induction Presentation provided at the website to sensitise him/her about the potential hazards encountered in dock working.

Standard Operating Procedure for Import Operation

Stage of work	Activity	Responsible Agency
Application	For handling of cargo from vessel, a Shipping Agent shall make an application is prescribed format (Annexure-1) giving details of his stevedore, man power supplier, transporter and consignee, in case of direct delivery	Shipping Agent
Deployment of dockworkers for discharging Operation	As per provisions of the Dock Workers (Safety, Health and Welfare) Regulations, 1990, it is mandatory that any employer of dockworker shall deploy him/her only after it has undergone medical examination and imparted requisite Safety Training depending upon their nature of work and skill required for performing their duties.	Shipping Agent / Stevedore Agency and Man Power Supplier engaged by the Shipping Agent.
On-Board Cargo Handling - Discharging	Please refer the SOP prepared for 'Working On-Board the Ship' (Annexure-2) Refer or make use of 'Safety Checklist for On-Board Working' (Annexure-3)	Shipping Agent / Stevedore Agency engaged by the Shipping Agent
Cargo Handling on Wharf	Please refer SOP for Transportation of CR/HR coils (Annexure-4) Refer or make use of 'Safety Checklist for Operation on Wharf' (Annexure-5)	Shipping Agent / Transporter Agency engaged by the Shipping Agent
In case of Direct Delivery of Cargo	Please refer SOP for Transportation of CR/HR coils (Annexure-4) Refer or make use of 'Safety Checklist for Operation on Wharf' (Annexure-5)	Importer / Custom House Broker (CHB) / Transporter Agency engaged by the Importer / CHB
Transportation of Cargo from Wharf to Storage Point	Please refer SOP for Transportation of CR/HR coils (Annexure-4)	Shipping Agent / Transporter Agency engaged by the Shipping Agent
Stacking of Cargo in Shed or Open Area	Please refer 'Safety Checklist for Operation in Shed' (Annexure-6) Please refer 'Safety Checklist for Operation in Open Yard' (Annexure-7)	Shipping Agent / Transporter Agency engaged by the Shipping Agent

Storage of Cargo till Delivery	Please refer 'Safety Checklist for Operation in Shed' (Annexure-6) Please refer 'Safety Checklist for Operation in Open Yard' (Annexure-7)	Supervisory Staff of Traffic Department
Deployment of dockworkers for Delivery Operation	As per provisions of the Dock Workers (Safety, Health and Welfare) Regulations, 1990, it is mandatory that any employer of dockworker shall deploy him/her only after it has undergone medical examination and imparted requisite Safety Training depending upon their nature of work and skill required for performing their duties.	Importer / Custom House Broker (CHB) / Transporter Agency engaged by the Importer / CHB
Delivery of Cargo	Please refer 'Safety Checklist for Operation in Shed' (Annexure-6) Please refer 'Safety Checklist for Operation in Open Yard' (Annexure-7)	Importer / Custom House Broker (CHB) / Transporter Agency engaged by the Importer / CHB
Transportation of Cargo till Exit Point	Please refer 'Safety Checklist for Operation in Shed' (Annexure-6) Please refer 'Safety Checklist for Operation in Open Yard' (Annexure-7)	Importer / Custom House Broker (CHB) / Transporter Agency engaged by the Importer / CHB

Standard Operating Procedure for Export Operation

Stage of work	Activity	Responsible Agency
Transportation of Cargo from Entry Point to Storage Point	Please refer SOP for Transportation of CR/HR coils (Annexure-4)	Exporter / Custom House Broker (CHB) / Transporter Agency engaged by the Exporter / CHB
In case of Direct Loading on Ship	Please refer SOP for Transportation of CR/HR coils (Annexure-4) Refer or make use of 'Safety Checklist for Operation on Wharf' (Annexure-5)	Exporter / Custom House Broker (CHB) / Transporter Agency engaged by the Exporter / CHB
Deployment of dockworkers for Stacking Operation	As per provisions of the Dock Workers (Safety, Health and Welfare) Regulations, 1990, it is mandatory that any employer of dockworker shall deploy him/her only after it has undergone medical examination and imparted requisite Safety Training depending upon their nature of work and skill	Exporter / Custom House Broker (CHB) / Transporter Agency engaged by the Exporter / CHB

	required for performing their duties.	
Stacking of Cargo in Shed or Open Area	Please refer 'Safety Checklist for Operation in Shed' (Annexure-6) Please refer 'Safety Checklist for Operation in Open Yard' (Annexure-7)	Exporter / Custom House Broker (CHB) / Transporter Agency engaged by the Exporter / CHB
Storage of Cargo till movement for Loading on Ship	Please refer 'Safety Checklist for Operation in Shed' (Annexure-6) Please refer 'Safety Checklist for Operation in Open Yard' (Annexure-7)	Supervisory Staff of Traffic Department
Transportation of Cargo from Storage Point to Wharf	Please refer SOP for Transportation of CR/HR coils (Annexure-4)	Exporter / Vessel Agent / Transporter Agency engaged by the Exporter / Vessel Agent
Deployment of dockworkers for Loading Operation	As per provisions of the Dock Workers (Safety, Health and Welfare) Regulations, 1990, it is mandatory that any employer of dockworker shall deploy him/her only after it has undergone medical examination and imparted requisite Safety Training depending upon their nature of work and skill required for performing their duties.	Shipping Agent / Stevedore Agency and Man Power Supplier engaged by the Shipping Agent.
On-Board Cargo Handling - Loading	Please refer the SOP prepared for 'Working On-Board the Ship' (Annexure-2) Refer or make use of 'Safety Checklist for On-Board Working' (Annexure-3)	Shipping Agent / Stevedore Agency engaged by the Shipping Agent
Stacking of Cargo in Hold / Hatch	Please refer the SOP prepared for 'Working On-Board the Ship' (Annexure-2) Refer or make use of 'Safety Checklist for On-Board Working' (Annexure-3)	Shipping Agent / Stevedore Agency engaged by the Shipping Agent

2.3 SOP FOR WORKING ON-BOARD THE SHIP

Purpose:

This procedure outlines the requirements of the management for handling of cargo on-board the vessel to avoid accident and minimize adverse effects on health of workers working thereat. The procedure applies to all workers of the Mumbai Port Authority as well as of Port User/contractors working in all

areas of the holds/hatches of the ship, where import/export/transhipment cargo handle in docks and at midstream.

The procedure provides general guidance for safe handling of each cargo. Safety is integral part of duties assigned to each person working in the Port. As the working condition in docks operation is dynamic in nature, therefore, any action needed, which is not covered in SOP, but required to maintain safe working environment shall be taken.

Personal Protective Equipment (PPE) - When working on board the ship head, foot, and hand protection are needed for all persons. Therefore, safety helmet. Safety shoes and nitrile coated hand gloves are required to be wear in proper way. Further, when harmful agents/dusty cargo is handled, then suitable mouth protection and clothing should be provided in addition to above PPEs. Protection for noise level also to be provided to the workers, where noise level is beyond 80 decibels due to operation of appliances like forklift, ship and other cranes.

Guidelines - For detailed guidance, the requisite regulatory provisions under the Dock Workers' (safety, Health & Welfare) Regulations, 1990 shall be referred.

Safety Responsibility *- The Safety Responsibilities of each category of the employees involved in cargo handling operations are already prepared by the Committee constituted during 117th meeting of the Safety Committee for the Port of Mumbai held on 17.02.2011 and it was sent to the Traffic Manager for implementation vide letter No. HRD/SHW/DSC/506 dated 05.03.2011.* (Attached as Annexure I)

On the same analogy, whenever a work is carried out by the Private workers deployed by the Shipping Agent, then corresponding Safety Responsibility to that category of hierarchy or nature of work shall apply.

Risk Management -

i) Risk Assessments - The potential risk assessment is given in Hazard Identification and Risk Assessment (HIRA) matrix (Attached as Annexure II) for handling of cargo on-board vessel shall be referred and accordingly the Supervisor of the workplace shall ensure that those precautions are taken.

ii) Identification of Potential Risk - Due to nature of size, shape and weight of cargo and its stacking position differs from ship to ship; therefore, besides HIRA sheet, the supervisor requires identifying any foreseeable hazard in the operation and shall take necessary precautions to prevent accident.

iii) **Risk Control -** Risk control measures given in the HIRA sheet shall be implemented by the Supervisor of the workplace and it shall be ensured by the Sectional Asst. Traffic Manager of the area.

Standard Operating Procedure:

Stage of work	Activity	Responsibility
Planning	Advance planning of Lifting Appliances, equipment, Loose Gears for appropriate capacity and other ancillary tools required for safe handling of cargo.	Supervisor
On Arrival of Vessel	1. Inspection of certificates of test and annual through examinations of lifting appliances, loose gears, wire ropes, etc. submitted by the Agents for their adequacy of capacity for handling maximum load of cargo as given in the IGM / Shipping Bill i. e. no cargo is to be handled beyond Safe Working Load (SWL) of the ship crane. If any cargo is beyond SWL of on-board lifting appliances, then ensure that suitable arrangement is made for its handling. Further, it is to be ensure that all lifting appliances and wire ropes, loose gears attached to them are tested every five years and annual thorough examinations is carried out by the Competent Person every year. (Refer Regulation 47 and 51 of the Dock Workers' (Safety, Health and Welfare Regulations, 1990)	Supervisor Foreman Chargeman
	2. Receiving of an undertaking from the Master / Chief Officer of the Vessel stating that wire ropes and loose gears attached to the lifting appliances are tested and examined as per the Dock Workers' (Safety, Health & Welfare) Regulations, 1990 and are in good working condition.	Supervisor Foreman Chargeman
	3. Receipt of undertaking of loose gear certificates and sound working condition from the vessel agent. Inspect that no cargo is to be handled beyond SWL of the loose gear.	Supervisor Foreman Chargeman
	4. For visual inspection of wire ropes & loose gears attached to the lifting appliances, the pulley block of the lifting appliance shall be taken down on ground and then visually check the	Supervisor Foreman Chargeman

	conditions of the wire ropes attached to it, for any defects, corrosion, broken wires, etc. as practicably as possible. If any doubt about strength and condition of wire rope exists, then the Chief officer / Master of the ship shall be consulted and remedial measures shall be taken for working. If required, such undertaking for soundness of working of lifting appliances shall be taken.	
	5. In case of any fumigated cargo, suitable Gas Free Undertaking shall be taken from the Chief Officer / Master of ship shall be obtained. Even after receipt of certificate, it is to ensure that hold are well ventilated and it is suitable for entry of persons.	Supervisor Foreman Chargeman
	6. Conduct trial Operation of lifting appliances without any load for its smoothness or detection of any defects in working or control system, etc. If any deviation, then it shall be reported to the Foreman / Chargeman, who in turn will report to Chief Officer or Master of the Ship for remedial measures.	Ship Crane Operator
	7. The safety checklist for handling of cargo by on-board the vessel is filled up & it is signed. If any point of the checklist is not complied, then necessary action is taken for maintaining safe work place. If required, matter may be brought to the notice of Sectional Asst. Traffic Manager for rectification.	Supervisor Foreman Chargeman
	8. Ensure safe access for the workers on deck, in hold, ship crane and see that the signalman is at safe position at work.	Supervisor Foreman Chargeman
	9. Ensure that trained and skilled dock workers with sound health are deployed for operations. No intoxicated person is deployed.	Asst. TM, OBL Booking
	10. In consultation with Chief Officer,	Supervisor /

	Vessel Agent the loading /unloading plan is finalized for maintaining stability of ship and accordingly the operation will take place. 11. Carry out inspection of stacking of cargo in hold and based on which decide safe and proper method of handling.	Chief Officer of ship Supervisor Foreman Chargeman
At the Time of Commencement of Operation	1. Impart Tool-Box Talk to explain Safety Precautions need to be taken and to make them aware about potential dangers involved while handling of cargo. 2. Provision of appropriate PPEs to the dock workers and instruct them for their use. 3. Keep ready stretcher or any other means required for emergency rescue of person working on/in the ship, in case of any accident / incident and emergency contact numbers.	Supervisor Foreman Chargeman Tindel / Individual Shed Superintendent / Shipping Agent Gear Supplier
During Operation	1. Ensure that all safety standard and procedure are followed and provisions of safety regulations are complied and strictly adhered to while cargo-handling activities are carried out on board the vessel. 2. All persons involved in cargo handing operation are using PPEs. 3. Ensure that no dock worker is standing or working in a danger zone of falling of cargo or any suspended load. 4. Carry out periodical inspection (i. e. at least every hour) for stability of stacking of cargo in hold or receiving of cargo from shore. Based on situation/condition prevailing in the hold and decide safe and proper method of handling. 5. Ensure that during operation no	Supervisor Foreman Chargeman Every Individual Tindel / Hatch Foreman / Chargeman / Foreman Supervisor Foreman Chargeman Tindel /

	unsafe stack or wing stack is created during operation.	Foreman / Chargeman
	6. Ensure that approach way to any working point on board is not blocked and safe access is maintained for emergency evacuation of dock workers.	Tindel / Foreman / Chargeman
	7. Ensure that always enough space is maintained around stack of cargo or working area for smooth movement of dock workers and lifting appliances used for cargo handling operation.	Tindel / Foreman / Chargeman
	8. No person is taking rest or sleeping in the vicinity of cargo handling operation.	Tindel / Foreman / Chargeman
	9. Ensure that cargo is handled in safe manner.	Every Dock Worker
	10. Prohibition of use of Mobile Phone, while working.	Every Dock Worker
	11. Maintain Good House Keeping and hygiene i. e dunnage, steel strips, packing material are kept at safe place.	Tindel / Foreman / Chargeman
	12. Ensure of proper securing and lashing of cargo of stack for accidental rolling/collapse.	Tindel / Foreman / Chargeman
	13. Adequate illumination and ventilation is maintained at the working area.	Supervisor Foreman Chargeman
	14. Ensure that all the control /arrangement/function of lifting appliances are in proper working conditions.	Ship Crane Operator
	15. No Hot Work or Smoking near cargo handling operation.	Supervisor Foreman Chargeman
	16. Ensure that pals or skid nets are rigged on wharf, to avoid fall of cargo in dock basin.	Supervisor Foreman Chargeman

	17. To rectify deficiencies pointed out during safety inspection by the official of the Safety Management Cell. 18. In case of handling of any dangerous goods or any harmful commodity, the Material Safety Data Sheet (MSDS) of the said is referred and to ensure that requisite safety precautions are taken or conditions stipulated in the permission given by the Competent Authority are complied. In case of any doubt, the advice of the officials of the Safety Management Cell shall be obtained.	Supervisor Foreman Chargeman Supervisor Foreman Chargeman
Training and Awareness	The safety management cell conducts periodical safety training at Port Management Training Centre. Besides this on-the-job training is given for awareness for safe handling of that cargo.	Safety Management Cell

Note - Whenever a work is carried out by the Private workers deployed by the Shipping Agent, then corresponding responsibility given in the SOP shall be applied to that category of employee of port user or nature of work carried by him.

Asst. Traffic Manager Dy. Traffic Manager (OBL) Dy. Manager (Safety)

Sr. Dy. Traffic Manager (OD)

2.4 SOP FOR THE TRANSPORTATION OF CR/HR COILS IN PORT PREMISES

I. SOP for Import Operation: Movement of Coils from Vessel to Storage Area

Sr. No.	Activity	Supervision	Responsibility
a)	In case of Trucking down the coil directly on trailer after discharging	**a.** Transporter **b.** Vessel Agent **c.** Labour Supervisor /Shed Superintendent.	**a.** Movement of the trailers specially reversemust be carried out under the direction and guidance of Cleaner / helper/signaler. **b.** Crane Operator to ensure that sling is not jerked or there is no swingof load and cargo is properly stacked on trailer bed while discharging. **c.** No one should stand below the hanging load / sling. **d.** Truck driver/supervisor of

			the transporter to ensure that the truck is notoverloaded based on itscapacity. **e.** Shall follow the 'General Guidelines for Transportation of Steel Coils' at para 5 of the SOP
2	In case of Coil discharging on wharf and then loading on trailer	**a.** Transporter **b.** Vessel Agent **c.** Labour Supervisor /Shed Superintendent.	**a.** Movement of the trailers specially reversemust be carried out under the direction and guidance of Cleaner / helper/signaler. **b.** Crane Operator to ensure that sling is not jerked or there is no swingof load. **c.** The Forklift driver to ensure that the forklift is not over loaded beyond its capacity while placing the coil on the trailer. **d.** Maneuvering should be done under the guidance of helper/cleaner of the Forklift for front and back movement. Similarly, forthe trailer **e.** No one should standbelow the hanging load / sling and working radius of the lifting appliances. **f.** Shall follow the 'General Guidelines for Transportation of Steel Coils' at para 5 of the SOP
3	After placing the coil on trailer bed, placing wedges beneath the coils.	**a.** Transporter **b.** Vessel Agent **c.** Labour Supervisor /Shed Superintendent.	**a.** Truck driver/Supervisor of the transporter toensure proper wedging toensure cargo stability on the trailer. There should not be any gap between the wedges and the coils. **b.** The workers shall use ladder to board the trailer. **c.** Shall follow the 'General Guidelines for Transportation of Steel Coils' at para 5 of the SOP
4	Lashing of coils	**a.** Transporter **b.** Vessel Agent **c.** Labour Supervisor /Shed Superintendent.	**a.** Truck driver/Supervisor of the transporter toensure proper lashing of coils by suitable means before movement to avoid toppling of coils. **b.** The lashing shall be of suitable type and capacity to ensure that coil remains firmly secured during transportation to avoid toppling

			of coils. **c.** Shall follow the 'General Guidelines for Transportation of Steel Coils' at para 5 of the SOP
5	Transportation of coils to storage area.	**a.** Transporter **b.** Vessel Agent **c.** Civil Engineering Department	**a.** Truck driver/Supervisor of the transporter to ensure safe movement of the trailer to the storage point. The safe movement to include avoiding over speeding i.e. by speed less than 20 kmph, avoiding overtaking and following all trafficdiscipline. **b.** Lashing should not be removed midway during transportation. **c.** Shall follow the 'General Guidelines for Transportation of SteelCoils' at para 5 of the SOP **d.** CE Department to ensure that there are no pot holes, depression and uncovered drainage on the roads / paths and in storage areas.

II. <u>SOP for Import Operation: Movement of Coils during delivery out of dock</u>

Sr. No.	Activity	Supervision	Responsibility
1	Deployment of proper lifting appliances.	**a.** Transporter **b.** Custom Broker (CB) **c.** Shed superintendent	**a.** The Transporter / CB to ensure that appropriate lifting appliances with adequate capacity and sound condition are deployed. **b.** Operator of the lifting appliances to ensure that proper lifting method is adopted to handle the cargo. **c.** Supervisor of the transporter should further ensure that no person is resent within the swing radius/handling zone of the lifting appliances. **d.** Shall follow the 'General Guidelines for transportation of Steel Coils' at para 5 of the SOP
2	Placing the coil on the trailer	**a.** Transporter **b.** Custom Broker (CB)	**a.** Truck driver/supervisor of the transporter to ensure that the truck is not overloading based on its

		c. Shed superintendent /Delivery Clerk.	capacity. Also to ensurethat no one should stand below the hanging load and working radius of the lifting appliances **b.** Shall follow the 'General Guidelines for Transportation of Steel Coils' at para 5 of the SOP
3	Lashing of coils	**a.** Transporter **b.** Custom Broker (CB) **c.** Shed superintendent	**a.** Truck driver/Supervisor of the transporter to ensure proper lashing of coils by suitable means before movement to avoid toppling of coils. **b.** The lashing shall be of suitable type and capacityto ensure that coil remains firmly secured during transportation to its upcountry destination to avoid toppling of coils **c.** Shall follow the 'General Guidelines for Transportation of Steel Coils' at para 5 of the SOP
4	Delivery of cargo from the storagepoint.	**a.** Transporter **b.** Custom Broker (CB) **c.** Civil Engineering Department	**a.** Truck driver/Supervisor of the transporter to ensure safe movement of the trailer to the storagepoint. The safe movement to include avoiding over speeding i.e. by speedless than 20 kmph, avoiding overtaking and following all traffic discipline. **b.** Lashing should not be removed midway during transportation. **c.** Shall follow the 'General Guidelines for Transportation of Steel Coils' at para 5 of the SOP **d.** CE Department to ensure that there are no pot holes, depression and uncovered drainage on the roads / paths and in storage areas.
5	Transportation of the trailer till gate and queue at the gates.	**a.** Transporter **b.** Custom Broker (CB)	**a.** Truck driver/supervisor of the transporter to ensure that there should be proper lane wise parking of the trailer along the dock expressway.

			b. There should be no obstruction to the traffic movement. Movement of the trailers specially reverse must be carried out under the direction and guidance of Cleaner / helper / signaler. **c.** Lashing should not be removed midway during transportation. **d.** Shall follow the 'General Guidelines for Transportation of Steel Coils' at para 5 of the SOP

III. <u>SOP for Export Operation: Movement of Coils from Gate to the Pre Stack Point</u>

Sr. No.	Activity	Supervision	Responsibility
1	Entry of trailer loaded with coils from the Gate	**a.** Transporter **b.** Custom Broker (CB) **c.** Gate Inspector	**a.** Truck driver/Supervisor of the transporter to ensure that the coils are properly lashed by suitable means before entering the docks. If not, then corrective measures to be taken to make it safe for transportation / handling before entering the Port **b.** The lashing shall be of suitable type and capacity to ensure that coil remains firmly secured during transportation **c.** Shall follow the 'General Guidelines for Transportation of Steel Coils' at para 5 of the SOP
2	Transportation of coils from the Gate to the pre stack point	**a.** Transporter **b.** Custom Broker (CB) **c.** Civil Engineering Department	**a.** Truck driver/Supervisor of the transporter to ensure safe movement of the trailer to the storage point. The safe movement to include avoiding over speeding i.e. by speedless than 20 kmph, avoiding overtaking and following all traffic discipline. **b.** Lashing should not be removed midway during transportation. **c.** CE Department to ensure that there are no pot holes, depression and

			uncovered drainage on the roads / paths and in storage areas. **d.** Shall follow the 'GeneralGuidelines for Transportation of Steel Coils' at para 5 of the SOP
3	Offloading of coils at the pre stack point.	**a.** Transporter **b.** Custom Broker (CB) **c.** Labour Supervisor /Shed Superintendent.	**a.** The concerned driver of the crane/forklift to ensure safe offloading of the coils. **b.** The Transport Supervisor / CB shall also check the surface condition of the pre stack point which should be even. **c.** Cargo should not be stacked in uneven / unsafe place. **d.** Unevenness if any, should be brought to the notice of the concerned Labour Supervisor / shed superintendent.

IV. SOP for Export Operation: Movement of Coils from Pre Stack Point to hook point of the vessel for loading

Sr. No.	Activity	Supervision	Responsibility
1	Deployment of proper lifting appliances	**a.** Transporter **b.** Custom Broker (CB) **c.** Vessel Agent **d.** Labour Supervisor /Shed Superintendent	**a.** The Transporter / CB / Vessel Agent to ensure that appropriate lifting appliances with adequate capacity and sound condition are deployed. **b.** Operator of the lifting appliances to ensure that proper lifting method is adopted to handle the cargo. **c.** Supervisor of the transporter should further ensure that no person is present within the swing radius/handling zone of the lifting appliances. **d.** Shall follow the 'GeneralGuidelines for Transportation of Steel Coils' at para 5 of the SOP
3	Lashing of coils	**a.** Transporter **b.** Custom Broker (CB) **c.** Vessel Agent **d.** Labour	**a.** Truck driver/Supervisor of the transporter to ensure proper lashing of coils by suitable means before movement to avoid toppling

		Supervisor /Shed Superintendent	of coils. **b.** The lashing shall be of suitable type and capacityto ensure that coil remains firmly secured during transportation to avoid toppling of coils **c.** Shall follow the 'General Guidelines for Transportation of Steel Coils' at para 5 of the SOP
4	Transportation of coils from pre stack point to vessel hook point for loading on vessel.	**a.** Transporter **b.** Custom Broker (CB) **c.** Vessel Agent **d.** Civil Engineering Department	**a.** Truck driver/Supervisor of the transporter to ensure safe movement of the trailer to the storagepoint. The safe movement to include avoiding over speeding i.e. by speedless than 20 kmph, avoiding overtaking and following all traffic discipline. **b.** Lashing should not be removed midway during transportation. **c.** Shall follow the 'General Guidelines for Transportation of Steel Coils' at para 5 of the SOP **d.** CE Department to ensure that there are no pot holes, depression and uncovered drainage on the roads / paths and in storage areas

V. Guidelines for transportation of Steel Coils in Dock

(A) For Vehicle and Lifting Appliances:

a. Transport equipment deployed for transportation of steel cargo shall be in good working order including all inbuilt safety devices/attachments/accessories and must have fitness certificate issued by RTO Authorities. Vehicle must be fit enough to transport the specific load.

b. Retreaded tyres should not be used in front wheel.

c. Rear view mirror & three-piece mirror should be fitted for clear visibility. Horn sound should be audible from at least 30-meter distance.

d. Vehicle's cabin, cabin door with handle, material body etc. should bephysically in good & working condition. Vehicles having bulged bodyshould not be used.

e. Vehicle's number plate, parking light, side indicator, brake light etc. should be cleaned at regular interval for clear visibility. Light reflecting radium tape to be pasted on periphery of the vehicle to be used fortransporting the materials.

f. Do not allow any person to stand at foot rest or sit on the loaded material of the vehicle.

Do not allow any body to get on-board and off-baord during running ofvehicle.

At all junctions in docks follow the principle of SLOW, LOOK and PROCEED.

Never overload the vehicle beyond its rated capacity and rated capacityshall be displayed on vehicle.

Before coming out or going in docks, stand in queue. Maintain discipline.

g. Before starting vehicle, ensure that the material loaded on the vehicle isproperly secured.

h. Never drive vehicle beyond speed limit of 20 km/h on roads in docks and8 km/h on wharf.

i. Give prior signal at least 30 meters before taking turn at right or left side.

j. Keep a safe distance of 2 seconds Rule to the vehicle ahead.

k. Never sit or take rest under the vehicle or within the vicinity of 10 feet ofthe vehicle or at any parking place area.

l. While taking a turn, speed should be below 10 km/hr.

m. When turning to the left, drive as close as to the left-hand side of the road from which the turn is being made and of the road which is beingtaken.

n. When turning to the right draw as near as may be to the centre of theroad and arrive as near as may be at the left-hand side of the road which is being taken.

o. Appropriate lifting appliances with adequate capacity and sound condition with all inbuilt safety devices/attachments/accessories are deployed. Operator of the lifting appliances to ensure that proper liftingmethod is adopted to handle the cargo.

p. Drivers/operators should have valid driving license for driving trucks/trailers accompanying with cleaners/helpers.

(B) Loading, Unloading and transportation of Coils:

a. Wear PPEs like helmet, safety shoes, hand gloves, etc.

b. Wear High Visibility Jacket for better visibility.

c. During loading operations everybody around should be in a safe position and no person will be on trailer during loading/ unloading of material.

For noting down marks of the coil will be done on ground by keepingsafe distance.

d. Materials to be loaded as per trailer capacity.

e. Put scotch block under the wheel to prevent rolling down of vehicle.

f. No person will move or stand under the suspended load.

g. For positioning the coil at centre of the bed, signal will be given fromground.

h. After loading of each coil, the at least two dunnage of good quality having minimum angle of 35 degrees to horizontal should be placed atfront and rear end of coils. Each Coil to be secured to trailer bed by at least two chains or wed lashings at an angle of less than 45 degrees and end fitting of the chain / web lashing must be suitable for the type of securing point used.

i. Chain lashing of minimum 12 mm links or web lashing of equivalent strength shall be used. With chain lashings, necessary fixtures like bracket, D- Shackles, turn buckles shall be provided.

The link chain shallbe tightened with turnbuckle and web lashing with standard ratchet.

j. Rubber pads to be provided for edge protection, when high level of abrasion and cut resistance against sharp and/or rough edges of theproduct or trailer exists.

k. Stanchions must be provided on the chassis of the trailers used for transportation of cargo like bundles of angles, steel pipes etc. and shall not be removed as long as cargo is on the chassis.

l. Vehicle will be allowed to go only after ensuring that material is properlysecured and tightened.
Do not sleep/ take rest in front of or below or side of the vehicles.

m. Park your vehicle at designated parking place only and keep safe distance between other parked vehicles.
Do not move here & there after placing the trailer at loading / unloadingpoint

n. Proper platform with ladder shall be used for working on the trailer bed,for placing dunnage, for lashing and for rigging work for loading and unloading.
Drivers should sit at drivers rest point during loading of coil.

o. The trailer shall be fitted with head boards to prevent injury to the driverby sliding of coils in case of sudden braking.

p. Vehicles should be parked on firm level ground and stability to maintain.

q. Loads should be spread as evenly as possible, during both loading and unloading. Uneven loads can make the vehicle or trailer unstable. Loadsshould be secured or arranged so that they do not slide around.

r. Ensure the stacked bundles are stable before unlashing the steel cargo and to ensure that no one is standing in danger zone of the cargo movement.

s. Reverse or any other movement of the transport equipment, in which driver's vision is obstructed, must be done under the direction of signalleronly.

t. Trailers, stanchions, dunnage and lashing material must be checkedvisually and should be used if it is in good condition only.

u. While carrying slit coils, where base of coil to height ratio is more than 1:3, then such coils should not be transported in vertical position but inhorizontal position (eye to sky direction) and with proper lashing and securing.

v. No naked light/smoking/cooking inside the docks.

w. Maintain cleanliness; avoid spitting, littering and throwing of waste indocks.

x. Ensure that no person is present within the swing radius/handling zone of the lifting appliances or trailer movement.

(C) Precautions for parking of Vehicles or attending any repairs:

a. Park at designated parking place or at safer place and not on the roadand keep safe distance with adjacent parked vehicle.
Do not park the vehicle in such a way that it is obstructing the movementof other vehicle or narrowing the width of road.
Keep the parking light ON.

b. Before parking please ensure that no one is at the rear side of the vehicle.

c. After parking apply the hand brake.
Place scotch block under the wheel at both side of wheel.

d. Switch-off the ignition of immobilized crashed vehicles to reduce risk offire.

e. Wear High Visibility Jacket while attending the breakdown.

f. Place a hazard-warning triangle (with Reflector) to the both side of theroad, 50 meters from the scene.

g. If the vehicle develops mechanical or tire trouble and begins to slowdown, drive it to the side of the road as far as possible from traffic.

h. Avoid working on the traffic side of your vehicle.

i. Remove all the barriers and clean the oils from the road before movingahead, after repairs.

VI. Notes:

a) The prime responsibility of ensuring compliance of the Standard Operating Procedure (SOP) shall be of the Transporter and Vessel Agent / Custom Broker (CB) who are engaging the transporter.

b) The Supervision of the above mentioned operations pertaining to HR/CR coils will be performed by the MbPA staff if MbPA gangs/labors are deployed for the Vessel and Shed operations.

c) In case of private labors are being deployed for vessel and shed operations,the supervision of the entire operations to be carried out by the concerned employee of the port user who is performing the operation.

VII. Punitive Action:

a. Sr. No. (A) (5) of the Blacklisting Policy for Individual / Firms/ Companies for Issuance of DEP of February 2018 stipulates punitive action as under:

Sr. No. (a)	Offence committed (b)	Gravity of misconduct(c)	Offence reported by (d)	Offence reported to (e)	Penalties/ Punishments (f)
5	Rash Driving, noncomplianceof safety normsand other misconduct of minor nature	Major (endangering life & property)	Safety Cell /Shed Supdt. / Gate Inspector /CISF/ Security	Sr. DTM (R)	Blacklisting of the person for 3years and letterissued to the Port user cautioning themfor misconduct of their employee

b. Repetitive offences will lead to action as deemed fit on the company i.e.Transporter / Custom Broker / Vessel Agent, including blacklisting of thefirm.

2.5 SOP's FOR HANDLING STEEL CARGO

2.5.1 HANDLING ON BOARD THE SHIP

a) Ensure the stacking is stable else take suitable action to make it stable.
b) Ensure lifting appliances, loose gears and wire ropes required for handling such cargo are of suitable SWL capacity and in good working order.
c) Use lifting appliances, loose gears and wire ropes which are periodically tested and examined by government approved competent person and shall conform to statutory requirements.
d) Relevant test & examination certificate in respect of lifting appliances, loose gears & wire ropes and cargo gear register should be made available for verification to the authorities.
e) Only skilled, well trained and experienced winchman /crane operator and signalman should be deployed on board the vessel in connection with operation of ship's lifting appliances.
f) Ensure the provision of suitable Personal Protective Equipment and its use by dock workers during dock work.
g) Ensure non availability of dock workers within danger zone while preparing kachha/pacca sling and handling steel cargo.
h) No dock workers should be allowed to remain below the hanging/lifted cargo. Wherever required use long metallic stick for pulling or guiding the sling.
i) Entry of unauthorized person at the place of work on board the ship should be strictly restricted.
j) No dock worker should be allowed to take rest or sleep inside the hatch or on the deck of the ship.
k) During cargo handling process no dock worker should be allowed to play music, use mobile & other gazettes at the place of work on board the vessel.
l) Stacking of cargo inside the hatch should be done as per stowage plan.
m) While stacking cargo inside the hatch, proper dunnage and lashing should be done to avoid accidental fall/collapse/rolling of cargo
n) Loitering on board is strictly prohibited.
o) No dock worker should be allowed to sit/walk on hatch covers.
p) Suitable and safe hatchway ladder should be marked for approaching hatch.
q) Ensure sufficient illumination and ventilation at the place of work on board the ship.
r) Cargo handling should be done under effective supervision.
s) Ensure initial and periodical OSH training and medical examination of dock workers before allowing them to carryout dock work.

2.5.2 HANDLING/STORING OF STEEL CARGO IN THE SHED AND OPEN SPACES

a) Ensure the weight of cargo to be store and the load bearing capacity of the floor.
b) Ensure loose lifting appliances, loose gears and wire ropes required for handling such cargo are of suitable SWL capacity and in good working order.
c) Use lifting appliances, loose gears and wire ropes which are periodically tested and examined by government approved competent person and shall conform to statutory requirements.
d) Relevant test & examination certificate in respect of lifting appliances, loose gears & wire ropes and cargo gear register should be made available for verification to the authorities.

e) All equipment / machines used on board shall conform to the statutory requirement.
f) Ensure the stacking is stable else take suitable action to make it stable.
g) Stack the cargo within space marked for storing the cargo.
h) Provide sufficient space for approaching near cargo while preparing for discharging/shifting.
i) Only skilled, well trained, authorized and experienced crane/FLT operator and signalman should be deployed on the site.
j) Ensure the provision of suitable Personal Protective Equipment and its use by dock workers during dock work.
k) Ensure non availability of dock workers within danger zone while preparing kachha/pacca sling and handling steel cargo.
l) No dock workers should be allowed to remain below the hanging/lifted cargo.
m) Wherever required use long metallic stick for pulling or guiding the sling.
n) Entry of unauthorized person at the place of work should be strictly restricted.
o) No dock worker should be allowed to take rest or sleep in the open yard/place of cargo handling.
p) During cargo handling process no dock worker should be allowed to play music, use mobile & other gazettes at the place of work.
q) Stacking of cargo in the open space/yard/shed should be done as per stowage plan.
r) While stacking cargo in the open space proper dunnage and wedges should be provided to avoid accidental fall/collapse/rolling of cargo.
s) Loitering at the place of cargo handling is strictly prohibited.
t) No dock worker should be allowed to sit/walk/enter in the danger zone at the place of cargo being handled.
u) Ensure sufficient illumination at the place of work in the work place.
v) Cargo handling should be done under effective supervision.
w) Ensure initial and periodical OSH training and medical examination of dock workers before allowing them to carryout dock work.

2.5.3 TRANSPORTATION OF STEEL CARGO

a) Transport equipment deployed for transportation of steel cargo shall be in good working order including all inbuilt safety devices/attachments/accessories and must have fitness certificate issued by RTO Authorities.
b) Drivers/operators should have valid driving license for driving trucks/trailers.
c) No transport equipment should be allowed to carry load beyond it's designed/permitted load carrying capacity.
d) Steel cargo bundles should be stacked properly and lashed with proper chains.
e) Ensure the stacked bundles are stable before unlashing the steel cargo.
f) Stanchions must be provided on the chassis of the trailers used for transportation of cargo like bundles of angles, steel pipes etc. and shall not be removed as long as cargo is available on the chassis.
g) Ensure the strong and firm lashing of heavy cargo like steel coils, etc. and use of dunnage to avoid rolling, during transportation.
h) Transport equipment should not be parked in prohibited area or in between road causing traffic jam.
i) Reverse or any other movement of the transport equipment, in which driver's vision is obstructed, must be done under the direction of signaler only.
j) Cooking inside Transport equipment is strictly prohibited.

k) No transport equipment should cross the specified speed limit of 20 Km/hr. in the port premises and must follow the queue system.

2.6 SOP FOR HANDLING PROJECT CARGO:

2.6.1 SAFE UNLOADING FROM SHIP TO VEHICLE OR SHORE:

a) Ensure gross weight, dimensions of project cargo and hooking/eye-plates points where sling has to be fixed for well-balanced slinging.
b) Ensure the proper condition of eye-plates & its welded joints before slinging the project cargo.
c) Use suitable type of slings & loose gears of appropriate SWL capacity for slinging the project cargo.
d) Ensure the wire ropes slings & loose gears required for slinging project cargo, are periodically tested and examined by government approved competent person and maintained in good working condition.
e) Ensure the lifting appliances are periodically tested and examined by government approved competent person, maintained in good working condition and of suitable SWL capacity.
f) Study the matter thoroughly and plan the steps for discharging/loading the project cargo.
g) Before engaging dock workers on project cargo handling conform their knowledge, skill & experience for such type of handling.
h) Pass proper instructions about the steps to be followed & hazards involved in handling to all dock workers engaged in project cargo handling.
i) Handle (lift, slew & lower) the project cargo slowly & smoothly in a well-controlled manner.
j) Project cargo should be handled under strict supervision of supervisors/foreman.
k) In case of noticing unsafe condition or action, consult the matter with Sectional Assistant Manager immediately.
l) The transport equipment like multi axel/wheels used for carrying project cargo should be of suitable load carrying capacity and should have all inbuilt safety devices/accessories like special braking system, reverse siren/horn, blinkers etc. in good working condition and RTO fitness certificate.
m) Examine the condition of the bed/chassis, provision of lashing points etc. for maintaining stable condition and proper lashing of project cargo.
n) Project cargo should be properly lashed before the movement of the transport equipment.
o) In case the cargo is to be unloaded/kept on wharf or to be stored in the dock premises, ensure the gross weight of the project cargo and load bearing capacity of the floor.
p) In case the project cargo does not have solid flat base then it should be suitably supported from all sides to avoid its rolling/toppling.
q) Project cargo must be barricaded to restrict the entry of unauthorized person in the danger zone.
r) While delivering project cargo, the concerned authorities like shed superintendent/ supervisors should take all necessary precautions for safety of cargo and dock workers.
s) Ensure all the dock workers are trained in OSH subject and medically examined & physically fit.
t) Keep rescue team & ambulance ready to handle emergency.

2.7 SOP FOR HANDLING DRY BULK CARGO:

2.7.1 HANDLING WITH GRAB

a) Check the grab & its attached accessories like wire ropes and loose gears for its good working condition and ensure its periodically testing and examined by government approved competent person, before taking into use.
b) The 'save all' net used for handling bulk cargo should be in good condition and properly fastened by means of nylon ropes.
c) The hoppers wherever used should be in good condition and free from defects. Hoppers should be installed on the wharf properly & firmly.
d) Ensure the density of the bulk cargo and set/adjust the volume of grab accordingly.
e) Ensure no dock worker is available in the danger zone i.e. inside the hatch, on the main deck & on the wharf, while handling bulk cargo with grab.
f) Transport equipment like trucks/lorries/dumpers etc. used for transportation should be in maintained in good condition.
g) Well trained, skilled, knowledgeable and authorized operator should drive/operate the transport equipment.
h) Truck should be loaded with bulk cargo only up to the body level, properly trimmed and covered by tarpaulin to avoid spillage and flying of dust during transportation. Spilled over cargo should be cleared immediately.
i) Movement of transport equipment should be regulated strictly.
j) Speed limit of transport equipment should not exceed 20 kmph on open roads inside docks and 8 kmph on the wharf, yard & shed.
k) Transportation of workers in the bucket of JCB / Pay Loader is totally prohibited.
l) All precautions should be taken to restrict entry of dock workers within danger zone.
m) Cargo must be handled in better co-ordination between Crane Operator and Signalman.
n) Provide and ensure the use of Personal Protective Equipment like safety helmet, safety shoes, hand gloves and dust mask etc. by dock workers while handling bulk cargo.
o) Screen should be adequately fixed between vessel and wharf to avoid spillage of bulk material in dock basin or sea.
p) The cargo shall be discharged tier by tier from all the sides of the hatch to avoid well formation in the hatch.
q) Movement of Pay loader, it's operator & helper deployed inside the hatch & on the wharf should be supervised strictly. Pay loader must be provided with cabin for operator (to avoid dust exposure) and overhead guard for his protection.
r) Pay loader should have safety related attachments like horn, reverse siren, head lights in good working condition & metallic overhead guard.
s) Do not allow any dockworker including driver, cleaner to seat/sleep below the heap of bulk cargo stored inside the hatch / open yard. Wherever required oxygen level inside the hatch should be monitored.
t) Provide and maintain proper illumination level inside the hatch, on the wharf & open bulk storage yard as per statutes.
u) Ensure all the dock workers are trained in OSH subject and medically examined.
v) Bulk cargo handling operation should be done under the strict supervision of concerned authorities.

2.8 SOP FOR HANDLING OF AUTOMOBILES:

a) Vehicles brought inside the docks should be parked in such an order that, at the time of loading, there should not be any hurdle and the movement should be smooth.
b) Drivers deployed to load the vehicles should drive vehicles at slow speed complying with the safety norms.
c) Drivers deployed to load the vehicle should be trained for loading vehicles on board.
d) High speed driving is strictly prohibited.
e) Employers/Agents should post their own supervisors to control vehicle movements.
f) Workers/persons engaged in vehicle loading must wear all required PPEs like Helmet, Safety shoes, reflective jackets for visibility.
g) Proper arrangement for transportation of drivers (dock workers) of vehicles from ship to berth or vice versa, shall be made.
h) Suitable belts/fastener shall be provided and tie up properly to all the vehicles parked on the loading platform of the RHO RHO ship.
i) Fire Fighting Equipment's should be provided and kept ready for its use during fire incident while handling cars.

2.9 SOP FOR HANDLING OF BREAK BULK MATERIALS:

a) Inspect the object you are going to lift to determine its size, weight, etc.
b) A good pair of hand gloves should be used in preventing hand injuries while handling materials.
c) Before lifting a material make a trial to ascertain whether you can lift it without strain. If you can't get a good grip, keep your feet apart and bend your knees. Then keep your back relatively straight and lift by strengthening your legs in order that your strong leg muscles do the job rather your back muscles.
d) When the material is heavy, call for help/assistance.
e) Where crane is used for material handling, all the persons working there should be kept away from the swing circle area of the crane and path of the cargo being moved.
f) Never stand under a load carried by cranes.
g) Only authorized persons should handle / operate the cranes.
h) While handling materials, wear hand gloves, goggles, helmet and safety shoes.
i) If more than two persons are involved in material handling, there should be good co-operation and team spirit.

2.10 SOP FOR HANDLING OF TIMBER LOGS:

a) Wire ropes/slings in good condition, suitable length & diameter, properly tested and certified by a competent person should only be used for timber handling.
b) The wire rope slings should have tag / punch mark indicating its safe working load.
c) While preparing 'Kaccha' sling, ensure that no loose log is available nearby & safe distance is maintained by workers.
d) Initially timber Logs should be lifted/hoisted slowly to bring the log/bundle of logs in plumb line & horizontal to floor and then after stable condition it should be lifted slowly for further discharging.
e) Timber logs inside the hatch must be discharged in a leveled manner to avoid formation of ditch, which results in formation of pile at sides of the ship followed by rolling over of logs. This should be ensured by on-duty cargo supervisor & hatch Tindel.

f) Trailers used for transportation should be of good condition and must be driven by an authorized driver only.
g) Place the timber properly on the trailer and lash by means of rope to avoid falling / rolling on wharf and roads.
h) Ensure existence of stanchions of a minimum height of 90 cms. at least three at each side of trailer before loading/unloading to avoid accidental rolling of logs.
i) Use of red flag / light indicating danger for the logs projecting beyond the trailer platform is compulsory.
j) Ensure the wooden log(s) having length more than length of trailer's chassis is transported by such trailer.
k) After loading wooden logs on the chassis of the trailer, all logs should be tied by chain to avoid accidental rolling out of logs during transportation.
l) Speed limit of trailers should not exceed 20 Kmph inside the roads in docks and 8 Kmph on wharf.
m) Use of personal protective equipment like safety helmet, safety shoes and hand gloves etc. is compulsory.
n) Better co-ordination between Crane Operator, Signalman, Supervisory staff and workers should be maintained.
o) Private vehicles or person not connected with cargo handling operations should remain away from the work place.
p) In open yard wooden logs may be handled only by typical mobile crane.
q) In open yard, wooden wedges should be used to avoid rolling of logs and certain stacking level (height) should be maintained to avoid accidental rolling of logs due to weight.
r) All dock workers must use suitable PPEs.

2.11 SOP FOR HANDLING HAZARDOUS CHEMICALS:

a) Acids and alkalis are highly corrosive. If a chemical fall on the skin, it may cause burns. Do not handle them without wearing proper protective equipment.
b) When there is an acid or alkali splash, flush it with lot of cold water and thereafter get medical attention.
c) Absorb acid spillages with a mixture of sand and soda ash only.
d) Do not smoke or carry open flame where inflammable solvents/chemicals are handled or stored.
e) Before starting maintenance work on chemical / gas pipelines, etc. where chemicals are handled or stored, ensure upmost safety precautions.
f) A person required to work in a gas tank/holder where there is possibility of poisonous gas existing, MUST wear Gas Mask with life belt attached with a safety line and at least one man at the top of gas tank/holder should stay as a watchman who can control the safety line, if it is necessary to pull him out.
g) When you are suspect existence of a poisonous gas, do not enter the area without wearing suitable gas mask.
h) If any gas leakage occurs or is suspected, immediately inform the concerned authority.
i) If light is required in a chemical/gas tank for maintenance work, use only a 6 V torch or flameproof light.

2.12 SOP FOR HANDLING OF PIG IRON FROM WAGONS/RACKS:

a) After placement of Pig Iron Racks, the doors will be opened by specific authorized workers only. No other worker should be allowed to open the wagon door.
b) In exceptional cases like shortage/non-availability of authorized workers or extraordinary delay for placement or any other general cause, the other workers may be allowed to open the wagon door with the permission and strict supervision of the Site In-charge/supervisor on-duty of the employer.
c) Site In-charge/supervisor should explain the hazards involved in pig iron handling.
d) Ensure the non-availability of any worker within danger zone and all safety aspects & precautions are undertaken before opening of the wagon doors.
e) Ensure that dock worker(s) whoever open the wagon door must keep themselves at least 05 feet away from the door of the wagon.
f) Before opening of the lock/latch of the wagon door by workers, ensure that support rod (preferably iron) must be placed rigidly in between wagon door and ground to prevent the sudden/accidental opening of the wagon door.
g) The wagon door should be opened with crowbar/steel rod only. Workers should not try to open it by bare hands.
h) After complete opening of the lock/latch of the wagon door, the support rod should be removed carefully to prevent sudden free fall of pig irons.
i) Ensure the provision of suitable Personal Protective Equipment i.e. helmet, shoes, florescent vest, hand gloves, nose mask etc. & its use by the workers.
j) After opening of wagon door, the dedicated workers should remain away at safe distance.
k) Area may be barricaded to ensure that all the workers are out of the danger zone and to restrict entry of unauthorized person in danger zone.
l) Safety ladder which is of suitable strength, height & good construction should be used to approach on the wagon and it should be firmly placed on the floor.
m) Manual Climbing/descending to/from wagon is strictly restricted.
n) While unloading the Pig Iron manually (by throwing it out of wagon), ensure the clearance between co-workers employed at the site & railway track.
o) The overall unloading activities should be carried out under the strict supervision till completion of the rakes.
p) All essential facilities like First-aid, drinking water, torch light etc. should be provided to workers.
q) Ensure provision of proper illumination level at the place of work.
r) In case of any unavoidable situation/emergency, contact the appropriate authorities like Safety officer/inspector.
s) Rescue team, ambulance, Medical treatment facilities should be kept ready to face any emergency.
t) Ensue all the dock workers are medically examined and trained in OSH Subject as per statutes.

2.13 SOP FOR HANDLING OF CONTAINERS:

a) Always make use of suitable, tested and certified spreaders for handling containers.
b) Trailers with twist lock facility should only be used for transporting containers, to prevent them from falling off the chassis.

c) Containers shall be firmly secured on the chassis of the Trailers by means of twist locks before transporting.
d) Use ladders only of sound construction, provided with anti-skid devices to reach the top of the containers, whenever necessary.
e) Do not use single or multi legged slings for lifting containers.
f) Do not permit any person to ride over spreaders / containers while handling at berth / yard.
g) The speed limit of trucks / trailers should not exceed 20 kmph on roads inside docks and 8 kmph on wharf.
h) Observe corners of containers while lifting, clewing and lowering operations.
i) Better co-ordination should be maintained between Winch Operator, Signalman and workers.
j) Use of Personal Protective Equipment is compulsory.
k) Container's locks should be removed before discharging/loading of containers from/to vessels. These locks should not have kept lying on container top unnecessarily.
l) No employee or worker shall sleep or relax inside empty container.
m) Loitering in container yard is prohibited.
n) Use of mobile phone is prohibited while handling containers on board/on shore and driving of Container Trailers/Equipment and other vehicles.
o) Cooking in the cabin of Container Trailer is prohibited.
p) Container Trailers shall be driven only by licensed drivers. Instructions should be issued to drivers not to hand over keys of the vehicles to cleaners.
q) No employee / worker should sleep below/near Container Trailer/Equipment.
r) Trailer driver shall not have left keys while leaving the trailer.

2.14 STACKING PLAN FOR STOAGRE OF CARGO:

Following is the stacking plan to avoid toppling over of improperly stacked cargo:

Sr. No.	Type of Cargo	Stacking	Safety Precautions	Responsibility for storage	Overall Monitoring
1	Bag cargo (Import)	17 Bags High Stack	one line vertical to shed and rest perpendicular from Back side of shed as per IGM	Vessel Agent	Shed Supdt
2	Bag cargo (Export)	10 Bags High Stack	one line vertical to shed and rest perpendicular from bay to bay as per shipping bill	CHB	Shed Supdt
3	CR Coils	G + 1 stacking in shed	Proper dunnage to protect from rolling.	For Import : Vessel Agent and Transporter & For Export : CHB	Shed Supdt
4	HR Coils	Ground stacking	Storage perpendicular to the boundary	For Import : Vessel Agent and	Shed Supdt

			line of storage area, use dunnage for ground fixing	Transporter & For Export : CHB	
5	Wood Pulp	G + 1 stacking in shed	Properly adjusted on ground stack	Vessel Agent and Transporter	Shed Supdt
6	Zink Ingots	G + 1 stacking in shed	Proper dunnage for stability (as required)	Vessel Agent and Transporter	Shed Supdt
7	Machinery and Project Cargo including ODC packages	Ground stacking	storage 2 to 3 feet away from road side & with adequate area for crane / forklift manovering. Barricating if required.	For Import : Vessel Agent and Transporter & For Export : CHB	Shed Supdt
8	Round Bar	Not more than 4 feet high	Place dunnge on ground stack after each bdl. Storage perpendicular to road.	For Import : Vessel Agent and Transporter & For Export : CHB / Vessel Agent	Shed Supdt
9	Billets	G + 3 stacking	Place vertical and perpendicular each stack, use dunnage	For Import : Vessel Agent and Transporter & For Export : CHB/ Vessel Agent	Shed Supdt
10	Wire rod bdls	G + 2 stacking	Storage perpendicular to the boundary line of storage area, use dunnage for ground fixing. Avoid deformation.	For Import : Vessel Agent and Transporter & For Export : CHB / Vessel Agent	Shed Supdt
11	Steel Pipes	G + 2 stacking	Storage perpendicular to the boundary line of storage area, use dunnage for ground fixing	For Import : Vessel Agent and Transporter & For Export : CHB / Vessel Agent	Shed Supdt
12	Steel Plates	Not more than 4 feet high	Use dunnage after every sling stacking. Also to ensure no bent.	For Import : Vessel Agent and Transporter & For Export : CHB/ Vessel Agent	Shed Supdt
13	Crane and booms	Ground stacking	storage 2 to 3 feet away from	Vessel Agent and	Shed Supdt

			perportion to road side, place dunnage if required & barricate if required.	Transporter	
14	Crane counter weight	G + 3 stacking in shed	Dunnage to be properly placed, upper stacks properly adjusted	Vessel Agent and Transporter	Shed Supdt
15	Drums and Palleties cargo	Ground stacking	For drums lead to be on top side, precautions to be taken to avoid/stop leackage. Use saw dust to prevent spreading of any liquid cargo leackages from drums	For Import : Vessel Agent and Transporter & For Export : CHB	Shed Supdt
16	Wooden logs	Not more than 4 feet high	Place dunnge on ground stack after each bdl. Storage perpendicular to road.	For Import : Vessel Agent and Transporter & For Export : CHB / Vessel Agent	Shed Supdt
17	Bulk Cargo (Pulses , Fertilizer and calcite chips)	Heap	create boundary wall with bags of content material, take precautions from slipping of cargo, Use tarpulin on vessel side as well as on vehicles to protect spillage. Take precautions to avoid water gully logging. Roads, Wharf and path to storage area should be regularly sweeped to avoid slipperiness.	For Import : Vessel Agent and Transporter & For Export : CHB	Shed Supdt

2.15 SAFETY PRECAUTIONS FOR HANDLING OF JUMBO BAGS:

a) Always adhere to all applicable regulations and safety requirements.
b) Material Safety Data Sheet (MSDS) shall be kept at every site of handling and all dock workers working thereat are aware about the irritant nature of this cargo.
c) Transportation, handling and storage shall be under done, under control of Responsible Person of Agent/Exporter.
d) Start handling of bags by ensuring it is visually free from any damage that may compromise its strength or carrying ability. If you see a rip, a loose seam or any other deformity, do not attempt to fill the bulk bag. It should be removed and given a thorough inspection before handling.
e) When transporting by truck, stow the cargo in a safe and stable fashion. It must not be transported with other cargo with sharp edges or rough surfaces that can damage the bags.
f) While transportation, ensure that truck bed in covered with tarpaulin so that no spill is occurred on road.
g) While transporting or storage in shed, a pyramid method shall be used. Under the Pyramid Method, each bag above the first layer must rest on at least four lower bags. Each subsequent layer is tiered inward, forming a pyramid-shaped structure.
h) It is also imperative that all lifting mechanisms, whether they be crane hooks, bars or fork lift, etc., are free from protrusions or any other sharp edges that may potentially cut or tear the lift loops on the bags. All lifting mechanisms must have rounded edges with a radius of at least five mm.
i) If forklift is used for handling in shed or ship's cargo hold, then proper exhaust protection shall be used.
j) Avoid scraping the bag against the wall or any surface or ship's side or the hold's walls or opening
k) Avoid shock loading (sudden stops or jerks) of bags.
l) If bags are placed temporarily on the dock to await transport or storage in sheds, ensure the area is clear of sharp obstacles such as stones, pieces of wood, or scrap metal to avoid damage to the base of the bags.
m) When carried on trailers, ensure that it is evenly distribute, securely lash, and before handling ensure that bag is free from damage that can compromise its strength.
n) The crane/hoist or forklift has a sufficiently rated weight capacity to support the filled bag.
o) The crane's hooks, bars or forklift used for lifting don't have sharp edges that may cause damage to the bag's lift loops or sleeves.
p) That all devices that are handling bags are designed specifically to do so.
q) All lift loops/sleeves are vertical to prevent damage.
r) The bag is lifted and suspended per the manufacturer and supplier's instructions.
s) The bag is raised and lowered smoothly.
t) All personnel wear all the personal protective equipment and stay clear of any potential hazards.
u) The distance between the forklift forks are correct width for the bag that is being handled.
v) The forklift operator holds the bag close to the mast as low as possible, tilted back to a proper angle.
w) Any pallets being used are the appropriate size for the bag.
x) The forklift operator has a clear line of site before moving the bag.
y) The forklift is stopped before raising or lowering the bag.
z) All personnel are clear before lifting or lowering a bag.
aa) Never Lift a bag with one hook unless it is specifically designed to be.
bb) If vision of machinery operator is obstructed, then handling shall be done with the help of signalman.

cc) Never allow movement of any personnel under a suspended bag.
dd) Never allow any personnel to place a limb under a suspended bag.
ee) Never lift a bag with fewer lift loops or sleeves than provided.
ff) Never tilt the mast of the forklift truck forward when handling a bag.
gg) Never move a bag when the bag is touching the ground.
hh) Never allow a bag to come in contact with the forklift wheels.
ii) Never lower or raise a bag when the forklift is moving.
jj) Always store your new and/or used bags in a safe and clean facility that protects them from direct sun light or UV rays as they weaken the strength of the bag over the time.
kk) Take care to cover your bags to prevent them from being exposed to dirt, dust, and moisture within your facility or an environment where it will be exposed to inclement weather, as this will weaken the strength of the bag over time.
ll) During storage ensure that the bags are stable when stacking and after storage. Each day round shall be taken by the staff posted thereat to check the stability of bags storage or hang over the side.
mm) Never repair a damaged bag without removing all bags stacked on top of it.
nn) Proper arrangements shall be done to collect any spills that occurred during transportation and storage. Then is shall be safety disposed off by applicable method as per the law.

2.16 SOP FOR MOORING OPERATION :

I. MOORING OPERATION

Ship enter and leave ports regularly. Tying up a ship when alongside a berth or another vessel is potentially a very hazardous operation unless simple and effective safety procedures are followed. Mooring accidents are always on the list of personal injury accidents, often resulting in severe injuries or even fatalities.

These are very simple guidelines marked by common sense, but that it can save of serious accidents and even human lives.

Planning the Operation

The key to safe and effective mooring operations is planning and ensuring that appropriate procedures are followed. A mooring operation risk assessment should always be carried out. Suitable controls and procedures should be in place to minimise the risks identified for this operation. The use of toolbox talks to discuss the operation and the hazards involved is an effective way to help reduce accidents. It may seem like an unnecessary task to undertake, as mooring is a routine operation that most crew are very familiar with. However, this is the danger, as familiarity and complacency can lead to a mistake and an accident.

Who is In-Charge?

The person in charge or directing the mooring operation at each mooring station should be easily identifiable and heard clearly by the rest of the mooring team. Consideration should be given to issuing the person in charge with a different coloured high visibility vest and/or a different coloured safety helmet.
Occasionally the Master issues instructions from the bridge to a dedicated person in charge at each mooring station. The change out of mooring

operation personnel, for example, due to shift change, should be avoided until the mooring operation is complete.

Dock master, Indira Dock is incharge for Indira Dock operations and Dock Master Jawahar Dweep is incharge for JD & PP mooring operations.

At site shore sarang is hearing the mooring gang. He is responsible for following safety procedures while mooring operations is in progress.

Communication

Communication between the mooring team is a key part of mooring procedures. VHF, talk back systems, hand signals and verbal communication are normally used. Be aware of any language barriers which can lead to miscommunication and an unintended action that may result in an accident. Always ensure that emergency signals and procedures are understood and well-practiced. Ensure that after an instruction has been given or received it is repeated back to confirm it has been fully understood. Training should be carried out in these procedures.

Pilot and dock Masters Incharge of operations is in communication with each other by hand held VHF. Communication between Dock Master Incharge and Shore Sarang is done by hand held VHF or direct verbal communication.

Personal Protective Equipment

The mooring team should always be wearing the proper personal protective equipment (PPE). This should be verified by the team leader/person in charge. If the incorrect PPE is worn then the person should not be allowed to take part in the mooring operation until correctly attired. Typical PPE consist of the following items: coverall; safety shoes; safety helmet; high visibility vest; gloves and buoyancy vest if working near shipside or quayside.
All persons involved in mooring operations require to be wear safety helmet, working clothes (boiler suit or approved clothing), safety shoes, working life vest and life line as required.

Danger Zones

Be aware of snap back zones and potential pinch points. The use of deck markings can greatly assist in the identification of these zones. Try to use common sense during mooring operations and if you can see a dangerous situation developing make sure that the stop signal is given. It is better to be safe than to ignore a dangerous situation. Do not forget that your view of the mooring operation may be different to that of others and you may be the only person who sees the development of a dangerous situation. Ensure all crew that carry out mooring operations are trained in the identification and understanding of snap back zones.
It is responsibility of shore sarang to make sure that snap zone, rope loops/bight and pinching points are avoided by mooring crew.

Condition of Mooring Lines

Mooring lines should always be examined regularly for damage and records maintained. If in doubt over the condition of a mooring line, ensure that it is inspected by a competent person. When handling mooring lines particular attention should be paid to signs of fraying, any damage and signs of corrosion.
It is the responsibility of vessel's master to make sure mooring lines are in good condition. It is also advised to mooring Sarang to check the eyes and physical status of mooring ropes. If it is observed to be not in good condition same to be informed to Duty Dock Master.

Environmental Conditions

Poor weather can have a big impact on mooring operation safety as follows:

- Wind, currents and tides – any of these can affect the movement of the ship. Excessive strain can be put on mooring lines and this may cause them to break. Pay particular attention to the snap back zones and vessel movement during mooring operations in these conditions. Gusting wind can also knock a person off balance.
- Fog – this reduces visibility and may make visual communication difficult with the persons ashore or on another vessel. Ensure that a good communication link is established and tested before mooring in these conditions. The risk assessment should take into consideration poor visibility.
- Cold weather clothing – if personnel are inadequately dressed this can have a great impact on concentration and mobility, which in turn may lead to an accident. Always ensure that you are appropriately dressed for the weather conditions.

It is responsibility of Duty Dock Master to make sure weather condition is suitable for mooring operations.

Vessels Assisting

Tugs and small workboats are often used when mooring a vessel. Ensure that good communication between vessels is established and is tested. Remember the possibility of language barriers in these instances. When passing lines from the vessel to the assisting vessel or to the quayside, ensure that the heaving line "monkey´s fist" does not include additional weight. It has been known for steel weights to have been added to these lines to enable them to be thrown further. This practice has been a cause of injury including causing serious head injuries.

It is the responsibility of the Tug Master to make sure standard mooring operations procedure has been followed and any shortcomings to be informed to Duty Dock Master.

Quay Access

Safe access to and from the vessel to the quay or another vessel may be required if personnel are not available to assist in the mooring operation. Means of safe access may include a gangway, pilot ladder to tender boat or a basket transfer. In all cases ensure that the equipment used for personnel transfer is well maintained and has a valid test certificate. Do not jump from the vessel to the quay or other vessel or use any other non-approved method other than the aforementioned and always use a buoyancy aid. Lives have been lost through failures to follow safe access procedures.

Duty Dock Master is responsible for safe access for mooring crew in mooring operational area.

Training

The concerned Dock Master with the help of Safety Officers imparts the Training on hazards associated in the mooring operations and Safety precautions to be taken during operation. Every month, one hour training is imparted and records of the same is kept at the office. Topics covered during this training are accident prevention, good house keeping, general inspection of mooring rope, danger zones in mooring operation, importance of PPEs, survival techniques, manual lifting method, first aid, fire fighting and emergency procedures.

2.17 SAFETY CHECKLISTS:

2.17.1 SAFETY CHECK LIST FOR CONTAINER FREIGHT STATION (CFS)

Location - Date & Time -

Nature of operation and type of cargo Storage / Handling -

Note *- All the items in the checklist should indicate "Yes" for safe operation. If any item indicates 'No" then appropriate safety precautions should be advised to concerned or work may be stopped if it's posing immediate danger to the life of any person working thereat.*

Sr. No.	Item	Yes	No	Remarks
A	**General**			
1	Fencing and marking of aisle / for cargo storage *(Refer Regulation 10)*			
2	Entry and exit marking for pedestrian *(Refer Regulation 10)*			
3	Surface area of yard is even *(Refer Regulation 9)*			
4	All Manhole in the yard are covered *(Refer Regulation 9)*			
5	Stacking surface is safe for storage of such type of cargo *(Refer Regulation 9)*			
6	Load bearing capacity of stacking is displayed / known *(Refer Regulation 20)*			
7	Entry and Exit point for vehicle are marked *(Refer Regulation 10)*			
8	Housekeeping in the yard is satisfactory *(Refer Regulation 9)*			
9	Illumination in the yard is satisfactory *(Refer Regulation 16)*			
10	Vehicles movement direction is available *(Refer Regulation 10)*			
B	**Container De-stuffing and Stuffing**			
1	After container opening waiting time of at least 10 - 15 minutes for good ventilation is maintained			
2	While working in 40' Container by forklift, a proper ventilation exhaust gases of vehicle is maintained			
3	No one standing in route of forklift movement working thereat			
4	Ramp is placed at container level i. e no gap is there			
5	Workers using PPE while working in the container			
6	While opening the door the worker, due care is taken to ensure that no one is standing in front of opening door as the cargo stacked inside may after door is opened			
7	Single operation at a time is allowed inside the container			
8	Proper Illumination at handling site			
9	Proper cleanliness is maintained at site			
10	Due care is taken while handling of cargo inside the container			
11	No person resting around site of operation.			

C	**Top Lift Truck (TLT)**			
1	Equipment is parked at safe place			
2	Annual inspection and periodical testing certificate is available at site (photo copy)			
3	Equipment is properly installed & functioning like side mirror, head & tail lights, reverse horn, etc.			
4	Equipment have no extensive sound.			
5	No any extra weight put on counter weight for enhance the capacity.			
6	Driver has taken all safety measures during operation like help of signaler, not overloading, etc.			
7	No person is standing at blind spots in path of forklift or below suspended load or moving/passing load			
8	No person is standing on TLT while it is being moved			
9	Fire Extinguisher is available			
10	Hydraulic Hose pipe is proper & no leaked oil			
D	**Fork Lift No.**			
	Transporters Name -			
	F/L DEP No. -			
	F/L Operators Name -			
1	Marking of SWL on F/L *(Refer Regulation 57)*			
2	Valid license of operator			
3	Reverse horn is working or help of signaler is available *[Refer Regulation 57(8)(b)]*			
4	Both Side mirrors are available *(Refer Regulation 40)*			
5	Front and rear Head & Tail lights are working *(Refer Regulation 40)*			
6	No oil / fuel leakage or spillage			
7	Length of fork is more than or equal to the width / length of load its handling *(Refer Regulation 40)*			
8	Load chart is available with operator			
9	Method of handling of load is proper and safe			
10	Workers working thereat are wearing PPEs *(Refer Regulation 73)*			
11	No person is standing at blind spots in path of forklift or below suspended load or moving/passing load			
12	While carrying load vision of operator is not obstructed due to cargo. If No, then adequate help of signaler is available to guide his path. *[Refer Regulation 57(8)(b)]*			
13	Handling is not causing any road / traffic obstruction. If No, then any alternate method of handling is available. Then also, no, then all safety precautions are taken.			
14	Movement of cargo on fork is carried out in at minimum lowered position i. e. ground level *(Refer Regulation 40)*			

15	No person is standing on forklift while it is being moved			
16	Effective mechanical braking device and mechanically operated current cut-off that comes into operation automatically when the operator leaves the forklift. *[Refer Regulation 40(3)]*			
17	Operator is protected by overhead guard			
18	Tested for stability as per National Standards *(Refer Regulation 41)*			
19	Area of handling is sufficiently ventilated			
20	If handling Dangerous Goods, then spark arrester is provided on its exhaust			
E	**Truck or Trailer**			
	Transporters Name.			
1	Driver possess valid Driving license			
2	Cleaner is provided or helper is available for manoeuvre of vehicle			
3	Driver, cleaner working thereat are wearing PPEs *(Refer Regulation 73)*			
4	Condition of Trailers bed is satisfactory *(Refer Regulation 57)*			
5	Side metal Stanchions are properly fixed in pockets on trailer to prevent falling of load from bed and loads are stacked beyond height of stanchions [*Refer Regulation 57(4)]*			
6	Both Side mirrors are available *(Refer Regulation 40)*			
7	Brakes, Head lights and Tail lamps are working *[Refer Regulation 40(3)]*			
8	Pkg/load is properly placed and secured on trailer			
9	Vehicle is not loaded beyond its registered capacity *[Refer Regulation 57(6)]*			
10	Twist locks are provided in case of containers movement *[Refer Regulation 85(13)]*			
11	Vehicle is Maintained in good working condition *(Refer Regulation 57)*			
12	Safe way for workers to approach on trailer bed for handling load			
F	**Stacking of Cargo in the Shed**			
1	Stacked properly on firm surface *(Refer Regulation 66)*			
2	Not overloaded to its load bearing capacity of surface *(Refer Regulation 66)*			
3	Stack is secured or blocked by suitable means to prevent its rolling/shifting or falling *(Refer Regulation 66)*			
4	Not stacked or rested against any structure *(Refer Regulation 66)*			
5	Not stacked to such height, which render the pile unstable			

	(Refer Regulation 66)			
6	Safe means of access to / around stack is provided *(Refer Regulation 66)*			
7	Sufficient space is maintained between two stacks for movement of vehicle *(Refer Regulation 66)*			
8	No worker is standing in potential danger zone, where there is a chance of falling of load			
9	Vehicles are not unnecessarily parked in the yard.			
	Operation			
1	Vehicles are moving in one direction.			
2	No Haphazard gathering of transport vehicles around LA			
3	During operation of LA - persons are away from the cargo being handled or any other danger zone			
4	No two wheeler / car moves in the yard around the operation			
5	Cargo stack on transport vehicle is safe and lash / unlash			
6	No smoking observed in the yard *(Refer Regulation 17)*			
7	Persons wearing retro-reflective jackets for visibility *(Refer Regulation 73)*			

Supervisor

Officer Incharge

2.17.2 SAFETY CHECK LIST FOR OPERATION IN SHED

Location - Date & Time -

Nature of operation and type of cargo handling -

Note *- All the items in the checklist should indicate "Yes" for safe operation. If any item indicates 'No" then appropriate safety precautions should be advised to concerned or work may be stopped if it's posing immediate danger to the life of any person working thereat.*

Sr. No.	Item	Yes	No	Remarks
A	**Shed**			
1	Structural stability of the structure is carried out.			
2	Adequate ventilation exist			
3	No unsafe condition in structure exist i. e. loose plaster, cracks in wall, fall of ceiling fan, corroded surface, etc.			
4	No water leakage from roof or through wall			
5	Rail guard protection or adequate protection for structural pillars of the shed			
6	Surface level is even; especially at shed door entrance			
7	Shed doors are in good working condition			
8	Condition of staircase is satisfactory i. e. steps & hand railings, etc. *(Refer Regulation 24)*			
9	Sufficient illumination is available at all locations *(Refer Regulation 16)*			
10	All electrical connections & wiring are in sound condition. No exposed / naked / dangerous point / fittings exists.			
11	During temporary electric supply, all joints are properly insulated and all wires are in good condition. No part of any wire is having any chance of contact of water with any electric wire			
12	Cargo lift is in satisfactory working condition with annual inspection carried out.			
13	If any air condition is installed, adjacent to entry door, then alternate escape route is available for emergency exit.			
14	Marking for cargo stacking area is done *(Refer Regulation 66)*			
15	Cargo stack is not overloaded to its rated capacity of surface *(Refer Regulation 66)*			
16	Stack is secured or blocked by suitable means to prevent its shifting or falling *(Refer Regulation 66)*			
17	Cargo stacking is proper with interlocking and in safe condition. There is no possibility of falling of any cargo from any stacks thereat. *(Refer Regulation 66)*			
18	Not stacked to such height, which render the pile unstable *(Refer Regulation 66)*			
19	Sufficient space is available between cargo stacks for access/movement person / vehicle *(Refer Regulation 66)*			

20	Sufficient and safe space between cargo and shed wall / any structure *(Refer Regulation 66)*			
21	All Handcart are kept in good working condition with its periodical maintenance			
22	All Aluminum ladders are in good condition i. e. no rung is missing, proper rubber shoes, etc. *(Refer Regulation 24)*			
23	No Spillage observed and in case of any spillage, for collection sufficient quantity of saw dust, drums, etc. are available			
24	Sufficient number of helmets are available for use of dock workers and they are maintained properly *(Refer Regulation 73)*			
25	All persons working thereat are using appropriate PPEs *(Refer Regulation 73)*			
26	First aid box with all required medicine is available. No medicine is kept beyond its date of expiry or damaged *(Refer Regulation 101)*			
27	Register of First Aid rendered is available and notice of first aid box availability is displayed *(Refer Regulation 101)*			
28	Stretcher is available and is in good working condition. *(Refer Regulation 104)*			
29	Sufficient fire extinguishers are available and no extinguisher is due for annual testing/refilling *(Refer Regulation 17)*			
30	In Fire buckets; sand and water is properly filled *(Refer Regulation 17)*			
31	No smoking boards are displayed *(Refer Regulation 17)*			
32	Provision of drinking water & cold water is available *(Refer Regulation 96)*			
33	Provision of washing facility is available *(Refer Regulation 100)*			
34	Rest room is available with proper hygiene & sufficient amenities like cleanliness, light, ventilation, fans, etc. *(Refer Regulation 105)*			
35	Adequate toilet block facility with supply of water is available. Periodical cleaning is carried out. *(Refer Regulation 97)*			
36	Dustbin with appropriate segregation is available *(Refer Regulation 95)*			
37	Display of emergency numbers in the shed			
B	**Fork Lift**			
	Transporters Name -			
	F/L DEP No. -			
	F/L Operators Name -			
38	Marking of SWL on F/L			
39	Valid license of operator			
40	Reverse horn is working or help of signaler is available			

	[Refer Regulation 57(8)(b)]			
41	Both Side mirrors are available *(Refer Regulation 40)*			
42	Front and rear Head & Tail lights are working *(Refer Regulation 40)*			
43	No oil / fuel leakage or spillage			
44	Length of fork is more than or equal to the width / length of load its handling *(Refer Regulation 40)*			
45	Load chart is available with operator			
46	Method of handling of load is proper and safe			
48	Workers working thereat are wearing PPEs *(Refer Regulation 73)*			
49	No person is standing at blind spots in path of forklift or below suspended load or moving/passing load			
50	While carrying load vision of operator is not obstructed due to cargo. If No, then adequate help of signaler is available to guide his path. *[Refer Regulation 57(8)(b)]*			
51	Handling is not causing any road / traffic obstruction. If No, then any alternate method of handling is available. Then also, no, then all safety precautions are taken.			
52	Movement of cargo on fork is carried out in at minimum lowered position i. e. ground level			
53	No person is standing on forklift while it is being moved			
54	Effective mechanical braking device and mechanically operated current cut-off that comes into operation automatically when the operator leaves the forklift.			
55	Operator is protected by overhead guard			
56	Tested for stability as per National Standards			
57	Area of handling is sufficiently ventilated			
58	If handling Dangerous Goods, then spark arrester is provided on its exhaust			
C	**Truck or Trailer**			
	Transporters Name.			
59	Driver possess valid Driving license			
60	Cleaner is provided or helper is available for man oeuvre of vehicle *[Refer Regulation 57(8)(b)]*			
61	Driver, cleaner working thereat are wearing PPEs *(Refer Regulation 73)*			
62	Condition of Trailers bed is satisfactory *(Refer Regulation 57)*			
63	Side metal Stanchions are properly fixed in pockets on trailer to prevent falling of load from bed and loads are stacked beyond height of stanchions *[Refer Regulation 57(4)]*			
64	Both Side mirrors are available *(Refer Regulation 40)*			

65	Brakes, Head lights and Tail lamps are working *[Refer Regulation 40(3)]*			
66	Package / load is properly placed and secured on trailer *(Refer Regulation 57)*			
67	Vehicle is not loaded beyond its registered capacity *(Refer Regulation 57)*			
68	Twist locks are provided in case of containers movement *[Refer Regulation 85(13)]*			
69	Vehicle is Maintained in good working condition *(Refer Regulation 57)*			
70	Safe way for workers to approach on trailer bed for handling load			
71	Lashing is not removed until fork is placed for offloading of load. If not, then suitable protective measures taken for protection from falling load			
72	No worker is standing in potential danger zone, where there is a chance of falling of load			
73	While removing sling or shackle, worker's hand/fingers are not in a potential danger zone i. e. can caught in between two surfaces			

Supervisor

Officer Incharge

2.17.3 SAFETY CHECKLIST FOR HANDLING OF HAZARDOUS CARGO

Location - Date & Time -

Nature of operation and type of cargo Storage / Handling -

Note *- All the items in the checklist should indicate "Yes" for safe operation. If any item indicates 'No" then appropriate safety precautions should be advised to concerned or work may be stopped if it's posing immediate danger to the life of any person working thereat.*

Sr. No.	Item	Yes	No	Remarks
1	Material Safety Data Sheet (MSDS) available with driver of vehicle as well as at site and explained to them.			
2	TREM card is available with driver of vehicle			
3	Authorized and Trained driver of the vehicle			
4	Suitable Fire extinguisher available in the vehicle			
5	Emergency contact number of Resource Person is available with driver of the vehicle			
6	All packages are in sound condition			
7	All packages are confirming to packaging, marking, labeling standards stipulated under the IMDG code			
8	Proper segregation of hazardous cargo as given in the IMDG code is maintained			
9	Appropriate lifting appliances and loose gears available for handling of cargo			
10	SOP for safe handling of cargo is available			
11	Presence of responsible person of the agent / exporter / importer have requisite experience of handling hazardous cargo.			
12	Supervision and escort of MbPA fire brigade is available			
13	All fire brigade personnel at site are aware about hazard possessed by the cargo & its fire fighting method			
14	All the time, the fire tender along with firefighting appliances and emergency equipment like plugging kit, etc. are kept in readiness condition			
15	No open flames, lighting of fire, welding, cutting or any hot work in vicinity of cargo handled or stored.			
16	Nearby area free is from any combustible material.			
17	Trailer in sound condition with proper twist locks and possess spark arrester fitted to its exhaust pipe			
18	Helper or attendant is available with driver			
19	Adequate illumination of 25 LUX is available at site			
20	Center of gravity is close to the mid-length of the vehicle bed is maintained			
21	Proper securing / lashing of cargo			
22	All the persons involved in handling are wearing requisite PPEs			
23	Emergency contact numbers are available at site			

Supervisor

Officer Incharge

2.17.4 SAFETY CHECKLIST FOR WAREHOUSE

Location - Date & Time -

Nature of operation and type of cargo Storage / Handling -

Note *- All the items in the checklist should indicate "Yes" for safe operation. If any item indicates 'No" then appropriate safety precautions should be advised to concerned or work may be stopped if it's posing immediate danger to the life of any person working thereat.*

Sr. No.	Item	Yes	No	Remarks
1	Structural Audit of warehouse is available			
2	Sufficient open area around warehouse is available for movement of vehicles			
3	Emergency contact numbers are available			
4	Load bearing capacity of warehouse floor surface where cargo is stored/stack, displayed on wall			
5	Demarcation for movement of vehicles and cargo stores in warehouse.			
6	Fire extinguishers are available at site and are kept at least one meter away from cargo. Access to it is kept clear all the time.			
7	Fire extinguishers are inspected / tested periodically.			
8	Any provision of Hydrant point with fire Hose. If yes, then no part of hydrant system is missing			
9	First Aid Box with requisite medicines is maintained.			
10	First Aid available here' is displayed at prominent place			
11	Do not present any electrical hazard i. e. exposed/naked wires, overloading of any electrical point, missing covers or hanging of electrical fixtures, contact of any electrical connection with water/leakage, unsafe wire joints, provision of circuit breaker, etc.			
12	Smoke detector and sprinkler system is available			
13	Proper illumination in and around warehouse is maintained			
14	Proper ventilation			
15	Cargo lift (Hoist) is well maintained and periodically inspected.			
16	Safe working load should be displayed inside the hoist.			
17	Over loading tripping device installed in hoist.			
18	Shutters of hoist properly working.			
19	Cargo stored one meter away from walls and supporting pillars of warehouse building.			
20	No High stacking of bags and palletized cargo			
21	No hazardous cargo is stored			
22	Rest room for workers is available			
23	Whenever A/C unit is installed near or above door then alternate exit/escape route is available.			
24	Drinking water with filter system. Provision of cooler during summer season.			
25	Adequate facility of toilet block is available			
26	Satisfactory cleanliness is maintained			
27	Safe exit is available & it is not obstructed/locked			
28	In case of any emergency, staff is aware of nearest Assembly Point			
29	Condition of Staircase is satisfactory with handrails & non slip surface			
30	Flooring is even / not broken & present no hazard for any slipping or tripping or falling from height			
31	Is there any provision for collection of spill			

	Cargo handling vehicles and equipment's safety check list.			
	Fork Lift No.			
	Transporters Name -			
	F/L DEP No. -			
	F/L Operators Name -			
1	Marking of SWL on F/L *(Refer Regulation 57)*			
2	Valid license of operator			
3	Reverse horn is working or help of signaler is available *[Refer Regulation 57(8)(b)]*			
4	Both Side mirrors are available *(Refer Regulation 40)*			
5	Front and rear Head & Tail lights are working *(Refer Regulation 40)*			
6	No oil / fuel leakage or spillage			
7	Length of fork is more than or equal to the width / length of load its handling *(Refer Regulation 40)*			
8	Load chart is available with operator			
9	Method of handling of load is proper and safe			
10	Workers working thereat are wearing PPEs *(Refer Regulation 73)*			
11	No person is standing at blind spots in path of forklift or below suspended load or moving/passing load			
12	While carrying load vision of operator is not obstructed due to cargo. If No, then adequate help of signaler is available to guide his path. *[Refer Regulation 57(8)(b)]*			
13	Handling is not causing any road / traffic obstruction. If No, then any alternate method of handling is available. Then also, no, then all safety precautions are taken.			
14	Movement of cargo on fork is carried out in at minimum lowered position i. e. ground level *(Refer Regulation 40)*			
15	No person is standing on forklift while it is being moved			
16	Effective mechanical braking device and mechanically operated current cut-off that comes into operation automatically when the operator leaves the forklift. *[Refer Regulation 40(3)]*			
17	Operator is protected by overhead guard			
18	Tested for stability as per National Standards *(Refer Regulation 41)*			
19	Area of handling is sufficiently ventilated			
20	If handling Dangerous Goods, then spark arrester is provided on its exhaust			

Supervisor

Officer Incharge

2.17.5 SAFETY CHECKLIST FOR HANDLING OF BAGGED CARGO IN RAILWAY WAGAON

Location - Date & Time -

Nature of operation and type of cargo Storage / Handling -

Note *- All the items in the checklist should indicate "Yes" for safe operation. If any item indicates 'No" then appropriate safety precautions should be advised to concerned or work may be stopped if it's posing immediate danger to the life of any person working thereat.*

Sr. No.	Item	Yes	No	Remarks
1	Wagon movement / placement is carried out under guidance of signaler.			
2	Wagon handling operation is fully stopped before coupling of engine.			
3	Whether placement / movement of wagons checked.			
4	Wagons uncoupling is not done on placement of load			
5	Wagon doors fully opened and secured properly			
7	Wagon doors are properly closed before movement of wagons			
8	Cleaner or helper is available for manoeuvre of vehicle			
9	Proper stacking of bags in trucks. No overloading.			
10	Planks / ramps checked for placement between wagon and platform of truck.			
11	Ladders used for opening of doors are placed on firm and level ground.			
12	Utmost housekeeping while unloading /loading of food grains such as peas.			

Supervisor

Officer Incharge

2.17.6 SAFETY CHECKLIST FOR HANDLING OF STEEL CARGO ON RAILWAY WAGON

Location - Date & Time -

Nature of operation and type of cargo Storage / Handling -

Note *- All the items in the checklist should indicate "Yes" for safe operation. If any item indicates 'No" then appropriate safety precautions should be advised to concerned or work may be stopped if it's posing immediate danger to the life of any person working thereat.*

Sr. No.	Item	Yes	No	Remarks
	Wagon fitness is checked.			
B	**Lifting Appliances (LA)**			
	Mobile crane No.			
	Transporters Name -			
	LA DEP No.			
	LA operators possess valid license			
1	Through Visual Inspection condition of LA is satisfactory *(Refer Regulation 41)*			
2	Inspection of wire ropes used in LA or loose gear are inspected by Responsible person *(Refer Regulation 41)*			
3	Eye splice and loops for attachment of hooks, rings and other such part of wire ropes used in LA are made with suitable thimble *(Refer Regulation 41)*			
4	Possess Valid Periodical Annual Thorough / Test & examination Certificate as per statutes *(Refer Regulation 41)*			
5	Marking of safe working load is displayed on LA *(Refer Regulation 52)*			
6	Load Angle Indicator / chart is available *(Refer Regulation 42)*			
7	Over load tripping device is available & working *[Refer Regulation 40(4)]*			
8	Three dead turns of the rope are remain on the drum in every operating position of lifting appliances *[Refer Regulation 40(2)(b)]*			
9	Efficient brakes to prevent fall of suspended load and act without any shock *[Refer Regulation 40(3)]*			
10	All controls of the cranes are working effectively and suitable locking device to prevent accidental movement or displacement *[Refer Regulation 40(4)]*			
11	No oil / fuel leakage or spillage from LA ~~in the vicinity~~			
12	Out riggers of crane rested on firm and rigid surface *(Refer Regulation 40)*			
13	Side mirrors are properly installed *(Refer Regulation 40)*			
14	Boom light, head and tail lights are working properly			

	(Refer Regulation 40)			
15	Helper / cleaner is available to guide the operator, when his vision is obstructed *[Refer Regulation 57(8)(b)]*			
16	Helper is not standing / resting within / under moving radius of counter weight as well as swinging radius of crane			
17	Operator can see clearly movement of person /cargo within swinging radius of crane.			
18	Method of handling of load is proper and safe *(Refer Regulation 57)*			
19	Loose gears / wires used for handling cargo are of proper and are of adequate strength *[Refer Regulation 46(48)]*			
20	Workers working thereat are wearing PPEs *(Refer Regulation 73)*			
21	No person is standing or passing below suspended load or moving/passing load			
22	No loose dunnage or debris is found hanging while handling of cargo. If yes, then suitable means are provided to prevent its falling out *[Refer Regulation 65(7)]*			
23	Hook lock is provided in the crane hook or there is no chance of slippage of any sling from hook *(Refer Regulation 40)*			
24	If cargo is lifted by preslung sling or by bundle binding wire or packing strip. If yes, then any document/certificate or marking on gear is available to indicate its safe working load/capacity			
25	Load of the loose gear is added while calculation of load to be lifted			
26	No person is resting/sleeping near handling area or in vicinity of cargo stacked			
27	Handling is not causing any road / traffic obstruction. If No, then any alternate method of handling is available. Then also, no, then all safety precautions are taken.			
28	Suitable fire fighting equipment is available *(Refer Regulation 17)*			
C	**Fork Lift No.**			
	Transporters Name -			
	F/L DEP No. -			
	F/L Operators Name -			
1	Marking of SWL on F/L *(Refer Regulation 57)*			
2	Valid license of operator			
3	Reverse horn is working or help of signaler is available *[Refer Regulation 57(8)(b)]*			
4	Both Side mirrors are available *(Refer Regulation 40)*			
5	Front and rear Head & Tail lights are working *(Refer Regulation 40)*			
6	No oil / fuel leakage or spillage			
7	Length of fork is more than or equal to the width / length of load its handling *(Refer Regulation 40)*			

8	Load chart is available with operator			
9	Method of handling of load is proper and safe			
10	Workers working thereat are wearing PPEs *(Refer Regulation 73)*			
11	No person is standing at blind spots in path of forklift or below suspended load or moving/passing load			
12	While carrying load vision of operator is not obstructed due to cargo. If No, then adequate help of signaler is available to guide his path. *[Refer Regulation 57(8)(b)]*			
13	Handling is not causing any road / traffic obstruction. If No, then any alternate method of handling is available. Then also, no, then all safety precautions are taken.			
14	Movement of cargo on fork is carried out in at minimum lowered position i. e. ground level *(Refer Regulation 40)*			
15	No person is standing on forklift while it is being moved			
16	Effective mechanical braking device and mechanically operated current cut-off that comes into operation automatically when the operator leaves the forklift. *[Refer Regulation 40(3)]*			
17	Operator is protected by overhead guard			
18	Tested for stability as per National Standards *(Refer Regulation 41)*			
19	Area of handling is sufficiently ventilated			
20	If handling Dangerous Goods, then spark arrester is provided on its exhaust			
21	Consignment CG meets with CG of wagon.			
22	Load is stable & no part of consignment is protruding outside the wagon			
23	No loose or hanging lashing material such as wire ropes /straps hanging out of wagon.			

Supervisor

Officer Incharge

2.17.7 SAFETY CHECK LIST FOR OPERATION ON WHARF

Location - Date & Time -

Nature of operation and type of cargo handling -

Note *- All the items in the checklist should indicate "Yes" for safe operation. If any item indicates 'No" then appropriate safety precautions should be advised to concerned or work may be stopped if it's posing immediate danger to the life of any person working thereat.*

Sr. No.	Item	Yes	No	Remarks
A	**General**			
1	Wharf surface is even and in clean condition *(Refer Regulation 9)*			
2	All manhole are covered properly *(Refer Regulation 9)*			
3	Wharf area is clear for free movement of vehicles *(Refer Regulation 9)*			
4	Lifebuoy with life line are available on wharf side *(Refer Regulation 15)*			
5	Drainage facility is satisfactory and no accumulation of water or water logging at any place *(Refer Regulation 9)*			
6	Load bearing capacity of wharf is available *(Refer Regulation 20)*			
7	No unsafe structure of shed or any portion of roof or shed door, exists at the location *(Refer Regulation 9)*			
8	Housekeeping is satisfactory *(Refer Regulation 9)*			
9	Illumination level is satisfactory *(Refer Regulation 16)*			
10	Electric cabin on the wharf is in closed condition and no material is kept inside it *(Refer Regulation 9)*			
11	Pals are fixed on wharf to avoid spillage into sea			
12	Workers working thereat are wearing PPEs *(Refer Regulation 73)*			
13	No person is standing below the suspended load or along the route of cargo handled			
14	No person is using mobile phone while working			
15	No person is resting/sleeping on the wharf			
16	Gangway of vessel is not within the route of cargo handled & it is properly placed on wharf *(Refer Regulation 24)*			
17	Safe landing/boarding on gangway exists & it is covered with safety net beneath it. *(Refer Regulation 24)*			
18	Through Visual Inspection condition of LA & its wire rope is satisfactory.			
19	Loose gears / wires used for handling cargo are of proper and are of adequate strength *[Refer Regulation 46(48)]*			
20	Handling operation is carried out by the proper equipment through safe lifting method and appropriate handling gears.(CG, type of sling, etc.) *(Refer Regulation 40)*			
21	While placing load on to trailer by forklift or by sling, no person is standing/working in danger zone of unexpected falling of load from trailer bed			

22	No loose Dunnage or debris is found hanging while handling of cargo. If yes, then suitable means are provided to prevent its falling out			
23	Locking pin is provided in the crane hook or there is no chance of slippage of any sling from hook *(Refer Regulation 40)*			
24	If cargo is lifted by preslung sling or by bundle binding wire. If yes, then are of adequate strength to bear load			
25	Road safety discipline i .e. Entry and Exit point for vehicle and its movement			
26	Vehicles are driven at speed limit of 8 of km/hr.			
27	Vehicles are driven by authorized person *(Refer Regulation 57)*			
28	Vehicle is maintained in good repair and working order *(Refer Regulation 57)*			
29	Cleaner is provided or helper is available for manoeuvre of vehicle on wharf *(Refer Regulation 57)*			
30	Condition of Trailers bed is satisfactory *(Refer Regulation 57)*			
31	Side mirrors are installed on vehicles *(Refer Regulation 57)*			
32	Brakes, Head lights and Tail lamps of vehicles are working *[Refer Regulation 57(4)]*			
33	Vehicle is not loaded beyond its registered capacity *[Refer Regulation 57(6)]*			
34	Side metal Stanchions are properly fixed in pockets on trailers to prevent falling of load from bed *[Refer Regulation 57(4)]*			
35	Safe way for workers to approach on trailer bed or vehicle			
36	No person is standing in the movement zone of vehicle or equipment especially in reverse direction or movement while carrying load			
37	No worker is standing on wharf or on trailer in potential danger zone, where is a chance of falling of load			
38	While removing sling or shackle, worker's hand/fingers are not in potential danger zone			
39	Package/load is properly secured/lashed on trailer, while it is being moved *(Refer Regulation 57)*			
40	No running vehicle is left unattended *(Refer Regulation 57)*			
41	Twist locks are provided in case of containers movement *(Refer Regulation 57)*			

Supervisor

Officer Incharge

2.17.8 SAFETY CHECK LIST FOR ON-BOARD WORKING

Location - Date & Time -

Nature of operation and type of cargo Storage / Handling -

Note *- All the items in the checklist should indicate "Yes" for safe operation. If any item indicates 'No" then appropriate safety precautions should be advised to concerned or work may be stopped if it's posing immediate danger to the life of any person working thereat.*

Sr. No.	Item	Yes	No	Remarks
A	**General**			
1	Effective planning to handle cargo by safe method and with proper Gears			
2	Provision exists for removal of injured person from hold			
3	Provision of Ambulance or First Aid is available			
4	No smoking policy is observed on-board the vessel			
5	Pals and skid nets are rigged on wharf			
B	**Lifting Appliances (LA)**			
1	Through Visual Inspection condition of wire ropes and loose gears of LA are in satisfactory condition *(Refer Regulation 40)*			
2	Inspection of wire ropes used in LA or loose gear are inspected by the Responsible person *(Refer Regulation 40)*			
3	Eye splice and loops for attachment of hooks, rings and other such part of wire ropes used in LA are made with suitable thimble. Splicing of loose Gears is proper *(Refer Regulation 40)*			
4	Possess Valid Periodical Annual Thorough / Test & examination Certificate as per statutes *(Refer Regulation 41)*			
5	Marking of safe working load is displayed on LA *(Refer Regulation 52)*			
6	Load Angle Indicator / chart is available. *(Refer Regulation 52)*			
7	Over load tripping device is available & working *[Refer Regulation 40(4)]*			
8	Three dead turns of the rope are remain on the drum in every operating position of lifting appliances *[Refer Regulation 40(2)(b)]*			
9	Efficient brakes to prevent fall of suspended load and act without any shock *[Refer Regulation 40(3)]*			
10	All controls of the cranes are working effectively and suitable locking device to prevent accidental movement or displacement *[Refer Regulation 40(4)]*			
11	No oil leakage or spillage from machine			
12	Loose gears / wires used for handling cargo are in sound condition and are of adequate strength *(Refer Regulation 46)*			
13	Arrestor flap/Hook lock is provided or there is no chance of slippage of any sling from cranes hook			
14	Load of the loose gear is added while calculation of load to be lifted			

15	Access to operators cabin is satisfactory i.e. no missing or slippery rungs, etc.			
16	Windshield or window glass of operator cabin is satisfactory			
C	**Fork Lift**			
1	Marking of SWL on F/L			
2	Valid license of operator			
3	Reverse horn is working or help of signaler is available *[Refer Regulation 57(8)(b)]*			
4	Both Side mirrors are available *(Refer Regulation 40)*			
5	Front and rear Head & Tail lights are working *(Refer Regulation 40)*			
6	No oil / fuel leakage or spillage			
7	Length of fork is more than or equal to the width / length of load its handling *(Refer Regulation 57)*			
8	Method of handling of load is proper and safe			
9	No person is standing at blind spots in path of forklift or below suspended load or moving/passing load			
10	While carrying load vision of operator is not obstructed due to cargo. If No, then adequate help of signaler is available to guide his path.			
11	Movement of cargo on fork is carried out in at minimum lowered position i. e. ground level			
12	No person is standing on forklift while it is being moved			
13	Effective mechanical braking device and mechanically operated current cut-off that comes into operation automatically when the operator leaves the forklift.			
14	Operator is protected by overhead guard			
15	Area of handling is sufficiently ventilated			
16	If handling Dangerous Goods, then spark arrester is provided on its exhaust			
D	**Tandem Operation for Lifting Appliances**			
1	Other means of lifting of load is not available			
2	Both equipment are of similar in SWL, working radius, speed and control			
3	Carried under supervision of Responsible person			
4	Equalizer beam is used to avoid tilting of load			
5	Total weight of cargo and accessory gear is not exceeding one & half time of SWL of either LA			
6	Plumb line of both cargo runner wires is maintained all the time			
7	Operation is carried out under direction of single signaler			
E	**Access between Ship and Shore**			
1	No gap exists between gangway & wharf. If exists, then suitable means is provided for safe access			
2	Gangway is properly & safely secured			
3	Safety net is rigged beneath the gangway			
4	Properly secured railings & are of sufficient height			

5	Gangway is not within swinging radius of load handled			
6	Gangway is maintained in good condition to prevent slipping of any person			
F	**Deck Access**			
1	Access is clear. If not, way exists for emergency escape			
2	No tripping OR electrical hazard is present			
3	No dangerous opening or any chance of falling in sea. If exists, then suitable barricaded			
4	If any hot work is carried out, then appropriate safety precautions are taken			
5	sufficiently illuminated			
G	**Signalman OR Hatch Foreman**			
1	Visible to both workers as well as to operator. If his vision is obstructed, then additional help exists.			
2	Located at safe place i.e. no suspended load is going over his head			
3	His position is safe i. e. no chance of falling from height			
H	**Access to Hold / Hatch**			
1	Safe access without any obstruction & well illuminated			
2	Manhole covers are properly secured in open position			
3	No chance of shifting/falling of any cargo on ladder			
4	Safe access to reach to the working point			
5	Rungs of ladder are not in slippery condition or missing			
I	**Hatch Covers**			
1	Properly secured from accidental displacement			
2	Not obstructing access or vision			
J	**Stacking**			
1	Stacked properly on firm surface			
2	Stack is secured or blocked by suitable means to prevent its rolling/shifting or falling			
3	Cylindrical cargo is stacked perpendicular to the hull or side wall of ship			
4	Not stacked to such a height, which render the pile unstable			
5	Safe means of access to / around stack is provided			
6	Sufficient space is available around stack for working			
K	**Operation**			
1	Method of handling of load is proper and safe			
2	Adequate illumination in hatch square as well as in coaming			
3	Workers working thereat are wearing PPEs			
4	During working, there is no chance of fall of any person from stack from a height more than 6 feet. If yes, then suitable safety precautions taken like barricading or securing by safety net, etc.			
5	Lashing is not removed until hook is placed for handling of load. If no, then suitable protective measures are taken for protection from falling load			
6	No worker is standing in potential danger zone, where there is a chance of falling of load OR Nobody is standing / resting within / under swinging radius of			

	crane or along route of load handled			
7	While removing sling or shackle, worker's hand/fingers are not in a potential danger zone i. e. can caught in between two surfaces like load & shackle, etc.			
8	No person is resting/sleeping near handling area or in vicinity of cargo stacked/handled			
9	No loose dunnage or debris is found hanging while handling of cargo. If yes, then suitable means are provided to prevent its falling out			
10	No chance of contact of any lifting gears with any sharp edges of cargo. If yes, suitable protective measures are taken to prevent contact			
11	Sufficient head room is available for working especially at coaming			
12	Cargo is lifted by safely by maintaining CG of cargo			
13	If cargo is lifted by preslung sling or by bundle binding wire or packing strip. If yes, then any document/certificate or marking on gear is available to indicate its safe working load/capacity			
14	During handling workers are away from the area of unexpected swing of cargo or trapping in between two objects like cargo & bulkhead, etc.			
15	Not posses any danger due to working of adjacent gang in the same hold			
16	No danger from any hot work carried thereat, if any			
17	Route for emergency escape is available			
18	Handling of cargo does not causes any listing of vessel			
19	Dunnage or packing strips are not scattered in hold, which causes any hazard			
20	Confirmed that private workers engaged by private agency are medically fit and skilled in a work, for which they are hired			

Supervisor

Officer Incharge

2.17.9 SAFETY CHECK LIST FOR OPERATION IN YARD / OPEN AREA

Location - Date & Time -

Nature of operation and type of cargo Storage / Handling -

Note *- All the items in the checklist should indicate "Yes" for safe operation. If any item indicates 'No" then appropriate safety precautions should be advised to concerned or work may be stopped if it's posing immediate danger to the life of any person working thereat.*

Sr. No.	Item	Yes	No	Remarks
A	**General**			
1	Fencing and marking of aisle / for cargo storage *(Refer Regulation 10)*			
2	Entry and exit marking for pedestrian *(Refer Regulation 10)*			
3	Surface area of yard is even *(Refer Regulation 9)*			
4	All Manhole in the yard are covered *(Refer Regulation 9)*			
5	Stacking surface is safe for storage of such type of cargo *(Refer Regulation 9)*			
6	Load bearing capacity of stacking is displayed / known *(Refer Regulation 20)*			
7	Entry and Exit point for vehicle are marked *(Refer Regulation 10)*			
8	Housekeeping in the yard is satisfactory *(Refer Regulation 9)*			
9	Illumination in the yard is satisfactory *(Refer Regulation 16)*			
10	Vehicles movement direction is available *(Refer Regulation 10)*			
B	**Lifting Appliances (LA)**			
	Mobile crane No.			
	Transporters Name -			
	LA DEP No.			
	LA operators possess valid license			
1	Through Visual Inspection condition of LA is satisfactory *(Refer Regulation 41)*			
2	Inspection of wire ropes used in LA or loose gear are inspected by Responsible person *(Refer Regulation 41)*			
3	Eye splice and loops for attachment of hooks, rings and other such part of wire ropes used in LA are made with suitable thimble *(Refer Regulation 41)*			
4	Possess Valid Periodical Annual Thorough / Test & examination Certificate as per statutes *(Refer Regulation 41)*			
5	Marking of safe working load is displayed on LA *(Refer Regulation 52)*			
6	Load Angle Indicator / chart is available *(Refer Regulation 42)*			

7	Over load tripping device is available & working *[Refer Regulation 40(4)]*			
8	Three dead turns of the rope are remain on the drum in every operating position of lifting appliances *[Refer Regulation 40(2)(b)]*			
9	Efficient brakes to prevent fall of suspended load and act without any shock *[Refer Regulation 40(3)]*			
10	All controls of the cranes are working effectively and suitable locking device to prevent accidental movement or displacement *[Refer Regulation 40(4)]*			
11	No oil / fuel leakage or spillage from LA ~~in the vicinity~~			
12	Out riggers of crane rested on firm and rigid surface *(Refer Regulation 40)*			
13	Side mirrors are properly installed *(Refer Regulation 40)*			
14	Boom light, head and tail lights are working properly *(Refer Regulation 40)*			
15	Helper / cleaner is available to guide the operator, when his vision is obstructed *[Refer Regulation 57(8)(b)]*			
16	Helper is not standing / resting within / under moving radius of counter weight as well as swinging radius of crane			
17	Operator can see clearly movement of person /cargo within swinging radius of crane.			
18	Method of handling of load is proper and safe *(Refer Regulation 57)*			
19	Loose gears / wires used for handling cargo are of proper and are of adequate strength *[Refer Regulation 46(48)]*			
20	Workers working thereat are wearing PPEs *(Refer Regulation 73)*			
21	No person is standing or passing below suspended load or moving/passing load			
22	No loose dunnage or debris is found hanging while handling of cargo. If yes, then suitable means are provided to prevent its falling out *[Refer Regulation 65(7)]*			
23	Hook lock is provided in the crane hook or there is no chance of slippage of any sling from hook *(Refer Regulation 40)*			
24	If cargo is lifted by preslung sling or by bundle binding wire or packing strip. If yes, then any document/certificate or marking on gear is available to indicate its safe working load/capacity			
25	Load of the loose gear is added while calculation of load to be lifted			
26	No person is resting/sleeping near handling area or in vicinity of cargo stacked			
27	Handling is not causing any road / traffic obstruction. If No, then any alternate method of handling is available. Then also, no, then all safety precautions are taken.			

28	Suitable firefighting equipment is available *(Refer Regulation 17)*			
C	**Fork Lift No.**			
	Transporters Name -			
	F/L DEP No. -			
	F/L Operators Name -			
1	Marking of SWL on F/L *(Refer Regulation 57)*			
2	Valid license of operator			
3	Reverse horn is working or help of signaler is available *[Refer Regulation 57(8)(b)]*			
4	Both Side mirrors are available *(Refer Regulation 40)*			
5	Front and rear Head & Tail lights are working *(Refer Regulation 40)*			
6	No oil / fuel leakage or spillage			
7	Length of fork is more than or equal to the width / length of load its handling *(Refer Regulation 40)*			
8	Load chart is available with operator			
9	Method of handling of load is proper and safe			
10	Workers working thereat are wearing PPEs *(Refer Regulation 73)*			
11	No person is standing at blind spots in path of forklift or below suspended load or moving/passing load			
12	While carrying load vision of operator is not obstructed due to cargo. If No, then adequate help of signaler is available to guide his path. *[Refer Regulation 57(8)(b)]*			
13	Handling is not causing any road / traffic obstruction. If No, then any alternate method of handling is available. Then also, no, then all safety precautions are taken.			
14	Movement of cargo on fork is carried out in at minimum lowered position i. e. ground level *(Refer Regulation 40)*			
15	No person is standing on forklift while it is being moved			
16	Effective mechanical braking device and mechanically operated current cut-off that comes into operation automatically when the operator leaves the forklift. *[Refer Regulation 40(3)]*			
17	Operator is protected by overhead guard			
18	Tested for stability as per National Standards *(Refer Regulation 41)*			
19	Area of handling is sufficiently ventilated			
20	If handling Dangerous Goods, then spark arrester is provided on its exhaust			
C	**Tandem Operation for Lifting Appliances**			
1	Other means of lifting of load is not available			
2	Both equipment are of similar in SWL, working radius, speed and control			

3	Carried under supervision of Responsible person			
4	Equalizer beam is used to avoid tilting of load			
5	Total weight of cargo and accessory gear is not exceeding one & half time of SWL of either LA			
6	Plumb line of both cargo runner wires is maintained all the time			
7	Operation is carried out under direction of single signaler			
D	**Truck or Trailer**			
	Transporters Name.			
1	Driver possess valid Driving license			
2	Cleaner is provided or helper is available for man oeuvre of vehicle			
3	Driver, cleaner working thereat are wearing PPEs *(Refer Regulation 73)*			
4	Condition of Trailers bed is satisfactory *(Refer Regulation 57)*			
5	Side metal Stanchions are properly fixed in pockets on trailer to prevent falling of load from bed and loads are stacked beyond height of stanchions *[Refer Regulation 57(4)]*			
6	Both Side mirrors are available *(Refer Regulation 40)*			
7	Brakes, Head lights and Tail lamps are working *[Refer Regulation 40(3)]*			
8	Pkg/load is properly placed and secured on trailer			
9	Vehicle is not loaded beyond its registered capacity *[Refer Regulation 57(6)]*			
10	Twist locks are provided in case of containers movement *[Refer Regulation 85(13)]*			
11	Vehicle is Maintained in good working condition *(Refer Regulation 57)*			
12	Safe way for workers to approach on trailer bed for handling load			
D	**Stacking of Cargo in the yard**			
1	Stacked properly on firm surface *(Refer Regulation 66)*			
2	Not overloaded to its load bearing capacity of surface *(Refer Regulation 66)*			
3	Stack is secured or blocked by suitable means to prevent its rolling/shifting or falling *(Refer Regulation 66)*			
4	Not stacked or rested against any structure *(Refer Regulation 66)*			
5	Cylindrical cargo is stacked perpendicular to the road *(Refer Regulation 66)*			
6	Not stacked to such height, which render the pile unstable *(Refer Regulation 66)*			
7	Safe means of access to / around stack is provided *(Refer Regulation 66)*			
8	Sufficient space is maintained between two stacks for movement of vehicle			

	(Refer Regulation 66)			
9	Lashing is not removed until hook is placed for offloading of load. If no, then suitable protective measures are taken for protection from falling load			
10	No worker is standing in potential danger zone, where there is a chance of falling of load			
11	While removing sling or shackle, worker's hand/fingers are not in a potential danger zone i. e. can caught in between two surfaces			
12	Vehicles are not unnecessarily parked in the yard.			
13	No vehicle standing in queue for offloading/delivery is not posing any danger to the traffic thereat.			
	Operation			
1	Vehicles are moving in one direction			
2	Haphazard gathering of transport vehicles around LA			
3	During operation of LA - persons are away from the cargo being handled or any other danger zone			
4	2 wheeler / car moves in the yard around the operation			
5	Cargo stack on transport vehicle is safe for lashing / unlashing			
6	No smoking observed in the yard *(Refer Regulation 17)*			
7	Persons wearing retro-reflective jackets for visibility *(Refer Regulation 73)*			

Supervisor

Officer Incharge

2.17.10 CHECKLIST FOR WORK PERMIT TO WORK AT HEIGHT

Sr. No. - Date:
Work Order No. -
Location of Work -
Valid from the date & time _____ to _____ date & time.
Name of the Agency, who will be carrying this Job -
Name of the Site Supervisor –

Sr. No	Measure to be taken	Yes	No	Remarks
1	If no permanent safe access to work area exist, then proper and safe temporary access is provided.			
2	Every open side or opening into or through which person likely to fall have been covered or guarded by an effective barrier to prevent falls. If covers are being used for opening, then those are securely fixed to prevent its accidental displacement.			
3	Every open side of staircase is provided with a sound handrail and lower rail or other effective means and maintained.			
4	Secure handhold or foothold is provided for any person, who has to work at a place from which he would liable to fall: i) a distance of more than 2 meters; or ii) which is likely to cause drowning or asphyxiation.			
5	If Measure at No. 4 is not practicable, other suitable means like safety harness or safety belt or fall arrest system is provided.			
6	If a Safety harness or Safety belt is provided, then i) it is in sufficient quantity and in sound condition. ii) it has a provision of suitable and secured anchorage iii) the anchorage is not being lower than the level of working position of the person wearing the harness or belt or there is sufficient height clearance for fall arrest. iv) harness/ belt, life line & their all attachment is of adequate strength. v) ensure that it is being always used by the person in the performance of his work. vi) in case of life line, it is attached to sufficient anchorage point. vii)it is provided with padding, wrapping or similar means to protect it from contact with sharp edges or sharp objects. viii) carried inspection of belt/harness/life line before use by an employee & those which shows any indication of wear, damage & deterioration, which affects its strength are removed from the site? ix) Person wearing safety belt/harness have been instructed in proper method of wearing and using it, as well as attaching it to the life line.			
7	If Safety Net is provided, then i) it is in sound condition ii) it is of sufficient size & strength to catch any person for whose protection, it is used. iii) it is located as to cover the area of possible fall. iv) it is attached to sufficient anchorages or supports outside & beyond the possible area of possible fall. v) it is supported at a height sufficient to prevent sagging to any surface or object beneath, and give impact to fall for the person.			
8	If ladder or step ladder is provided, then i) it is of good construction, sound material and of adequate strength. ii) it's footing is on firm, non-slip & even level surface. iii) it is as far as possible securely fixed so that it cannot move either from its top nor its bottom point of rest. iv) If (iii) above is not practicable then a person has been stationed at the base of ladder all the time to prevent slipping or falling. v) it has sufficient rise & adequate handhold to a height at least one meter above the place of landing of a person working thereat. vi) its firmly secured to prevent undue swaying or undue sagging. vii) no missing or defective rung in the ladder.			
9	If work platform is provided, then i) it is of adequate dimension & sufficiently wide to walk without any risk of tumbling or losing balance.			

	ii) if a person liable to fall therefrom for a distance of more than 3 meters, then as far as practicable be provided with sufficient & suitable guardrails or edge protection to a height of one meter above the landing place. iii) iii) If (ii) above is not possible, then suitable means like safety harness or safety belt or fall arrest system is provided. iv) it is capable to support load of workers, equipment & material.			
10	Piling, shoring and bracing of adequate strength is used in a trench, excavation to protect any person against falling or sliding material			
11	Measures have been taken to prevent falling of objects in the area below the working zone. If not possible, then this is barricaded to prevent entry of person & to protect them from any fall of object			
12	Weather condition such as rain, wind speed, sun glare, etc. and surface condition at working site such as slippery, sharp objects is acceptable			
13	Before commencement of work, the work area has been surveyed for assessment of hazard like crosshead electricity contact, inhalation of fumes or steam, unsuitable surface condition, moving machine parts, etc.			
14	Means of contact in case of emergency and rescue plan, in case of fall arrester, is readily available.			
15	All reasonably practicable steps have been taken to eliminate any foreseeable risk involved in working.			
16	Persons exposed to risks are informed about its nature and safe work procedure and it is implemented to eliminate & control these risks.			
17	Ensure that adequate supervision is provided to ensure safe work practices for working at heights, are followed			
18	Ensure that method statement, safe work procedure and risk assessment is available for any framework erection, dismantling or shifting is carried out.			
19	Ensure that persons involved in this work is adequately trained.			
20	Tool Box Talk is given to the workers to explain them about hazards associated in the work and its preventive measures.			

We have checked all the items in the checklist and are satisfied that the entries made are correct to the best of my knowledge. Further, I will carry out necessary repetitive checks, if required.

Concerned In-Charge of the work/Contractor

All the relevant aspects of the Work Permit System are checked and complied.

Section-in Charge of MbPA

2.18 HAZARD IDENTIFICATION AND RISK ASSESMENT (HIRA):

To identify types of Hazard in work area, To make Risk Assessments, To suggest Risk Controls to Organization, To implementing Risk Controls and To review Risk Controls the Hazard Identification and Risk Assessment (HIRA) shall be prepared for all the operations carried out in dock premises.

The format/methodology for preparation of HIRA for various activities / tasks is as follows:

PLANT:				ISSUE NO.: DATE:
DOCUMENT NO: HIRA/PLANT	HAZARD IDENTIFICATION AND RISK ASSESSMENT (HIRA)			REVISION NO.:
PAGE NO.: Page _ of _	ISO 9001:	ISO 14001:	OHSAS 18001:4.3.1	DATE:

Abbreviations: **Severity:-** Negligible-1,Minor-2,Modrate-3,Substantial-4,High-5,Very High-6 **Probability :-** Rarerly-1,Probable-2, Priodic-3,Frequent-4,Very Frequent-5, Always Present-6 **Risk Levels :-**1-6: Trivial, 8-12: Acceptable , 15-18: Moderate, 20-24: Substantial, 25-30: Very Substantial, 36: Unacceptable; R= Routine; NR = Non Routine; WI= work Instruction; OHSMP: Occupational Health and Safety Management Programme, OCP= Operational Control Procedure

s N	**Activity**	**R/ NR/ L**	**Hazard**	**Existing Control**	**Risk Assessments**		**Risk Level**	**Risk Control WI/OCP/OHSMP (Proposed Control)**	Residual Risk	Remarks
					Severity (S)	Probability (P)	S X P			
1		R								
2		R								

PREPARED BY:	IMS DOCUMENTS	APPROVED BY:
CHECKED BY :		

HAZARD IDENTIFICATION & RISK ASSESSMENT (HIRA) REGISTER

HAZARD IDENTIFICATION & RISK ASSESSMENT (HIPA) RATTING METHODOLOGY

RATING	SEVIRITY OF THE CONSEQUENCE / HARM (S)	PROBABILITY / CHANCE OF CASUING HARM (P)
1	Harm : Negligible Health Problems : Negligible	Rarely Heard of(Hazard never faced so far when activity ids carried out)
2	Harm : Very minor injury Health Problems : that may be recovered on the same day	Probable(Hazard arises in regular periodicity at least once in 2/3 years)
3	Harm : Loss Time Injury (Moderate) Health Problems : that may be recovered within a maximum period of a week through general medical treatment e.g. Nausea, couth, eye burning sensation, stomach pain etc.	Periodic (Hazard arises at least once in six months)
4	Harm : Major injury causing Hospitalization (Substantial) Health Problems : any regulated occupational disease or illness which may take 10/15 days to few months to get recovered e.g. gastrointestinal problems, continuing agronomical pain etc.	Frequent (Hazard arises at least once in a month)
5	Harm : Amputation or disability Health Problems : Damages that may be caused due to immediate major exposure or prolonged exposure of small doses that may take very long time to get recovered or may require very prolonged treatment.	Very Frequent(Hazard arises at least once in a week)
6	Harm : Fatality Health Problems: Any irrecoverable health problem like Cancer, silicosis, asbestosis, permanent neurological disorders, irrecoverable damage of Kidney or other important organs.	Always present (Hazard is always present)

RISK LEVELS: 1-6: Trivial, 8-12: Acceptable, 14-18: Moderate,

20-24: Substantial, 26-30: Very Substantial, 32-36: Intolerable

	IMS DOCUMENT	Approved By:

2.18.1 ON-BOARD CARGO HANDLING ACTIVITY

MUMBAI PORT TRUST										
TITLE : HAZARD IDENTIFICATION AND RISK ASSESSMENT (HIRA) & DETERMINED CONTROLS										
Clause 4.3.1								DOC. NO. HIRA/F&S/2		
DEPARTMENT : TRAFFIC								PAGE NO. 1 OF 1		
PREPARED BY : Shri Harishchandra R. Jadhav, Shri Chedilal G. Kewat, ASSISTANT TRAFFIC MANAGER								ISSUE NO : 01		REVISION NO: 1.0
								REVISION DATE :		
Sr. No.	Activity/Task	Routine (R) / Non-routine (NR)	Hazard/Risk	Risk consequences	Existing Control	Risk Assessments		Risk Level	Risk Control WI/OCP/OSHMP (Proposed Control)	Remarks
						Severity (A)	Probability(B)	AxB		
Abbreviations : Severity :-Negligible-1, Minor-2, Moderate-3, Substantial-4, High-5, Very High-6. Probability:- Rarely-1, Probable-2, Periodic-3, Frequent-4, Very Frequent-5, Always Present-6. Risk Levels:- 1-6 : Trivial, 8-12: Tolerable, 15-18: Moderate, 20-24: Substantial										
On Board Cargo handling activity										
1	Boarding / alighting on/ from vessel (Gangway)	R	Fall in Sea / Dock Basin.	Drowning	Gangway is properly rigged and secured. Safety net in place.	6	1	6		
			Struck on head by the beam of lifting appliance of the gangway.	Head Injury	1) Maneuvering of gangway 2) Wearing of helmet	4	2	8		
2	Movement on Deck to reach or return from workspot.	R	Trip, slip or fall on the deck due to obstructions, spillage of cargo or oil making it slippery on the deck.	Physical injury	Wearing PPE , adequate illuminiation and clearing of cargo and oil spilled on the deck.	4	2	8		
			Being struck by falling objects such as "dunnage" or the cargo itself.	Physical Injury	Safety rules - No person shall walk or stand below hanging cargo					
3	Access to Hold.	R	Exposure to struck by falling manhole cover.	Head injury	Manhole cover is secured from fall and risk awareness	4	1	4		
			Fall through manhole / hatchway in the hold	Serious injury or death due to a fall from height	Ensuring safe access to the hold. Holding the ladder railing with firm grip while ascending or descending. Adequate illuminition in the hatchway.	5	1	5		
4	Going to working spot in the Hatch/Hold moving on cargo	R	Exposure to cut injury / blunt injury / dash to the body by loaded sling, fall of cargo from the loaded sling.	Serious injury to the body & head (Physical injury which may be fatal)	Ensuring safe preparation of sling away from loaded sling, adequate illumination in the hatch, follow the lawful instructions of signal man	6	1	6		
5	Taking F/L Truck in the hatch	R	While taking fork lift in the hatch may dash ships railing, hatch railing and wall of the hatch. Falling of counter weight of Forklift in the hatch.	Damage to forklift, railing of ship and injury to the employee working in the hatch.	Safe working while taking Fork lift in the hatch.	4	1	4		
6	Preparing sling (Katcha / Pakka) in the hatch.	R	Hands, fingers, foot get caught/trapped in between cargo while preparing slings.	Falling / Slipping of the cargo.	Ensuring safe working practices, safety training and more vigil while preparing sling.	6	2	12		

MUMBAI PORT TRUST

TITLE : HAZARD IDENTIFICATION AND RISK ASSESSMENT (HIRA) & DETERMINED CONTROLS

Clause 4.3.1		**DOC. NO. HIRA/F&S/2**	
DEPARTMENT : TRAFFIC		**PAGE NO. 1 OF 1**	
PREPARED BY : Shri Harishchandra R. Jadhav, Shri Chedilal G. Kewat, ASSISTANT TRAFFIC MANAGER		**ISSUE NO : 01**	**REVISION NO: 1.0**
		REVISION DATE :	

Sr. No.	Activity/Task	Routine (R)/ Non-routine (NR)	Hazard/Risk	Risk consequences	Existing Control	Risk Assessments		Risk Level	Risk Control WI/OCP/OSHMP (Proposed Control)	Remarks
						Severity (A)	Probability (B)	AxB		
Abbreviations : Severity :-Negligible-1, Minor-2, Moderate-3, Substantial-4, High-5, Very High-6. Probability:- Rarely-1, Probable-2, Periodic-3, Frequent-4, Very Frequent-5, Always Present-6. Risk Levels:- 1-6 : Trivial, 8-12: Tolerable, 15-18: Moderate, 20-24: Substantial										
7	**Handling EXIM cargo (loading / unloading)in the hold.**									
i	Iron and Steel coils, plates, slabsetc.	R	Slip and fall on slipppery or uneven surface, on steel cargo oron bottom plate from height or ingaps in between cargo stowed in the hold.	Abraision, cut or blunt injury, bleeding and/ or even serious injury	Safety training, following safety rules,practices and orders issued from timeto time. Wearing PPE's	4	3	12		
			Hands, fingers, foot get caught/trapped in between cargo or in between cargo and gears and	Blunt injury, wound, bleeding ,loss of limb and /or fatal accidents		5	4	20		
			Breakdown of gears and lifting appliances	Loss of life and property	Inspection of gear and lifting appliances. Thorough check of gears at commrncement of shift and at regular intervals.	6	1	6		
ii	Bag cargo	R	Sprain, strain, cramps due to manual handling	Pain, fatigue and other healthissue	Recess intervals for rest and refreshment. Rotational deploymentof workers.	3	6	18		
			Fall of heap.	Physical injury	Layer wise discharging	6	2	12		
			Fall of bag from the sling due to overflow.		Adequate supervision and safety awareness	6	4	24		
iii	Dry bulk cargo - manual handling	R	Physical strain , Environment pollution	Pain , fatigue, respiratory problem and other health issue	Mouth pad for protection from dust inhalation. Recess intervals for rest and refreshment. Use of grab and other mechanical equipment.	4	4	16		
	Dry bulk cargo - mechanical handling		Unsafe working condition, formation of well in the hold. Environment pollution.	Bury of men and machine underthe bulk cargo. Loss of life and property.	Effective planning is one of the keyelements of safe loading/discharge operations.	4	6	24		
iv	Drums	R	Fall of drum on foot	Injury	Wearing of safety shoes, gloves and use of proper drum handling gears	1	1	1		
v	Chemical	NR	Short and long term health effects	Burn, poisoning , skin rashes anddisorders of internal organs.	Wearing of gowns, aprons, footwear,gloves, eye goggles, face shields and masks					
vi	Timber logs, pipesand other lengthycargo of circular shape	R	Difficulty in movement on slippery and circular shape cargo, fall on deck or in hold	Physical injury	Following safety practices and safetyawareness	6	3	18		
			Formation of ditch, which results in rolling over of logs	Serious injury or fatalities by getting caught between rolling	Discharging in a levelled manner. Adequate supervision	6	4	24		

vii	Over Dimensional Project Cargo	R	Breaking of Cargo.	Serious injury to worker and loss of property.	The load is well secured and balanced in the sling or lifting device before it is lifted. Slinging of project cargo is as per directives given on packing. Suitable and tested gears used for handling project cargo.	6	2	12		
vii i	Containers	R	Falls from height and slips and trips. Collision with the adjacent cargo, ship structure or the truck / trailer while lifting from and loading on the truck/ trailer, due to swing, twist and turns.	Serious injury to worker, damage and loss of property.	The cranes are usually equipped with an automatic spreader which allows the driver to lock on to and release containers from the crane cab.	6	2	12		

MUMBAI PORT TRUST

TITLE : HAZARD IDENTIFICATION AND RISK ASSESSMENT (HIRA) & DETERMINED CONTROLS

Clause 4.3.1	**DOC. NO. HIRA/F&S/2**	
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PREPARED BY : Shri Harishchandra R. Jadhav, Shri Chedilal G. Kewat, ASSISTANT TRAFFIC MANAGER	**ISSUE NO : 01**	**REVISION NO: 1.0**
	REVISION DATE :	

Sr. No.	**Activity/Task**	**Routine(R)/ Non-routine (NR)**	**Hazard/Risk**	**Risk consequences**	**Existing Control**	**Risk Assessments**		**Risk Level**	**Risk Control WI/OCP/OSHMP (Proposed Control)**	**Remarks**
						Severity (A)	**Probability(B)**	**AxB**		
Abbreviations : Severity :-Negligible-1, Minor-2, Moderate-3, Substantial-4, High-5, Very High-6. Probability:- Rarely-1, Probable-2, Periodic-3, Frequent-4, Very Frequent-5, Always Present-6. Risk Levels:- 1-6 : Trivial, 8-12: Tolerable, 15-18: Moderate, 20-24: Substantial										
8	**Ship Crane Operation**									
i	Functioning	R	Operator incompetency, Unintended movement of crane from operating wrong controls or errors in judgment.	Unsafe working practices can result in injuries, fatalities and costly damage to property.	Medically fit and adequately trained persons are allowed to perfom operations. Familiarizing with all controls before start operating the crane	6	4	24		
ii	Visibility	R	No Clear visibility, collision of swinging load with the adjacent package or ship structure or the truck while trucking the cargo on the wharf.	Serious injury to the workers, damage and loss of property.	Medically fit Ship Crane Operator deployed for the operation. Additional Signaller employed to direct the operator. Adequate illuminiation .	6	2	12		
iii	Crane load	R	Exceed a crane's operational capacity	Crane structural failures and upsets cause irreversible damage.	Visually inspect the crane before use. Follow instructions and warnings.	6	4	24		
iv	Lifting	R	Slipping, falling loads	Several injuries, fatalities and significant damage to property.	Employees are adequately trained.	6	3	18		
v	Mechanical failure	NR	Falling loads	Several injuries, fatalities and significant damage to property.	Routine inspections, maintenance and repairs at suitable intervals.	6	1	6		
9	**Signaling**									
i	Hoisting / Lowering /slinging operations	R	Non standard signals	Collision from swinging load, workers injury and damage to property.	Trained signalmen uses standard signals during hoisting / lowering / slinging operations.	6	2	12		
ii	Position on the deck	R	Poor observation therefore wrong signalling	Accidents causing injury to the workers and damage or loss of property.	Provision of safe and secured platform for standing.	6	2	12		

10	**Man/ machine interface**	R	Movement of cargo handling equipments (CHE) within a confined space .	Risk of person/machine contact causing serious injury and inhalation of exhaust emissions can affect health.	Cargo handling equipment having audible and visual warnings systems are operated. Compliance of statutory requirements, guidelines and safe work practices are in place.	6	2	12		
11	**Stacking of cargo**	R	Improper stacking and unsafe handling of cargo	Fall of cargo causing injury and damage to property	Use of proper dunnage/ wedges for stacking cargo. Stacking of cargo as per stowage plan for safety. Lashing of cargo under strict supervision.	6	4	24		
12	**Lashing / unlashing of cargo/ container.**	R	Collapse or shifting of the cargo/ container stow.Work at height. Fall from height.	Dangerous to life and property. Serious injury or fatal accidents.	Continuous training on proper lashing / unlashing process. Proper PPE worn . Reminders to workers to maintain situation awareness.	6	3	18		
13	**Trimming and bleeding of bags of agri products and other dry bulk cargo**	R	Unsafe working conditions (confined space) in the hold. Environment pollution	Fatigue, respiratory problem and other health issue. Cut injury.	Mouth pad for protection from dust inhalation. Recess intervals for rest and refreshment. Rotational deployment of workers.	3	2	6		

2.18.2 ON-SHORE CARGO HANDLING ACTIVITY

MUMBAI PORT TRUST

TITLE : HAZARD IDENTIFICATION AND RISK ASSESSMENT (HIRA) & DETERMINED CONTROLS

Clause 4.3.1									**DOC. NO. HIRA/F&S/2**	
DEPARTMENT : TRAFFIC									**PAGE NO. 1 OF 1**	
PREPARED BY : Shri Harishchandra R. Jadhav, Shri Chedilal G. Kewat, ASSISTANT TRAFFIC MANAGER									**ISSUE NO : 01**	**REVISION NO: 1.0**
									REVISION DATE :	

Sr. No.	**Activity/Task**	**Routine(R)/ Non-routine (NR)**	**Hazard/Risk**	**Risk consequences**	**Existing Control**	**Risk Assessments**		**Risk Level**	**Risk Control WI/OCP/ OSHMP (Proposed Control)**	**Remarks**
						Severity (A)	**Probability (B)**	**AxB**		
Abbreviations : Severity :-Negligible-1, Minor-2, Moderate-3, Substantial-4, High-5, Very High-6. Probability:- Rarely-1, Probable-2, Periodic-3, Frequent-4, Very Frequent-5, Always Present-6. Risk Levels:- 1-6 : Trivial, 8-12: Tolerable, 15-18: Moderate, 20-24: Substantial										
On Shore Cargo handling activity										
1	**Movement on wharf**	R	Trip, slip or fall due to uneven surface, spillage of cargo or oil making the surface slippery on the wharf.	Physical injury	Wearing PPE , adequate illuminiation and regularly clearing of spilled cargo.	4	2	8		
			Being struck by falling objects such as “dunnage” or the cargo itself.	Physical Injury	Safety rules - No person shall walk or stand below hanging cargo	5	1	5		
2	**Access on to truck/ chassis.**	R	Exposure to fall from height.	Physical injury	Ensuring safe climbing on the truck / chassis using ladder and safety awareness.	4	1	4		
3	**Fixing Gears and prapari ng sling**	R	Chain rope, rope wire, shackles may fall on floor.	Hands, fingers, foot get caught/trapped in between cargo or in between cargo and gears and equipments. Physical injury.	Follow safe working practices, Safety training and wearing PPE. Staying away from loaded sling. Should not walk or stand under loaded sling.	6	4	24		
4	**Handling EXIM cargo (loading / unloading) on the wharf.**									

i	Iron and Steel coils, plates, slabs etc.	R	Hands, fingers, foot get caught/trapped in between cargoor in between cargo and gears and equipments.	Abraison , cut and blunt injury,wound, bleeding , loss of limb and /or serious accidents	Using wedges, following safety rules, practices and orders issued from time to time. Wearing PPE's	3	4	12		
			Breakdown of gears and liftingappliances	Loss of life and property	Inspection of gear and lifting appliances. Thorough check of gearsat commrncement of shift and at regular intervals.	6	1	6		
ii	Bag cargo	R	Sprain, strain, cramps due to manual handling	Pain, fatigue and other healthissue	Recess intervals for rest and refreshment. Rotational deployment of workers.	3	6	18		
			Fall of bag from the sling due to overflow.	Physical injury	Adequate supervision and safety awareness	6	4	24		
iii	Dry bulk cargo - manual handling on truck.	R	Getting trapped in between thesling and truck body. Environment pollution from release of dry bulk cargo.	Physical injury, respiratory problem.	Mouth pad for protection from dustinhalation. Use of grab and other mechanical equipment.	4	4	16		
	Dry bulk cargo - mechanical handling		Environment pollution from release of dry bulk cargo from / in the truck.	Respiratory problem.	Effective planning is one of the keyelements of safe loading/discharge operations.	2	3	6		

2.19 HANDLING OF DANGEROUS/HAZARDOUS GOODS:

I. STATUS OF HANDLING OF DANGEROUS GOODS IN MUMBAI PORT

The handling of explosives is governed by the Explosives Rules, 2008 and the handling of Ammonium Nitrate is governed by the Ammonium Nitrate Rules, 2012, both these rules are enacted under Section 5 and 7 of the Explosives Act, 1884.

II. REGARDING HANDLING OF EXPLOSIVES IN MUMBAI PORT

As per Sub-Rule 2 (b) of the Rule 10 of the Explosive Rules, 2008 i. e. Restriction on Import or Export states that No explosive shall be imported or exported except at its ports notified by the Central Government. Such notified Ports are given on the website of PESO under head of Recognized/Approved List and sub Head of Explosive Rules, 2008 - Authorised ports for Import/Export (link - https://peso.gov.in/web/authorized-ports-importexport) and the extract of the same is reproduced below:

1. PETROLEUM RULES:

All those ports which are duly approved by the Ministry of Shipping, Govt. of India, in consultation with Chief Controller and declared as custom ports by the Commissioner of Customs. These are:

(A) Notified under Petroleum Rules, 2002:

1.	Mumbai	2.	Kolkata
3.	Cochin	4.	Haldia
5.	Kandla	6.	Chennai

7.	Mangalore	8.	Marmugao
9.	Okha	10.	Port Blair
11.	Visakhapatnam	12.	Tuticorin

(B) Not notified under Petroleum Rules, 2002 but clearance given for import of petroleum products by Ministry of Petroleum & Natural Gas from time to time.

1.	J.N.P.T.	2.	Vadinar
3.	Ennore	4.	Paradeep
5.	Hazira	6.	Kakinada
7.	Dabhol	8.	Pipavar
9.	Dahej	10.	Mundra
11.	Jogeshwar Jetty (Distt. Baruch)		

2. EXPLOSIVES RULES:

Karanja in Mumbai and Tuticorin ports are authorized for Export of explosives.

Karanja in Mumbai, Chennai, Cochin, Tuticorin, Visakhapatnam and Kolkata (Diamond Harbour) Ports are authorized for Import of explosives.

Therefore, Mumbai Port is not authorized to handle explosives under Explosives Rules, 2008.

III. <u>REGARDING HANDLING OF AMMONIUM NITRATE IN MUMBAI PORT</u>

As per Sub-Rule 4 (c) of the Rule 6 of the Ammonium Nitrate Rules, 2012, states that The Ammonium Nitrate shall not be imported in to India by sea except through the ports which are duly approved for this purpose by the Ministry of Shipping & Transport, Government of India, in consultation with the Chief Controller and declared as Customs Ports by the Commissioner of Customs.

The Ministry of Shipping vide Notification No. GSR 2182(E)dated 16/07/2013, have notified the Major Ports of Kolkatta, Visakhapatnam, V.O. Chidambannar and Chennai for import of Ammonium Nitrate in India by Sea. Subsequently, by Notification GSR 667(E) dated 12/02/2014, the Ministry has notified Jawaharlal Nehru Port for import/export of Ammonium Nitrate, in bagged form, in/out of India by sea.

Therefore, Mumbai Port is not authorized to handle Ammonium Nitrate under the Ammonium Nitrate Rules. 2012.

IV. REGARDING HANDLING OF DANGEROUS GOODS IN MUMBAI PORT

By T. R. No. 43 of 27.07.2010, the Sanction is accorded to discontinue handling of dangerous goods in break-bulk form and containers, covered under IMDG Code, at Mumbai Port.

Further, by issue of public notice dated 06.08.2010, it was informed that the substance or dangerous goods classified under IMDG Code are not allowed to handle in Port.

However, by demand of trade, exception is given to handle limited quantity of import/export cargo of dangerous goods (except explosive, radioactive and poisonous gases cargoes), which are forming part of project cargo. In case of export, such cargo upon entry in docks is loaded on vessel directly from trailer within 24 hours and in case of import, direct delivery of such cargo is to be taken within 24 hours after discharge. No storage of such cargo is allowed in Port and this cargo is under supervision of MbPA Auxiliary Fire Services from entry in docks till it is loaded on vessel and vice versa.

V. REGULATIONS UNDER DOCK WORKERS SAFETY HEALTH AND WELFARE REGULATIONS 1990 ON HANDLING OF DANGEROUS GOODS:

The regulation 76 to 82, of Dock workers safety health and welfare regulations 1990 are related to handling of dangerous good and they emphasis on what precautions should be taken while handling of dangerous goods.

The details of the regulations are as follows:

a) NOTIFICATION

(1) Before unloading of any dangerous goods, as categorised in Schedule II, from any ship is commenced, the master or officer-in-charge and the agent of the ship shall furnish the employer of the dock workers, Port Authority and the Inspector with a statement in writing identifying the goods and specifying the nature of the danger which they can give rise to and specifying the categories and obtain an acknowledgment of the receipt of the same.

(2) Before any dangerous goods are received for shipment, the shipper or his agent shall furnish the information as required by sub-regulation (1) above to the Port Authority, the Inspector and the employer of the dock workers handling the dangerous goods.

b) GENERAL PRECAUTIONS. -

(1) Dangerous goods shall be loaded, unloaded handled and stored under the supervision of a responsible person who is familiar with the risks and the precautions to be taken. In case of doubt as to the nature of the risk or the precautions to be taken, necessary instructions shall be obtained from the Safety Officer appointed under these regulations.

(2) Dangerous goods shall not be loaded, unloaded or stored unless they are suitably packed and labelled showing the danger therefrom.

The dock workers shall be given adequate information concerning the nature of the cargo and special precautions to be observed in handling them.

(3) Special precautions, such as provision of mats, sling nets, boxes and high sided pallets shall be taken to prevent breakage or damage to containers of the dangerous goods.

(4) Dock workers employed in loading or unloading or otherwise handling dangerous goods shall be provided with suitable protective equipment's.

(5) Dock workers handling dangerous goods shall thoroughly wash their hands and faces with soap or some other cleaning agent before taking any food, drink, pan and supari or tobacco.

(6) Only specially trained dock workers shall be employed for cleaning, sweeping or handling spillages or sweeping of dangerous goods.

c) EXPLOSIVE AND INFLAMMABLE CARGO.-

(1) Where there is a risk of explosion from electrical equipment, the circuit shall be made dead and kept dead as long as the risk lasts unless such equipment and circuits are safe for use in the explosive atmosphere and non-sparking tools shall be provided and used in such atmosphere

(2) When inflammable cargo is being loaded or unloaded, special measures shall be taken to ensure that an incipient fire can be controlled immediately.

Other dangerous goods. -

(1) Before furnigated cargo such as grain is loaded or unloaded, adequate measures shall be taken to ensure that the cargo is safe to handle.

(2) Where caustic and corrosive substances are handled or stored, special precautions shall be taken to prevent damage to the containers and to render any spillage harmless.

(3) If skins, wool, hair, bones, or other animal parts have not been certified by competent authority as having been disinfected, especially against anthrax, the dock workers concerned shall be:-

(a) instructed about the risk of infection and the precautions to be taken;

(b) provided with suitable type of personal protective equipment; and

(c) subjected to special medical supervision.

d) HANDLING OF TETRAETHYL LEAD COMPOUND-

(1) Tetraethyl lead compound shall not be unloaded from a ship unless:

(a) it is packed in specially constructed steel drums of substantial construction, sealed with an inner and outer bung,

and fitted with rolling roops on to the shell as an added precaution;

(b) all receptacles containing tetraethyl lead compound are distinctively and durably marked with the words

"Tetraethyl Lead Compound- Poison"; and

(c) two sets of protective equipment comprising the following are provided and kept readily available for use in the

event of any leakage of tetraethyl lead compound:

(i) rubber gloves.

(ii) rubber boots,

(iii) rubber apron or oilskin suit, and

(iv) suitable respirator, which should be either of cannister type containing minimum of 50 cc. of activated charcoal or

an airline respirator with an independent fresh air supply.

(2) Following measures shall be taken while unloading tetraethyl lead compound:

(a) no receptacle containing tetraethyl lead compound shall be opened within the limits of the port;

(b) before commencement of the unloading operations, the consignment of tetraethyl lead compound shall be

inspected on board the vessel by a responsible person. No tetraethyl lead compound drums showing any sign of

leakage shall be unloaded until suitably repaired or placed in a larger receptacle or container offering sufficient

precautions from leakage;

(c) drums containing tetraethyl lead compound shall be discharged under the supervision of a responsible person;

(d) drums containing tetraethyl lead compound shall be loaded discharged in rope slings with a maximum of two drums to separate sling for each drum Hooks shall on no account be used;

drums at a separate sling for each drum. Hooks shall on no account t be used.

(e) dock workers handling drums containing tetraethyl lead compound shall be provided with heavy gloves of canvas or leather and shall use such gloves; and

(f) adequate quantities of non-inflammable solvent or kerosene a. soap and water to deal with any leakages of tetraethyl lead compound shall be kept readily available where the work of handling of the tetraethyl lead compound is carried on.

(3) Following measures shall be taken In the event of leakage of tetraethyl lead compound:

(a) the area on which the leakage of tetraethyl lead compound has occurred (including the outside of a drum) shall be treated as follows:

(i) flush with kerosene or some other light oil solvent followed by water. If the surface permits, wash thoroughly with soap working-up as much lather as possible, and again flush with water;

(ii) if it is possible to obtain quickly a supply of common bleaching line (Ca O Cl2) the area should first be treated generously with a mixture of bleaching lime and water in the form of thin slurry (NEVER use the dry powder) alternatively a five per cent solution of sulphuryl chloride (S02 Cl2) in kerosene may be used;

(b) if contamination of absorbent material such as wooden flooring, dunbage, or other packing material has taken

place, then such material shall, after treatment as above, be removed from the place where tetraethyl lead compound is being handled;

(c) any clothing which becomes contaminated by tetraethyl lead compound shall be removed immediately and cleaned by repeated rinsing in a non-inflammable dry cleaning fluid;

(d) if tetraethyl lead compound can be smelled, dock workers not assigned to deal with the leakage of tetraethyl lead compound shall be removed from that place; and

(e) dock workers assigned to deal with leakage of tetraethyl lead compound shall wear the protective equipment described under sub-regulation 1 (c).

(4) Suitable protective clothing shall be provided for handling of tetraethyl lead compound in refrigerated spaces.

e) BROKEN OR LEAKING CONTAINERS. -

(1) When there is danger from broken or leaking containers of dangerous goods dock workers shall be evacuated from the area involved and the following steps taken before dock work is resumed:

(a) if the cargo produces dangerous gases or vapour:

(i) suitable respiratory protective equipment shall be made available for dock workers who are to remove the defective containers;

(ii) the area shall be ventilated if necessary and tested to ensure that the concentration of gases or vapours In the atmosphere is safe for dock work;

(b) if the cargo is a corrosive substance-

(i) suitable personal protective equipment shall be made available to the dock workers engaged in the removal of damaged containers; and

(ii) suitable absorbent or neutralizing materials shall be used in cleaning the spillage.

f) TOXIC SOLVENTS. -

Before any solvents are used, the toxic properties of such solvents shall be ascertained and adequate means to safeguard the health of the dock workers exposed to toxic solvents shall be provided.

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CHAPTER 3: GEAR AND EQUIPMENTS FOR RIGGING AND MATERIAL HANDLING

3.1 MATERIAL HANDLING:

Material handling is an inseparable part of every employee for performing the various works in port premises. Everyone has to carry out the handling job at his different levels, without material handling job cannot be done in everyday work.

There are two ways of material handling:

a. Manual Material Handling
b. Mechanical Material Handling

a. Manual material handling.

Safety Tips for Manual Handling of Material

1. Do not lift excessive weights.
2. Keep your back straight and upright.
3. Bend your knees and left your legs do the work.
4. Keep your arms as close to your body and get a good hold on the object.
5. Balance the load on your body and tuck your chin in.
6. Avoid the sudden movements and twists of your spine.
7. Seek assistance, when essential.
8. When two people lift together they should be similar height.
9. Clear way all obstacles before you move anything.
10. Carry long loads in such way that no-one else will be injured.
11. Use gloves to avoid injuries from sharp or rough edges.
12. Move load as simple as possible and avoid unnecessary exertion.
13. Position feet correctly, about 25-30 cms apart & close to the load, with one foot ahead of other to the direction of movement.
14. Lift the object by straightening the leg, by giving an upward thrust. Reverse the procedure while lowering the object (load).
15. Avoid any twisting movement. Most of the back Injuries can be prevented if correct utilising methods are employed by fully lifting the strong leg muscles rather than weak back muscles.

b. Mechanical way of material handling.

Safety Tips during Mechanical Handling of Material

1. The maximum safe working load in kilograms shall be marked on all lifting machines and tackles, at a conspicuous place.
2. All lifting machines and tackle shall not be loaded beyond the maximum safe working load except for actual testing purpose.
3. In case of mobile cranes, the angle of the jib is a function of the capacity of crane and due regard should be paid to this. The safe load at various angles shall be indicated on such cranes, and indicators shall be affixed showing the angles of the jibs on the various positions.
4. It is the responsibility of the person supervising the lifting operation to ensure that lifting machine or tackle is not overloaded. Equipment Operator should object to overloading. The objection of the equipment operator should not be normally over-ruled except with the personal authority of concerned Plant Engineer or other officer of senior status
5. Move the load without sudden jerk, swinging or twisting.
6. Position the lifting hook directly above the centre of gravity of load so that the load is in balance.
7. Avoid pushing or pulling to correct in balance during lifting.

8. Supervisor incharge should ensure that no one remains in a position of danger in the course of lifting operation.
9. Riding on loads being lifted or lifting of persons up or lowering them on crane ropes is strictly forbidden.
10. When lifts are being taken which necessitates signals to the Driver from the ground or intermediate floors, one man should be detailed by the person supervising the job, and made known to the equipment operator so that he will take signals/instructions from this person only.
11. Do not walk under the moving loads.
12. Do not leave a load hanging any longer than necessary.
13. Always lower a load gently and firmly into place.

3.2 INSPECTION OF GERS AND EQUIPMENT:

a. All gear and equipment provided by the employer for rigging and materials handling shall be inspected before each shift and when necessary, at intervals during its use to ensure that it is safe. Defective gear shall be removed and repaired or replaced before further use.
b. The safe working load of gear as shall not be exceeded.

3.3 ROPES, CHAINS AND SLINGS:

a. **MANILA ROPE AND MANILA-ROPE SLINGS.** Employers must ensure that manila rope and manila-rope slings:

1. Have permanently affixed and legible identification markings as prescribed by the manufacturer that indicate the recommended safe working load for the type(s) of hitch(es) used, the angle upon which it is based, and the number of legs if more than one;

2. Not be loaded in excess of its recommended safe working load as prescribed on the identification markings by the manufacturer; and (3) Not be used without affixed and legible identification markings as required by para (a)(1) of this section.

3. FIBER ROPES.

(i) Fiber rope for hoisting, lowering or hauling loads should be of high-grade Manila hemp or other hemp of equal quality and the factor of safety of such ropes should not be less than ten.
(ii) Manila rope is stronger, easier to handle and will not kink as badly as sisal or other natural fiber ropes.
(iii) When fiber ropes other than high grade manila rope are used for hoisting purposes, proper allowances should be made for the proportionate tensile strength and all fiber ropes should bear a metal tag indicating the maximum permissible load, date of placing in service and the name of the supplier.
(iv) Eye splices on fiber ropes should be made round and with suitable thimbles.
(v) When cutting fiber ropes, seizing for the yarn should be applied on each side of the intended cut.
(vi) Splices are safer and stronger than knots for permanent connections. The use of knots reduces the strength of a rope as much as 50% while a short or long splice reduces it only by 5 to 10%
(vii) Rope should not be dragged along the ground, or on rough surfaces. Always use padding on sharp edges and corners to avoid cutting of rope.

(viii) Fiber rope should not be used for hoisting purposes or stored in locations where they will be exposed to acid, alkali, or their fumes or other destructive chemicals.

(ix) Always dry a rope after it gets wet. A dry, unheated room with good ventilation is the best place for storage. Place rope in loose coils off the floor on wooden peg. Manila rope will not dry quickly if it is kept wet and is not properly dried.

(x) Wet ropes should not be piled against steam pipes to dry. This will remove the natural moisture and destroy the life of the fiber.

(xi) Always inspect rope at frequent intervals while in use and also before placing it in storage if it has been subjected to any wear or destruction by the action of corrosive chemicals and their fumes.

(xii) Avoid sudden pulls or jerks on fiber ropes. These may result in breaks that would not have occurred.

(xiii) Always select fiber ropes of higher capacity than the object to the lifted. Avoid the use of fiber rope for lifting heavy objects or jobs with sharp edges.

(xiv) All defective fiber ropes should be discarded, cut off to avoid reuse.

4. SYNTHETIC FIBER ROPES.

(i) The popularity of synthetic fiber ropes, now, rivals that of natural fiber ropes. There are several reasons.

(ii) Greater knowledge of the properties of various synthetics is an important reason for their increased use. Successful use of synthetics depends largely on the selection of the synthetics with the physical properties and characteristics that most closely match the requirements of the job.

(iii) Splices can be made readily and can develop nearly the full strength of the rope. Tapered splices are highly recommended for ropes of 1-inch diameter and more.

(iv) It is recognised that synthetics have “magic sounding” names. Caution dictates, however, that no more than the true attributes are assumed for these materials.

(v) ***Nylon Rope*** – it has over 2.5 times the breaking strength of manila rope and about 4 times its working elasticity. It is, therefore, particularly suitable for shock loading such as required for safety lines,. Its resistance to abrasion is remarkably high in comparison to other ropes. When nylon rope is wet or frozen, its breaking strength is reduced by 10 to 15 per cent.

(vi) It is also highly resistant to mildew, rotting and attach by marine bores in seawater. Atmospheric exposure produces little loss of strength over a considerable period. Wet nylon ropes can run through blocks as easily as dry nylon ropes since there is no swelling. Although resistant to petroleum oils and common solvents and most of the chemicals, nylon strength is found affected by drying oils such as linseed oil, phenols and is quickly.

(vii) Whereas manila rope begins to char at 300 ◦ F. Nylon rope loses some of its strength at this temperature and all of it at 482 ◦ F(its melting point)., short of melting, most of the strength is regained on cooling to normal temperature. At an increased initial cost, nylon of higher melting point can be secured.

(viii) Nylon, more than any other rope material, will absorb and store energy in the same manner as a spring. This energy, released at break, will make the moving ends as dangerous as a projectile. Caution must; therefore be exercised when working lines around corners, capstans, timberheads and the like.

(ix) ***Polyester Ropes*** – Polyester makes probably the best general-purpose rope available, especially for critical uses. Polyester stretch about half that of nylon, so energy absorption is also about half., it is not weakened by rot, mildew or prolonged exposure to sea water. It retains its full strength when wet and shows little deterioration from long exposure to sunlight. It has good resistance to abrasive wear and to most of the alkalies and acids except benzoic acid.

5. INSPECTION OF FIBER ROPES.

(i) In service ropes should be inspected every 30 days under ordinary conditions and more often if used in critical applications such as to support scaffolding on which men work, inspection consists of an examination of the entire length of the rope, inch by inch, for wear, abrasions, powdered fiber between strands, broken or cut fibers, displacement of yarns or strands, variation in size or roundness of strands, discoloration, and rotting. To inspect the inner fibers, the rope should be untwisted in several places to see whether the i8nner yarns are bright, clear, unspotted. If exposed to acids, natural fiber ropes, such s manila, should be scrapped or retired from critical operations, as visual inspection will not always reveal acid damage. A rope, like a chain, “is only as strong as its weakest link” (or with rope, its cross section).

(ii) Natural fiber rope loaded to over 50 per cent of its breaking strength will be permanently damaged; synthetics loaded to over 65 per cent may be damaged. Damage from this cause may be detected by examining the inside fibers. These will be broken into short lengths in proportion to the degree of overload., a good estimate of the strength of fibers can be made by scratching the fibers with a finger nail; fibers of poor strength will readily part. This “finger nail test” is a quick test for chemical damage.

(iii) Due to the motion or slippage on a supporting surface when under high tension, synthetics sometimes melt on the surface and form a skin. This skin may be evidence of degradation

6. CARE OF FIBER ROPES

(i) The recommended Factors, of Safety of fiber ropes for average use are – Nylon-9, Polyester-9, Manila-5 and Sisal-5 Unusual or erratic loading requires higher factor of safety.

(ii) If at all possible, rope should not be dragged as this abrades the outer fibers. If the rope picks up dirt and sand, abrasion within the lay of the rope will rapidly wear it out.

(iii) Precautions should be taken to keep rope in good condition. Kinking, for example, strains the rope and may overstress the fibers. it may be difficult to detect a weak spot made by the kink. To prevent a new rope from kinking while it is being uncoiled, first lay the rope coil on the floor with the bottom end down. Then pull the bottom end up through the coil and unwind the rope counter clockwise. If it uncoils in the

other direction, turn the coil of rope over the pull the end out on the other side.

(iv) Twisted rope should be handled so as to retain the amount of twist (called balance) hat the rope seeks when free and relaxed,. If rotating loads and improper coiling and uncoiling change the balance, it can be restored by proper twisting of either end,. Sever unbalance can cause permanent damage; localised over twisting causes linking or hockling.

(v) Sharp bends over an unyielding surface cause extreme tension on the fibers. To make a rope fast, an object with smooth round surface of sufficient diameter should be selected. If the object does have sharp corners, pads should be used. To avoid excessive bending, sheaves or surface curvatures should be of suitable size for the diameter of the rope.

(vi) When lengths of ropes must be joined, they should be spliced and not knotted. A well made splice will retain up to 100% of the strength of the rope, but a knot, only half.

(vii) Use of wet rope, or of rope reinforced with metallic strands near power lines and other electrical equipment is extremely dangerous.

(viii) Rope must be thoroughly dried out after it becomes wet, otherwise it will deteriorate quickly. A wet rope should be hung up or laid in a loose coil in a dry place until thoroughly dry. Rope will deteriorate more rapidly if it becomes alternatively wet and dry than it wills if it remains wet.

(ix) Rope should be stored in a dry place where air circulates freely about it. Air should not be extremely dry. However, small ropes can be hung up, and larger ropes can be laid on gratings so that air gets underneath and around them.

(x) Rope should not be stored unless it has been cleaned. Dirty rope can be hung in loops over a bar or beam and then sprayed with water to remove the dirt. The spray should be so powerful that it forces the dirt in the fibers. After washing, the rope should be allowed to dry and then be shaken to remove the rest of the dirt.

(xi) Rope should not be stored or used in an atmosphere containing acid fumes, as it will quickly deteriorate. Sings of deterioration from this cause are dark brown or black spots on the rope.

b. **WIRE ROPE AND WIRE-ROPE SLINGS.**

1. Employers must ensure that wire rope and wire rope slings:
   (i) Have permanently affixed and legible identification markings as prescribed by the manufacturer that indicate the recommended safe working load for the type(s) of hitch(es) used, the angle upon which it is based, and the number of legs if more than one;
   (ii) Not be loaded in excess of its recommended safe working load as prescribed on the identification markings by the manufacturer; and
   (iii) Not be used without affixed and legible identification markings as required by para (b)(1)(i) this section.
2. Protruding ends of strands in splices on slings and bridles shall be covered or blunted.

3. Where U-bolt wire rope clips are used to form eyes, The U-bolt shall be applied so that the “U” section is in contact with the dead end of the rope.
4. Wire rope shall not be secured by knots.
5. The wire rope is composed of wires, strands and core. Normally wire ropes in use are of 6 x 19 or 6 x 37 classification i.e. ropes having six stands and each strand consisting of 19 or 37 wires respectively.
6. The greater the number of wires in the rope, the more flexible is the rope. For all hosting purposes, ropes of 6 x 19 to 6 x 37 classification made from improved plough steel or best plough steel are recommended. This type of steel has greatest strength and is resistant to abrasion, shock, fatigue and vibration.
7. Eye splices, sockets and rope anchorage subjected to a direct tensible load should be capable of withstanding a load equal, at least to the maximum permissible working load multiplied by the factor of safety, and they should be capable of withstanding a load 95% of the rated breaking load of the ropes.
8. Eye splices and loops for the attachment of hook, ring and other parts to wire ropes should be provided with suitable thimbles.
9. The size, material and maximum safe working load should be marked on all wire ropes and wire rope slings by means of metal tags or in other suitable way.
10. Ends of wire ropes should be seized to prevent the strands from becoming loose.
11. Fastenings of wire ropes should be examined at regular intervals and tightened if they show sign of loosening.
12. Wire ropes and wire rope slings should be removed from service whenever their strength is affected by broken wires, corrosion, kink etc.
13. Whenever rope slings are taken in use, check should be made of kinks and lose wires. Normally, if 10% or more broken wires are found, the wire rope should be discarded.
14. In order to keep wire ropes pliable and to prevent rust, the rope should be lubricated at regular intervals with suitable lubricant free from acid or alkali. This will avoid corrosion; wear from friction and any drying out of the core of wire rope.
15. Wire ropes should be stored in cool places, which are free from moisture, excessive heat and corrosive fumes. Proper stands should be used for storage.
16. Wire ropes and wire rope slings should not be dragged along the ground or against rough or sharp objects.
17. While using wire ropes or wire rope slings avoid kinks, sharp angles or bends. If the object to be handled does have sharp corners, pads of gunny bags or wooden pieces should be used.
18. Where double or multiple slings are used for hoisting purposes, the upper end of the slings should be connected by means of suitable shackle or ring and should not be placed separately in the lifting hook.
19. All defective wire ropes and wire rope – slings that show evidence of cuts, abrasion, excessive wear, fatigue or other defects should be discarded and destroyed.
20. Only the trained personnel shall use / handle lifting tackles, slings and ropes

c. **CHAINS AND CHAIN SLINGS.**

1. Employers must ensure that chain and chain slings:
   - **(i)** Have permanently affixed and legible identification markings as prescribed by the manufacturer that indicate the recommended safe working load for the type(s) of hitch(es) used, the angle upon which it is based, and the number of legs if more than one;
   - **(ii)** Not be loaded in excess of its recommended safe working load as prescribed on the identification markings by the manufacturer; and
   - **(iii)** Not be used without affixed and legible identification markings as required by para (c)(1)(i) this section.
2. All sling chains, including end fastenings, shall be given a visual inspection before being used on the job. A thorough inspection of all chains in use shall be made every 3 months. Each chain shall bear an indication of the month in which it was thoroughly inspected. The thorough inspection shall include inspection for wear, defective welds, deformation and increase in length or stretch.
3. Employers must note interlink wear, not accompanied by stretch in excess of 5 percent, and remove the chain from service when maximum allowable wear at any point of link has been reached.
4. Chain slings shall be removed from service when, due to stretch, the increase in length of a measured section exceeds five (5) percent; when a link is bent, twisted or otherwise damaged; or when raised scarfs or defective welds appear.
5. All repairs to chains shall be made under qualified supervision. Links or portions of the chain found to be defective as described in para (c)(4) of this section shall be replaced by links having proper dimensions and made of material similar to that of the chain. Before repaired chains are returned to service, they shall be proof tested to the proof test load recommended by the manufacturer.
6. Wrought iron chains in constant use shall be annealed or normalized at intervals not exceeding six months when recommended by the manufacturer. The chain manufacturer shall be consulted for recommended procedures for annealing or normalizing. Alloy chains shall never be annealed.
7. A load shall not be lifted with a chain having a kink or knot in it. A chain shall not be shortened by bolting, wiring or knotting.
8. Chain made from iron of less than 5/6” diameter should not be used for lifting purpose.
9. Chains with worn out, damaged or defective links such as locked, stretched or jammed should not be used.
10. While using chain slings over sharp corners, padding of gunny bags, wooden blocks should be inserted to protect the chain.
11. Chain should not be dropped from heights. It should also be not dragged from under a load.
12. Excessively pitted, corroded or worm out chain should not be used. Chain having bent or twisted links or having a tendency of welds to open out should not be used.
13. Chain should not be spliced by inserting a bolt between two links.
14. Chain attachments such as rings, hooks, shackles, swivels, couplings and end links should be made of the same metal and should be of same safe working load as the chains to which they are fastened.
15. It shall be the responsibility employer that all defective chains and chain slings are withdrawn from use and sent for repairs. Those,

which cannot be repaired, must be cut out and destroyed to prevent their reuse.

16. Steel chains and their accessories should be normalised and iron chains and their accessories should be annealed regularly. After normalising/annealing, the chains and chain slings should be tested and tagged showing their safe working loads.
17. When chains have been exposed to extremely low temperature for a period of several hours, users should be warned before they are used.
18. The chains made of steel, which have been subjected to special thermic treatment, should be returned to the manufacturer for any heat treatment required.
19. When not in use, chains and chain slings should be stored in such conditions so as to avoid their rusting, damage due to corrosive chemicals and mechanical means.

3.4 SHACKLES, HOOKS AND SHEEVES:

a. **SHACKLES**. Employers must ensure that shackles:
   1. Have permanently affixed and legible identification markings as prescribed by the manufacturer that indicate the recommended safe working load;
   2. Not be loaded in excess of its recommended safe working load as prescribed on the identification markings by the manufacturer; and
   3. Not be used without affixed and legible identification markings as required by para (a)(1) of this section.

b. **HOOKS AND RINGS**
   1. The manufacturer's recommendations shall be followed in determining the safe working loads of the various sizes and types of specific and identifiable hooks. All hooks for which no applicable manufacturer's recommendations are available shall be tested to twice the intended safe working load before they are initially put into use. The employer shall maintain and keep readily available a certification record which includes the date of such tests, the signature of the person who performed the test and an identifier for the hook which was tested.
   2. Loads shall be applied to the throat of the hook since loading the point overstressed and bends or springs the hook.
   3. Hooks shall be inspected periodically to see that they have not been bent by overloading. Bent or sprung hooks shall not be used.
   4. Hooks and rings used with chain should be of material at least as good as that of the chain. Forged steel is preferable in every case and especially for lifting heavy loads.
   5. A ring must be strong enough to carry a load equal to the sum of safe loads of all the attached chains.
   6. When a hook has been bent by overloading, it **SHOULD NOT** be straightened and put back into service.
   7. Hooks that close and lock should be used where there is a danger of catching on an obstruction. The maximum safe working load should be stamped on each hook of the hoisting apparatus.

c. **SHEEVES**
   1. Grooves of sheeves used in connection with chain should be provided with pockets to fit the links of the chain.
   2. Grooves of sheeves should have rounded edges and smooth surface without any defects, which might injure the rope and

should be of such dimensions that rope, will run free without chafing against the block or other suspension parts.

3. Sheeves that have become worn, chipped or with corrugated grooves should not be used.
4. Bottom blocks for hoisting apparatus should be protected with close fitting guards and ring handles so as to prevent the hands of workers from being caught in the sheeves or between the sheeves and the loads.
5. Block designed for use with manila rope should not be used with wire rope.

3.5 CHAIN FALLS AND PULL-LIFTS:

a. Chain falls and pull-lifts shall be clearly marked to show the capacity and the capacity shall not be exceeded.
b. Chain falls shall be regularly inspected to ensure that they are safe, particular attention being given to the lift chain, pinion, sheaves and hooks for distortion and wear. Pull-lifts shall be regularly inspected to ensure that they are safe, particular attention being given to the ratchet, pawl, chain and hooks for distortion and wear.
c. Straps, shackles, and the beam or overhead structure to which a chain fall or pull-lift is secured shall be of adequate strength to support the weight of load plus gear. The upper hook shall be moused or otherwise secured against coming free of its support.
d. Scaffolding shall not be used as a point of attachment for lifting devices such as tackles, chain falls, and pull-lifts unless the scaffolding is specifically designed for that purpose.

3.6 HOISTING AND HAULING EQUIPMENT:

a. **Derrick and crane certification**.
   1. Derricks and cranes which are part of, or regularly placed aboard barges, other vessels, or on wing walls of floating dry-docks, and are used to transfer materials or equipment from or to a vessel or dry-dock, shall be tested and certificated in accordance with the applicable standards by persons accredited for the purpose.
b. The moving parts of hoisting and hauling equipment shall be guarded.
c. **Mobile crawler or truck cranes used on a vessel.**
   1. The maximum manufacturer's rated safe working loads for the various working radii of the boom and the maximum and minimum radii at which the boom may be safely used with and without outriggers shall be conspicuously posted near the controls and shall be visible to the operator. A radius indicator shall be provided.
   2. The posted safe working loads of mobile crawler or truck cranes under the conditions of use shall not be exceeded.
d. Accessible areas within the swing radius of the outermost part of the body of a revolving derrick or crane, whether permanently or temporarily mounted, shall be guarded in such a manner as to prevent an employee from being in such a position as to be struck by the crane or caught between the crane and fixed parts of the vessel or of the crane itself.

3.7 SAFETY PRECAUTIONS FOR USE OF HOISTING AND HAULING EQUIPMENT:

a. **SAFETY PRECAUTIONS FOR USE OF TRANSPORTATION EQUIPMENT**

1. All transport equipment's should be driven/operated only by authorized drivers i.e. by holder of heavy vehicle license issued by government authorities
2. All the transport vehicles should be maintained in good working order and should hold passing certificate from Local RTO authority.
3. Speed of Forklift trucks (FLT) and other Automobiles shall not exceed 8 Kmph & 20 Kmph respectively, on the dock roads, wharves and other work places.
4. Drivers must sound horn at all intersections of roads, blind corners and while moving in reverse. (use reverse horn/siren).
5. Extra care should be taken during driving at the junctions of road; the drivers should stop, check clearance and then proceed further.
6. Nobody shall get on or get down from moving vehicles.
7. Vehicles shall NOT be parked near gangways, aisles or close to the wharf.
8. Safe distance should be maintained between vehicles while driving on the road.
9. Driving the vehicle in standing position and horseplay should be strictly avoided.
10. Driver should ensure the clearance while reversing. Driver must take help of signaler, if his vision is obstructed while driving.
11. No passenger or fellow worker should be permitted by the driver to become co-rider of FLT, Reach Stacker, etc.
12. If the transport vehicle like truck is left on the gradient, set the brakes/gears and block the wheel by wedges.
13. Transport equipment should be parked only at authorized parking place.
14. To avoid un-authorized driving, do not leave keys of the unattended transport equipment. Handover keys only to authorized driver/reliever of the transport equipment.

b. Registration no. should be clearly reflected at front & back side of the vehicle and should be clearly visible.

c. SAFETY PRECAUTIONS FOR USE OF CRANES

1. Crane should have SWL capacity more than the weight of cargo to be handled.
2. Periodically tested and annually examined crane should be used for handling cargo.
3. Select the type of crane as per the type of cargo.
4. Out riggers of the mobile crane should be extended upto its full length and positioned its jacks on hard surface and the crane is fully stable before handling cargo.
5. Ensure SWL capacity at working radius (Maxm & Minm) of the crane is marked clearly on the boom/jib.
6. Ensure its limit switches and inbuilt safety devices are in good working order.
7. Ensure entire structure of the crane is intact without any damages.
8. Ensure good condition of all the wire ropes attached and all controls including brakes are in good working order.

9. Ensure the load is well secured while handling by crane.
10. Guide rope may be used for controlling swinging/rotating movements of cargo like pipes, wooden logs, etc.
11. Ensure the smooth movements i.e. lifting, swinging, lowering etc. of the crane while handling cargo.
12. Ensure crane operator is well secured in his cabin.
13. To test the brakes the operator should apply the brakes after lifting up the load upto few inches.
14. Dragging of cargo should be avoided.
15. Before hoisting / lifting a load, the operator should ensure that slingers and other workers/persons are not within the danger zone.
16. The load should not be lowered below the point where less than three & half turns of wire rope remain on the rope drum.
17. Anchoring of the wire ropes ends (both) should be properly secured.
18. The load should not be kept in suspended position for long time.
19. Only one person should be authorized to signal crane operator while handling cargo.
20. Before commencing travelling or when the hook approaches near or over personnel, warning signal should be sounded.
21. Mobile crane shall not be repaired while it is being operated for handling cargo.
22. No additional load should be fixed on counter load to raise its lifting capacity.
23. Rigging of wire ropes should not be changed/alter without approval of competent person.
24. All the certificates related with crane should be preserved & produced for verification wherever required.
25. Fire extinguishers should be provided on the crane & maintained properly.
26. Crane operator & cleaner should be imparted OSH training & medically examined.

Do's and Don'ts for Crane operation

DO's

(i) Do check all limit switches before starting the crane.
(ii) Do understand lifting capacity of crane.
(iii) Do check working of emergency switch during control.
(iv) Do lift and travel the load at enough height.
(v) Do remove the chain and wire when crane is not in use.
(vi) Do keep crane hook at its safe and height when not in use.
(vii) Do inform when crane is under repair and put a sign board writing "do not start crane"
(viii) Do use chain/wire rope slings possessed inspecting tag having SWL.
(ix) Do check the crane for its general condition.
(x) Doc check for lifting loads weight and crane lifting capacity.
(xi) Ensure both side, bus bars with sign lamps.
(xii) Ensure fuses to be removed and write warning board near fuse box during working on overhead bus bar and stop the supply.

DON'TS

(i) Do not lift the load beyond its safe working load capacity.
(ii) Do not keep hanging load.
(iii) Do not by pass the safety limit switches.
(iv) Do not pass the loads above working people which was lifted by magnetic lifter.

(v) Do not push the another crane by previous crane.
(vi) Do not start crane if it is minor break down and bring in to notice of concerned authority.
(vii) Do not keep loose material on crane.
(viii) Do not stand on or under the lifted load.
(ix) Do not lift excess load beyond the rope/chain sling.
(x) Do not forget rule of chain/wire, 'rope included angle increases' safe working load decrease.
(xi) Do not give rotation to wire rope/chain rope and knot them.
(xii) Do not pull the chain/wire rope in lifted load position.
(xiii) Do not throw the chain/wire rope from height.
(xiv) Do not use worn/deteriorated chain/wire ropes

d. SAFETY PRECAUTIONS FOR FORK LIFT TRUCKS.

1. Tyre pressure should know the weights of all heavy objects before attempting to lift them.
2. Load should be carried as low as possible taking care of floor.
3. Fork should be kept lifted back except when raising or depositing loads.
4. Truck must be driven at a safe speed.
5. Horns should be sounded at blind corners with restricted vision.
6. The carrying of passengers should be prohibited.
7. If a load is so bulky as to obstructs forward vision the truck should be driven in reverse.
8. When carrying a load up a slope the truck should be driven reverse.
9. When carrying a load down a slope the truck should be driven forwards.
10. The hand brakes should be kept on when the mast is tilted.
11. No one should be allowed under the forks when elevated.
12. Forks should be lowered and the truck immobilised when a truck is parked.
13. Truck should be parked only in special parking areas reserved for them.
14. Do not move with insecure loads.
15. Stop and start smoothly

3.8 USE OF GEAR:

a. Loose gears & slings which are tested, certified and annually examined by government approved competent person should be used for handling cargo.
b. Ensure that gears are made up of sound material and should have adequate strength.
c. Ensure SWL capacity & identification marks available on the gears are clearly visible.
d. Gears used in cargo handling shall not be over loaded.
e. A responsible person of employer shall regularly inspect gears used in cargo handling.
f. All the gears should be properly stored and maintained in good working condition.
g. Damaged or defective gear should not be taken into further use and should be discarded immediately.
h. Tandem lifting operation should be carried out by using gears having appropriate SWL capacity and under the strict supervision.
i. Loads shall be safely rigged before being hoisted.

j. Tag lines shall be provided on loads likely to swing or to need guidance.
k. When slings are secured to eye-bolts, the slings shall be so arranged, using spreaders if necessary, that the pull is within 20 degrees of the axis of the bolt.
l. Slings shall be padded by means of wood blocks or other suitable material where they pass over sharp edges or corners of loads so as to prevent cutting or kinking.
m. Skips shall be rigged to be handled by not less than 3 legged bridles, and all legs shall always be used. When open end skips are used, means shall be taken to prevent the contents from falling.
n. Loose ends of idle legs of slings in use shall be hung on the hook.
o. Employees shall not be permitted to ride the hook or the load.
p. Loads (tools, equipment or other materials) shall not be swung or suspended over the heads of employees.
q. Pieces of equipment or structure susceptible to falling or dislodgement shall be secured or removed as early as possible.
r. An individual who is familiar with the signal code in use shall be assigned to act as a signalman when the hoist operator cannot see the load being handled. Communications shall be made by means of clear and distinct visual or auditory signals except that verbal signals shall not be permitted.
s. Pallets, when used, shall be of such material and construction and so maintained as to safely support and carry the loads being handled on them
t. A section of hatch through which materials or equipment are being raised, lowered, moved, or otherwise shifted manually or by a crane, winch, hoist, or derrick, shall be completely opened. The beam or pontoon left in place adjacent to an opening shall be sufficiently lashed, locked or otherwise secured to prevent it from moving so that it cannot be displaced by accident.
u. Hatches shall not be open or closed while employees are in the square of the hatch below.
v. Before loads or empty lifting gear are raised, lowered, or swung, clear and sufficient advance warning shall be given to employees in the vicinity of such operations.
w. At no time shall an employee be permitted to place himself in a hazardous position between a swinging load and a fixed object.

3.9 QUALIFICATIONS OF OPERATORS:

a. When ship's gear is used to hoist materials aboard, a competent person shall determine that the gear is properly rigged, that it is in safe condition, and that it will not be overloaded by the size and weight of the lift.
b. Only those employees who understand the signs, notices, and operating instructions, and are familiar with the signal code in use, shall be permitted to operate a crane, winch, or other power operated hoisting apparatus.
c. No employee known to have defective uncorrected eyesight or hearing, or to be suffering from heart disease, epilepsy, or similar ailments which may suddenly incapacitate him, shall be permitted to operate a crane, winch or other power operated hoisting apparatus.
d. No minor under eighteen (18) years of age shall be employed in occupations involving the operation of any power-driven hoisting apparatus or assisting in such operations by work such as hooking on, loading slings, rigging gear, etc.

3.10 OPERATING RULES FOR DRIVERS OF LIFTING MACHINES:

a. When the equipment Operator or Driver takes over charge, it is his first duty to check over the controls of the crane and see the crane tracks are clear. He will not operate the crane unless he ensures that:-
    1. All guards are in place.
    2. The limit switches and other electrical and mechanical devices are in proper working condition.
    3. Wire rope is winding on the drum properly and the rope is free from kinks and other defects. (This can be checked by running the pulley block up or down and scanning the rope)
b. It is the duty of the Equipment Operator or Driver to ensure that the equipment is not overloaded and loads are properly slinged with regard to strength of slings and their position.
c. Loads should be raised and lowered smoothly avoiding jerks due to sudden starts or stops.
d. Hands or feet should not be removed from the controls while a load is suspended.
e. In case of power failure while operating an electric crane, the controls should be thrown to the off position. The area under the suspended load shall be cordoned off.
f. Loads should not be carried over the heads of other persons.
g. When the crane is not working, the hooks and slings should be raised to a height, which will clear all fixed and moving objects below and allow free movement of persons or vehicles, etc.
h. Before switching "OFF" the power from main switch of an electric crane, check that all controls are in the "OFF" position.
i. Any defect in the crane such as unusual noise, faulty operation, sparking motors, bridge jumping etc. Should be reported to the concerned Supervisor or Plant Engineer for immediate repair before attempting to lift a load.
j. The equipment Operator or Driver is responsible for the safe operation of the crane & he should follow the following principles
    1. He should be certain that the hook is directly above the load to be raised and avoid placing an additional strain on the crane and swinging of the load
    2. Crane should not be used for pushing, dragging or sliding the load or any other object.
    3. The bridge or trolley should not be operated before the load is raised from the ground to a desired height.
    4. While lowering the block, ensure that a minimum of two wraps of rope is left on the drum.
    5. When a long sling or hitch is used to lift a load, consideration should be given to the height of lift so as to prevent tripping of limit switch by the block.
    6. Limit switch is a safety device. It is not designed to work as an Operating Controller.
    7. When picking up heavy load, it is advisable to lift the load slightly and test for wire rope breakage or slings slipping out.
    8. The hoisting rope must not be used as a sling round an object being handled.
    9. The Operator should not allow the crane to bump against buffers.
    10. When boom cranes are not operating, the boom should be lowered to horizontal position ensuring that it does not obstruct any traffic or emergency exists.
    11. Use the warning bell, gong, whistle or siren to warn everyone around while operating the crane.
    12. When mobile cranes are working or moving, ensure that they do not foul with any pipeline, equipment, structures, and overhead electric

lines. A minimum distance of 2 meters must be maintained between the boom or load and all power lines.

13. In case it is not possible to maintain this minimum safe clearance for any particular job, the power line must be de-energised to avoid any mishap.
14. The Equipment Operator or Driver should take instructions/signals from one man only specially assigned for this work. Only standard predetermined signals shall be used for communication to facilitate raising, lowering or shifting of the object.

3.11 MAINTENANCE OF REGISTER AND RECORDS OF GEAR AND EQUIPMENTS OF MATERIAL HANDLING:

a) The sectional officer should maintain registers of all cranes, lifting apparatus, chains, ropes and lifting tackles and ensure that periodical examination tests, and where applicable, annealing, etc. is carried out in accordance with the Dock workers (Safety, Health and Welfare Regulations, 1990).

b) A history sheet of all such equipment's which are put into operation should also be maintained to record involuntary stoppage, breakdown, etc. as a safety precaution, since the history sheet will bring to light defects or possible improvements, modifications in design, etc. and likelihood of breakdown in various combinations of circumstances.

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CHAPTER 4: CIVIL WORKS

At Mumbai Port Operational and Maintenance, related works / activities are continuously carried out on day-to-day basis. Various departments of MbPA executes these works /activities by way of outsourcing through private contractors or sometimes MbPA own staff carry out the work of repair and maintenance work. The repair and maintenance work need to carry out very carefully as various risks are associated with that and any negligence to safety may cause accidents.

It was observed that one of the foremost causes of accidents and fires is the miss-operation of equipment or unplanned Job without taking proper safety precautions. This usually occurs because of violation of the Safe operating procedures of operation, or in an attempt to take short cuts. The need for alertness to possible dangers is an obvious one.

Following are the risks associated with the repair and maintenance work / activities. Therefore, flowing General Safety precautions shall be taken before commencement of any repair and maintenance work/ activity.

4.1 GENERAL SAFETY PRECAUTIONS FOR THE WORKS:

- Remember that Safety Operations take priority over all other work.
- It is of particular importance that appropriate safety precautions /measures should be taken before undertaking of any major /minor maintenance work. Don not sacrifice Safety precautions to save time.
- Ensure that any system, machinery or equipment is operated strictly as per the safe operating procedure.
- To undertake maintenance, work the guards and covers on machinery, fencing and railing around machinery, walkways, stairways, platforms, sumps, pits, etc. shall not be removed without displaying cautionary board to warn the people to that effect.
- Safety apparatus and Firefighting apparatus is to be kept at ear marked location and ensured that they are easily accessible and in hygienic / usable condition at all the times.
- Any Employee should not be permitted to work if he is sick, under the influence of intoxicants or otherwise incapable of performing their duties in safe way
- Safety equipment /PPEs prescribed for particular job such as goggles or protection of eyes, hand gloves for protection of hands, PVC aprons/ PVC suits to protect against corrosive liquid splash, respirators/masks to protect against poisonous gases, etc. must be worn.
- The proper tools must be used for the job. Tools must be maintained in good condition. This applies not only to hand-tools but also to power operated hand-tools and lifting tackle, etc.
- It is the duty of the Engineer-in-charge / Supervisor of the work to ensure that equipment is adequate to the task to be performed and that no avoidable risk is taken.
- When work is being carried out at higher elevation than ensure that tools and materials are not left in position where they can fall down, and to protect personals form falling objects, a safety net must be laid below, where the maintenance work is to be carried out.
- Where it is necessary to open manholes or remove sections of flooring. It is the responsibility of who-so-ever in-charge of the work to ensure that manholes and floor sections are cordoned off until the manhole covers and floor sections are replaced.
- All temporary scaffolds, platforms, etc. erected for the purpose of maintenance jobs should be removed promptly after the completion of the job.

In case of Emergency

- One of the foremost cause of accidents and fires is the miss-operation of equipment or unplanned maintenance job without taking proper safety precautions. At the time of any emergency, it is the responsibility of the supervisor to take immediate and proper action to bring the system to safe condition as per the operating instructions as well as to see that there is no panic amongst the personnel present in the vicinity.
- It is also the responsibility of the supervisor to evacuate the personnel from the Section, if necessary, and take a roll call so as to ensure that no one is left behind.
- In case the emergency gets out of control, the Emergency Control Plan will come into force.

4.2 WORK PERMITS FOR THE WORKS:

1. At Mumbai port most of the occasions the repair and maintenance work has to be carried out on pipelines, structures, buildings, floors or yard areas, and sometimes employees may have to enter confined spaces such as tanks, pits, sumps etc. Many hazards have to be tackled when persons are engaged on such work. These hazards require a procedure to be followed to make the equipment, pipeline or structures safe for carrying out the repair, maintenance or inspection work.
2. It is necessary that all the jobs of repair, inspection, maintenance and entry into confined space are covered under the safety permit procedure.
3. Depending upon the nature of the job and risk involved, the appropriate permit shall be obtained and No job of repair, maintenance, inspection and entry into confined space can start unless the Safety Work Permit is obtained.
4. A safety permit is a form to be completed by all concerned with copies issued to the appropriate departments/concerned supervisor as shown on the form, so as to ensure that safe working conditions are maintained BEFORE A JOB IS STARTED AND DURING THE CURRENCY OF THE JOB.
5. When safety permits cover the performance of work by contractors, the departmental supervisors looking after the work of contractor will be responsible to see that the contractor and his employees are properly instructed in all precautions which must be observed to ensure safety.
6. It is personal responsibility of those initiating, accepting and collaborating in signing safety permits to ensure that all precautions necessary to prevent injury to personal or damage to property/equipment/etc. are duly observed.
7. All safety permits except safe entry permit must be issued to individuals and not to department. Where work covered by a safety permits extends over more than one shift, full and complete arrangements must be made for passing on responsibility to named person.
8. Safe entry permit shall be displayed on entry points of confined space informing all concerned required to enter the said confined space, regarding conditions inside the confined space, precautions to be followed and safety appliances to be used.
9. Safety permits must be made out in specific forms describing the work out in specific terms, there must be personal contact between the person issuing the permit and the person to whom it is issued., The work to be done should be described orally and the precautions mentioned on the permit should be repeated.

   10.Where more than one permit are issued for a single job, equivalent number of tags must be placed on valves or locks on switches, which are isolating the equipment.

11.In general the permits are to be initiated by the operating personnel and issued to the maintenance personnel.
12.When in doubt whether a permit should be initiated or a 'No Permit Certificate' should be endorsed on Maintenance Job Card, always initiated and issue a permit.
13.Initiator authoriser and permittee of safety work permits of all classes, and the officers of senior status of the section concerned have got the authority to stop jobs covered by the Safety Work Permit at any stage if the conditions are unsafe due to change in process conditions or other reasons.

a. TYPES OF WORK PERMIT

1. General Work Permit (Cold Work Permit)

(i) It is also called "Cold Work Permit". It is issued for relatively low-risk jobs. Example: Routine maintenance done on machines

2. Hot Work Permit (Fire Permit)

(i) HOT WORK: Any work activity involving the use of tools or equipment, which can generate heat, flame, sparks or any source of ignition. Example: Welding / gas cutting in a hazardous area.
(ii) Jobs like electric arc welding, brazing, gas soldering, and oxygen-acetylene cutting and welding require Hot Work Permits before work begins.

3. WORK AT HEIGHT PERMIT– ABOVE 2M

(i) What is work at height?
(ii) It is work at any place from which a person could fall a distance liable to cause personal injury
(iii) Includes : access and egress, and work at or below ground level; but not stairways or slips or trips on the level
(iv) This permit is generally issued when a work has to be carried out at a height of 2m or above on a temporary structure.

4. EXCAVATION WORK PERMIT

What is excavation?
(i) It is a man-made cut, cavity, trench or depression formed by earth removal.
(ii) An Excavation Work Permit is essential before starting work.
(iii) Permit issued for carrying out any kind of work on underground pipelines, power cables, etc. are covered under this.
(iv) Cases where depth is less, but the soil condition is unstable and there is chance for a collapse, should be covered under this permit.

b. ESSENTIAL INFORMATION REQUIRD ON WORK PERMIT

1. Description of work to be done
2. Exact location of the job
3. Date and time – start and end
4. Details of potential hazards
5. Safety measures taken by permit issuer
6. Safety measures to be taken by the executor of job, including PPE to be used
7. Preparatory works carried out- Tools testing, Isolation
8. Emergency procedure
9. Name of employees on the job
10. Name and signature of person(s) authorizing the W.P.
11. Name and signature of person accepting the W.P.
12. Date and time of issue of W.P.

13. Renewal of validity of W.P.

4.3 GENERAL WORKING CONDITIONS:

The following general working conditions shall be maintained at site for execution of any repair and maintenance job.

4.3.1 HOUSEKEEPING

a. General requirements.

1. The employer shall establish and maintain good housekeeping practices to eliminate hazards to employees to the extent practicable.
2. The employer shall eliminate slippery conditions, on walkways and working surfaces as necessary. If it is not practicable for the employer to remove slippery conditions, the employer either shall:
   (i) Restrict employees to designated walkways and working surfaces where the employer has eliminated slippery conditions; or
   (ii) Provide slip-resistant footwear.
3. The employer shall store materials in a manner that does not create a hazard for employees.
4. The employer shall maintain easy and open access to each fire-alarm box, fire-call station, fire-fighting equipment, and each exit, including ladders, staircases, scaffolds, and gangways.
5. The employer shall dispose of flammable and combustible substances, such as paint thinners, solvents, rags, scrap, and waste, or store them in covered fire-resistant containers at the end of each work shift or when the job is completed, whichever occurs first.

b. Walkways.

1. In addition to the general requirements in the paragraph (a) above. the employer also shall ensure that each walkway:
   (i) Provides adequate passage;
   (ii) Is clear of debris, including solid and liquid wastes, that may create a hazard for employees;
   (iii) Is clear of tools, materials, equipment, and other objects that may create a hazard for employees; and
   (iv) Is clear of hoses and electrical service cords.

   The employer shall:
   (A) Place each hose and cord above walkways in a location that will prevent injury to employees and damage to the hoses and cords;
   (B) Place each hose and cord underneath walkways;
   (C) Place each hose and cord on walkways, provided the hoses and cords are covered by crossovers or other means that will prevent injury to employees and damage to the hoses and cords; or
   (D) Protect each hose and cord by other suitable means.
2. While a walkway or part of a walkway is being used as a working surface, the employer shall cordon off that portion to prevent it from being used as a walkway.

c. Working surfaces.

In addition to the requirements in paragraph (a) above, the employer also shall ensure that each working surface:

1. Is cleared of tools, materials, and equipment that are not necessary to perform the job in progress;
2. Is cleared of debris, including solid and liquid wastes, at the end of each work shift or job, whichever occurs first;
3. Is maintained, so far as practicable, in a dry condition. When a wet process is used, the employer shall maintain drainage and provide false floors, platforms, mats, or other dry standing places. When the employer

demonstrates that this procedure is not practicable, the employer shall provide each employee working in the wet process with protective footgear.

4.3.2 LIGHTING

a. General Requirements.

1. The employer shall ensure that each work area and walkway is adequately lighted whenever an employee is present and working.
2. When adequate illumination is not obtainable by permanent lighting sources, temporary lighting may be used as supplementation.
3. The employer shall ensure that neither matches nor open-flame devices are used for lighting.

b. Temporary lights. The employer shall ensure that temporary lights meet the following requirements:

1. Lights with bulbs that are not completely recessed are equipped with guards to prevent accidental contact with the bulb;
2. Lights are equipped with electric cords designed with sufficient capacity to safely carry the electric load;
3. Connections and insulation on electric cords are maintained in a safe condition;
4. Lights and lighting stringers are not suspended solely by their electric cords unless they are designed by the manufacturer to be suspended in this way;
5. Lighting stringers do not overload branch circuits;
6. Branch circuits are equipped with over-current protection with a capacity that does not exceed the rated current-carrying capacity of the cord used;
7. Splices have insulation with a capacity that exceeds that of the original insulation of the cord; and
8. Exposed, non-current-carrying metal parts of lights are grounded. The employer shall ensure that grounding is provided either through a third wire in the cord containing the circuit conductors or through a separate wire that is grounded at the source of the current.

c. Portable lights.

1. In any dark area that does not have permanent or temporary lights, where lights are not working, or where lights are not readily accessible, the employer shall provide portable or emergency lights and ensure that employees do not enter those areas without such lights.
2. Where the only means of illumination on a vessel or vessel section are from lighting sources that are not part of the vessel or vessel section, the employer shall provide portable or emergency lights for the safe movement of each employee. If natural sunlight provides sufficient illumination, portable or emergency lights are not required.

d. Explosion-proof, self-contained lights. The employer shall provide and ensure that each employee uses only explosion-proof, self-contained temporary and portable lights, approved for hazardous conditions by the competent authority, in any area that the atmosphere is determined to contain a concentration of flammable vapours that are at or above 10 percent of the lower explosive limit (LEL).

4.4 WORKING AT HEIGHT:

Working at heights means working on two meters or above height (i.e. working on platform, stage, scaffolding etc.) For carrying out various civil related works it is required to work at elevated places. As compare to

working on floor level more hazards are associated with the working at height. Working on heights involves climbing / descending, carrying and lowering of tools / equipment / materials, etc. Also, one has to take care of men, material and machinery on lower levels. Due to all these complications, working on heights requires anticipation and observing of more safety precautions at every step.

Therefore, for carrying out any work at height consider following basic safety guidelines:

- Work at height should be properly planned and all the risks shall be assessed in advance.
- Day-specific work permits shall be issued/obtained for working at height from designated competent persons
- Work shall be supervised by competent person.
- Do not commence the work if weather conditions (e.g., high wind velocity) jeopardise health and safety
- Ensure that the personals deployed for working at height are competent (or if being trained, supervised by a competent person).
- Keep in mind that any dropped material or tool may endanger other persons below, therefore the area below should be fully cordoned/barricaded.
- Safe means of access shall be provided, proper scaffoldings are provided
- Appropriate PPEs shall be issued to all employees – Helmet, goggles, leather gloves, safety shoes, safety belt, safety net, etc. and ensure that employees are using them.
- Proper procedure for emergency situation should be designed and implemented.

In addition to the above points, the following factors which are closely related to working at height must be given due consideration and complied with while working at elevation.

4.4.1 SAFETY GUIDELINES FOR WORKING AT HEIGHT

Before the commencement of the work, the 'Working at Height Permit' must be issued / obtained and all the requirements/condition mentioned in the permit strictly followed:

4.4.2 ACCESS TO WORKPLACE AT HEIGHT

- Adequate and safe means of access and exit shall be provided for all workplaces, at all elevations. Ladders shall be always used for approaching high elevations.
- Suitable ladder / scaffolds shall be provided for workmen for all works that cannot safely be done from the ground.
- Climbing / descending over pipes, structures and equipment is dangerous and should be avoided.
- Safety procedures for Ladder, Scaffolding and working platform shall be strictly followed.
- All access to the work place shall be well guarded viz. stairs, ramps, etc. and shall be well illuminated.
- The access shall not have any water logging; they shall be levelled and dry so that people do not slip.
- Sign boards, written in language understood by majority of the workers, and exit signs shall be displayed at suitable location for easy identification.

- The steps of the stair shall be periodically cleaned for any accumulation of debris, dust, etc.

While using cat ladders, staircases and ladders for access to workplace the following precaution should be observed: -

CAT LADDER:

- Use both hands
- Ensure firm grip and firm footing.
- If more than one person has to climb / descend, use cat ladder one by one
- Always face towards the ladder
- Do not keep hands engaged in holding other materials

LADDER:

- Safe means of access shall be provided to all working platforms and other elevated working places with the help of ladders.
- Ladder shall be placed in an inclination not steeper than 1 in 4 (1horizontal and 4 vertical).
- Every ladder shall be securely fixed at bottom from sliding/slipping.
- No single portable ladder shall be over 9 m in length.
- For ladders up to 3m in length, the width between side rails in the ladder shall be a minimum of 300 mm. For longer ladders, this width shall be increased by at least 20 mm for each additional metre of length.
- The spacing of rungs shall be uniform and shall not exceed 300 mm.
- Ladder shall be of rigid construction having sufficient strength for the intended loads and made either of good quality wood or metal. All ladders shall be maintained well for safe working condition. The rungs shall be tested periodically as per provisions of IS: 3696 -1991 (Part 2) (Reaffirmed in 2002).
- Whenever ladder is not securely fixed an extra worker shall be engaged for holding the ladder.
- Ladders shall not be used for climbing while carrying materials in hands.
- While climbing use both hands for holding the rails ensure firm footing and firm gripping while ascending or descending.
- Always face the ladder
- Do not position the ladder near doors likely to be opened and near blind corners.

4.4.3 CARRYING OF TOOLS AND ACCESSORIES

- Tools, accessories and other items required for the completion of job should be never carry in hands while using a ladder.
- Tools and accessories, etc. should be shifted to and from elevated work places by using a manila rope or other safe means of lifting / lowering

4.4.4 SAFETY PRECAUTIONS FOR CARRYING OUT THE WORK AT HEIGHT

- If a permanent working platform is not provided on elevation, where work is to be done, a proper scaffolding must be arranged and provided.
- The scaffolding provided should have hand rails and toe boards and be preferably made a tubular structure and strong wooden planks.
- In places where scaffolding cannot be provided, the use of safety belt with lifeline is a must.

4.4.5 SAFETY PRECAUTIONS DURING THE PROGRESS OF WORK AT HEIGHT

- The area below the work should be cordoned off and caution signs 'MEN WORKING OVERHEAD' should be displayed.
- The oxy-acetylene set, if in use, should be kept in such a place where no spark from the job can fall on it.
- If the work is being done in a 'NO SMOKING AREA' the equipment, machinery, pipelines and vessels in the vicinity and below should be well guarded and protected against sparks falling from welding / cutting being carried out at elevations.
- Due care should be taken to avoid falling of any tool or article especially through the grating or openings.

4.4.6 SAFETY PRECAUTIONS ON COMPLETION OF WORK AT HEIGHT

- All tools, articles, lubricants and the other items brought for any work should be removed from the place of work and the area should be cleared of all unwanted items.
- Temporary scaffolding, if any, erected for the work should be removed to proper place.
- Gratings, sections of flooring removed for the purpose of carrying out the work should be replaced.

4.5 SCAFFOLDS, LADDERS AND OTHER WORKING SURFACES:

4.5.1 SCAFFOLDS OR STAGING

a. **Scope and application**. The provisions of this section shall apply to all the repair and maintenance operations/activities to be carried out at height:

b. **General requirements**.

1. All scaffolds and their supports whether of lumber, steel or other material, shall be capable of supporting the load they are designed to carry with a safety factor of not less than four (4).
2. All lumber used in the construction of scaffolds shall be spruce, fir, long leaf yellow pine, Oregon pine or wood of equal strength. The use of hemlock, short leaf yellow pine, or short fiber lumber is prohibited.
3. Lumber dimensions as given in this Subpart are nominal except where Given in fractions of an unit.
4. All lumber used in the construction of scaffolds shall be sound, straight- grained, free from cross grain, shakes and large, loose or dead knots. It shall also be free from dry rot, large checks, worm holes or other defects which impair its strength or durability.
5. Scaffolds shall be maintained in a safe and secure condition. Any component of the scaffold which is broken, burned or otherwise defective shall be replaced.
6. Barrels, boxes, cans, loose bricks, or other unstable objects shall not be used as working platforms or for the support of planking intended as scaffolds or working platforms.
7. No scaffold shall be erected, moved, dismantled or altered except under the supervision of competent persons.
8. No welding, burning, riveting or open flame work shall be performed on any staging suspended by means of fiber rope.
9. Lifting bridles on working platforms suspended from cranes shall consist of four legs so attached that the stability of the platform is assured.
10. Unless the crane hook has a safety latch or is housed, the lifting bridles on working platforms suspended from cranes shall be attached by shackles to the lower lifting block or other positive means shall be

taken to prevent them from becoming accidentally disengaged from the crane hook.

c. Independent pole wood scaffolds.

1. All pole uprights shall be set plump. Poles shall rest on a foundation of sufficient size and strength to distribute the loan and to prevent displacement.
2. In light-duty scaffolds, not more than 24 feet in height, poles may be spliced by overlapping the ends not less than 4 feet and securely nailing them together. A substantial cleat shall be nailed to the lower section to form a support for the upper section except when bolted connections are used.
3. All other poles to be spliced shall be squared at the ends of each splice, abutted, and rigidly fastened together by not less than two cleats securely nailed or bolted thereto. Each cleat shall overlap each pole end by at least 24 inches and shall have a width equal to the face of the pole to which it is attached. The combined cross sectional area of the cleats shall be not less than the cross sectional area of the pole.
4. Ledgers shall extend over two consecutive pole spaces and shall overlap the poles at each end by not less than 4 inches. They shall be left in position to brace the poles as the platform is raised with the progress of the work. Ledgers shall be level and shall be securely nailed or bolted to each pole and shall be placed against the inside face of each pole.
5. All bearers shall be set with their greater dimension vertical and shall extend beyond the ledgers upon which they rest.
6. Diagonal bracing shall be provided between the parallel poles, and cross bracing shall be provided between the inner and outer poles or from the outer poles to the ground.
7. Minimum dimensions and spacing of members shall be adequate and as per the requirements.
8. Platform planking shall be in accordance with the requirements of Paragraph (h) below.
9. Backrails and toeboards shall be in accordance with the requirements of paragraph (i) below.

d. Independent pole metal scaffolds.

1. Metal scaffold members shall be maintained in good repair and free of corrosion.
2. All vertical and horizontal members shall be fastened together with a coupler or locking device which will form a positive connection. The locking device shall be of a type which has no loose parts.
3. Posts shall be kept plumb during erection and the scaffold shall be subsequently kept plumb and rigid by means of adequate bracing.
4. Posts shall be fitted with bases supported on a firm foundation to distribute the load. When wooden sills are used, the bases shall be fastened thereto.
5. Bearers shall be located at each set of posts, at each level, and at each intermediate level where working platforms are installed.
6. Tubular bracing shall be applied both lengthwise and crosswise as required.
7. Platform planking shall be in accordance with the requirements of paragraph (h) below. Back rails and toe boards shall be in accordance with the requirements of paragraph (i) below.

e. **Wood trestle and extension trestle ladders**.

1. The use of trestle ladders, or extension sections or base sections of extension trestle ladders longer than 20 feet is prohibited. The total height of base and extension may, however, be more than 20 feet.
2. The minimum dimensions of the side rails of the trestle ladder, or the base sections of the extension trestle ladder, shall be as follows:
   (i) Ladders up to and including those 16 feet long shall have side rails of not less than 15 /16 x 23 /4 inch lumber.
   (ii) Ladders over 16 feet long and up to and including those 20 feet long shall have side rails of not less than 15 /16 x 3 inch lumber.
3. The side rails of the extension section of the extension trestle ladder shall Be parallel and shall have minimum dimensions as follows:
   (i) Ladders up to and including 12 feet long shall have side rails of not less than 15 /16 x 21 /4 inch lumber.
   (ii) Ladders over 12 feet long and up to and including those 16 feet long shall have side rails of not less than 15 /16 x 21 /2 inch lumber.
   (iii) Ladders over 16 feet long and up to and including those 20 feet long shall have side rails of not less than 15 /16 x 23 /4 inch lumber.
4. Trestle ladders and base sections of extension trestle ladders shall be so spread that when in an open position the spread of the trestle at the bottom, inside to inside, shall be not less than 51 /2 inches per foot of the length of the ladder.
5. The width between the side rails at the bottom of the trestle ladder or of the base section of the extension trestle ladder shall be not less than 21 inches for all ladders and sections 6 feet or less in length. For longer lengths of ladder, the width shall be increased at least 1 inch for each additional foot of length. The width between the side rails of the extension section of the trestle ladder shall be not less than 12 inches.
6. In order to limit spreading, the top ends of the side rails of both the trestle ladder and of the base section of the extension trestle ladder shall be beveled, or of equivalent construction, and shall be provided with a metal hinge.
7. A metal spreader or locking device to hold the front and back sections in an open position, and to hold the extension section securely in the elevated position, shall be a component of each trestle ladder or extension ladder.
8. Rungs shall be parallel and level. On the trestle ladder, or on the base section of the extension trestle ladder, rungs shall be spaced not less than 8 inches nor more than 18 inches apart; on the extension section of the extension trestle ladder, rungs shall be spaced not less than 6 inches nor more than12 inches apart.
9. Platform planking shall be in accordance with the requirements of Paragraph (h) below, except that the width of the platform planking shall not exceed the distance between the side rails.
10. Backrails and toeboards shall be in accordance with the requirements of paragraph (i) of this section.

f. Painters' suspended scaffolds.

1. The supporting hooks of swinging scaffolds shall be constructed to be equivalent in strength to mild steel or wrought iron, shall be forged with care, shall be not less than 7 /8 inch in diameter, and shall be secured to a safe anchorage at all times.
2. The ropes supporting a swinging scaffold shall be equivalent in strength to first-grade 3 /4 inch diameter manila rope properly rigged into a set of standard 6 inch blocks consisting of at least one double and one single block.

3. Manila and wire ropes shall be carefully examined before each operation and thereafter as frequently as may be necessary to ensure their safe condition.
4. Each end of the scaffold platform shall be supported by a wrought iron or mild steel stirrup or hanger, which in turn is supported by the suspension ropes.
5. Stirrups shall be constructed so as to be equivalent in strength to wrought iron 3 /4 inch in diameter.
6. The stirrups shall be formed with a horizontal bottom member to support the platform, shall be provided with means to support the guardrail and midrail and shall have a loop or eye at the top for securing the supporting hook on the block.
7. Two or more swinging scaffolds shall not at any time be combined into one by bridging the distance between them with planks or any other form of platform.
8. No more than two persons shall be permitted to work at one time on a swinging scaffold built to the minimum specifications contained in this paragraph. Where heavier construction is used, the number of persons permitted to work on the scaffold shall be determined by the size and the safe working load of the scaffold.
9. Backrails and toeboards shall be in accordance with the requirements of paragraph (i) below.
10. The swinging scaffold platform shall be one of the three types described in paragraphs (f)(11), (12), and (13) below.
11. The ladder-type platform consists of boards upon a horizontal ladder-like structure, referred to herein as the ladder, the side rails of which are parallel. If this type of platform is used the following requirements shall be met.

    (i) The width between the side rails shall be no more than 20 inches.

    (ii) The side rails of ladders in ladder-type platforms shall be equivalent in strength to a beam of clear straight-grained spruce

    (iii) The side rails shall be tied together with tie rods. The tie rods shall be not less than 5 /16 inch in diameter, located no more than 5 feet apart, pass through the rails, and be riveted up tight against washers at both ends.

    (**iv)** The rungs shall be of straight-grained oak, ash, or hickory, not less than 11 /8 inches diameter, with 7 /8 inch tenons mortised into the side rails not less than 7 /8 inch and shall be spaced no more than 18 inches on centres.

    (v) Flooring strips shall be spaced no more than 5 /8 inch apart except at the side rails, where 1 inch spacing is permissible.

    (vi) Flooring strips shall be cleated on their undersides.
12. The plank-type platform consists of planks supported on the stirrups or hangers. If this type of platform is used, the following requirements shall be met:

    (i) The planks of plank-type platforms shall be of not less than 2 x 10 inch lumber.

    (ii) The platform shall be no more than 24 inches in width.

    (iii) The planks shall be tied together by cleats of not less than 1 x 6 inch lumber, nailed on their undersides at intervals of not more than 4 feet.

    (iv) The planks shall extend not less than 6 inches nor more than 18 inches beyond the supporting stirrups.

    (v) A cleat shall be nailed across the platform on the underside at each end outside the stirrup to prevent the platform from slipping off the stirrup.

    (vi) Stirrup supports shall be not more than 10 feet apart.

13. The beam-type platform consists of longitudinal side stringers with cross beams set on edge and spaced not more than 4 feet apart on which longitudinal platform planks are laid. If this type platform is used, the following requirements shall be met:
(i) The side stringers shall be of sound, straight grained lumber, free from knots, and of not less than 2 x 6 inch lumber, set on edge.
(ii) The stringers shall be supported on the stirrups with a clear span between stirrups of not more than 16 feet.
(iii) The stringers shall be bolted to the stirrups by U-bolts passing around the stirrups and bolted through the stringers with nuts drawn up tight on the inside face.
(iv) The ends of the stringers shall extend beyond the stirrups not less than 6 inches nor more than 12 inches at each end of the platform.
(v) The platform shall be supported on cross beams of 2 x 6 inch lumber between the side stringers securely nailed thereto and spaced not more than 4 feet on centres.
(vi) The platform shall be not more than 24 inches wide.
(vii) The platform shall be formed of boards 7 /8 inch in thickness by not less than 6 inches in width, nailed tightly together, and extending to the outside face of the stringers.
(viii) The ends of all platform boards shall rest on the top of the cross beams, shall be securely nailed, and at no intermediate points in the length of the platform shall there be any cantilever ends.

g. **Other types of scaffolds**.

1. Scaffolds of a type for which specifications are not contained in this section shall meet the general requirements of paragraphs (b), (h), and (i) of this section, shall be in accordance with recognized principles of design and shall be constructed in accordance with accepted standards covering such equipment.

h. **Scaffold or platform planking**.

1. Except as otherwise provided in paragraphs (f)(11) and (13) of this section, platform planking shall be of not less than 2 x 10 inch lumber. Platform planking shall be straight-grained and free from large or loose knots and may be either rough or dressed.

2. Platforms of staging shall be not less than two 10 inch planks in width except in such cases as the structure of the vessel or the width of the trestle ladders make it impossible to provide such a width.

3. Platform planking shall project beyond the supporting members at either end by at least 6 inches but in no case shall project more than 12 inches unless the planks are fastened to the supporting members.

i. **Backrails and toeboards**.

1. Scaffolding, staging, runways, or working platforms which are supported or suspended more than 5 feet above a solid surface, or at any distance above the water, shall be provided with a railing which has a top rail whose upper surface is from 42 to 45 inches above the upper surface of the staging, platform, or runway and a midrail located halfway between the upper rail and the staging, platform, or runway.

2. Rails shall be of 2 x 4 inch lumber, flat bar or pipe. When used with rigid supports, taut wire or fibre rope of adequate strength may be used. If the distance between supports is more than 8 feet, rails shall be equivalent in strength to 2 x 4 inch lumber. Rails shall be firmly secured. Where exposed to hot work or chemicals, fibre rope rails shall not be used.

3. Rails may be omitted where the structure of the vessel prevents their use. When rails are omitted, employees working more than 5 feet above solid

surfaces shall be protected by safety belts and life lines and employees working over water shall be protected by buoyant work vests.

4. Employees working from swinging scaffolds which are triced out of a vertical line below their supports or from scaffolds on paint floats subject to surging, shall be protected against falling toward the vessel by a railing or a safety belt and line attached to the back rail.

5. When necessary, to prevent tools and materials from falling on men below, toe boards of not less than 1 x 4 inch lumber shall be provided.

j. **Access to staging**.

1. Access from below to staging more than 5 feet above a floor, deck or the ground shall consist of well secured stairways, cleated ramps, fixed or portable ladders meeting the applicable requirements or rigid type non-collapsible trestles with parallel and level rungs.

2. Ramps and stairways shall be provided with 36-inch handrails with mid rails.

3. Ladders shall be so located or other means shall be taken so that it is not necessary for employees to step more than one foot from the ladder to any intermediate landing or platform.

4. Ladders forming integral parts of prefabricated staging are deemed to meet the requirements of these regulations.

5. Access from above to staging more than 3 feet below the point of access shall consist of a straight, portable ladder meeting the applicable requirements

4.5.2 LADDERS

a. **General requirements**.

1.The use of ladders with broken or missing rungs or steps, broken or split side rails, or other faulty or defective construction is prohibited. When ladders with such defects are discovered, they shall be immediately withdrawn from service. Inspection of metal ladders shall include checking for corrosion of interiors of open end, hollow rungs.

2.When sections of ladders are spliced, the ends shall be abutted, and not fewer than 2 cleats shall be securely nailed or bolted to each rail. The combined cross sectional area of the cleats shall be not less than the cross sectional area of the side rail. The dimensions of side rails for their total length shall be those specified in paragraph (b) or (c) below.

3. Portable ladders shall be lashed, blocked or otherwise secured to prevent their being displaced. The side rails of ladders used for access to any level shall extend not less than 36 inches above that level. When this is not practical, grab rails which will provide a secure grip for an employee moving to or from the point of access shall be installed.

4.Portable metal ladders shall be of strength equivalent to that of wood ladders.

5.Portable metal ladders shall not be used near electrical conductors nor for electric arc welding operations.

b. **Construction of portable wood cleated ladders up to 30 feet in length**.

1.Wood side rails shall be made from West Coast hemlock, Eastern spruce, Sitka spruce, or wood of equivalent strength. Material shall be seasoned, straight- grained wood, and free from shakes, checks, decay or other

defects which will impair its strength. The use of low density woods is prohibited.

2.Side rails shall be dressed on all sides and kept free of splinters.

3.All knots shall be sound and hard. The use of material containing loose knots is prohibited. Knots shall not appear on the narrow face of the rail and, when in the side face, shall be not more than 1 /2 inch in diameter or within 1 /2 inch of the edge of the rail or nearer than 3 inches to a tread or rung.

4.Pitch pockets not exceeding 1 /8 inch in width, 2 inches in length and 1 /2 inch in depth are permissible in wood side rails, provided that not more than one such pocket appears in each 4 feet of length.

5.The width between side rails at the base shall be not less than 111 /2 inches for ladders 10 feet or less in length. For longer ladders this width shall be increased at least 1 /4 inch for each additional 2 feet in length.

6.Side rails shall be at least 15 /8 x 35 /8 inches in cross section.

7.Cleats (meaning rungs rectangular in cross section with the wide dimension

parallel to the rails) shall be of the material used for side rails, straight-grained and free from knots. Cleats shall be mortised into the edges of the side rails 1 /2 inch, or filler blocks shall be used on the rails between the cleats. The cleats shall be secured to each rail with three 10d common wire nails or fastened with through bolts or other fasteners of equivalent strength. Cleats shall be uniformly spaced not more than 12 inches apart.

8.Cleats 20 inches or less in length shall be at least 25/32 x 3 inches in cross section. Cleats over 20 inches but not more than 30 inches in length shall be at least 25/32 x 33 /4 inches in cross section.

c. Construction of portable wood cleated ladders from 30 to 60 feet in length.

1.Ladders from 30 to 60 feet in length shall be in accordance with the specifications of paragraph (b) of this section with the following exceptions:

(i) Rails shall be of not less than 2 x 6 inch lumber.

(ii) Cleats shall be of not less than 1 x 4 inch lumber.

(iii) Cleats shall be nailed to each rail with five 10d common wire nails or fastened with through bolts or other fasteners of equivalent strength.

4.5.3 GUARDING OF DECK OPENINGS AND EDGES

a. The provisions of this section shall apply to ship repairing and shipbuilding operations.

b. When employees are working in the vicinity of flush manholes and other small openings of comparable size in the deck and other working surfaces, such openings shall be suitably covered or guarded to a height of not less than 30 inches, except where the use of such guards is made impracticable by the work actually in progress.

c. When employees are working around open hatches not protected by coamings to a height of 24 inches or around other large openings, the edge of the opening shall be guarded in the working area to height of 36 to 42 inches, except where the use of such guards is made impracticable by the work actually in progress.

d. When employees are exposed to unguarded edges of decks, platforms, flats, and similar flat surfaces, more than 5 feet above a solid surface, the edges shall be guarded by adequate guardrails unless the nature of the work in progress or the physical conditions prohibit the use or installation of such guardrails.

e. When employees are working near the unguarded edges of decks of vessels afloat, they shall be protected by personal flotation devices.

f. Sections of bilges from which floor plates or gratings have been removed shall be guarded by guardrails except where they would interfere with work in progress. If these open sections are in a walkway at least two 10-inch planks placed side by side, or equivalent, shall be laid across the opening to provide a safe walking surface.
g. Gratings, walkways, and catwalks, from which sections or ladders have been removed, shall be barricaded with adequate guardrails.

4.6 CIVIL / CONSTRUCTION WORKS:

There is great difference between safety during construction work as against during operation. In the operation, condition of operation are known and there is homogeneity of group of personnel doing various jobs. In the construction work, however the condition changes from day to day and sometimes even from hour to hour. Group of people who have never known each other group of people have to work without coordination.

Construction work is normally done by the contractors. Quite often, they employ sub-Contractors. Many of them practically, have no basic knowledge of hazards and safety measures in the construction work. This constitutes a great problem for the principle employer, because he has no control on day-to-day activities and condition created by these contractors.

4.6.1 HAZARDS IN CONSTRUCTION WORK

- Overhead Hazards: Every place where persons are required to work or pass is normally exposed to falling material or objects should be provided with overhead protection. When no one is required to work or pass but employees are at work in the vicinity, the exposed areas should be cordon off or otherwise guarded against inadvertent entry. Persons working at such areas must be given and asked to use safety helmets.
- Falling Hazards: For every work place more than 2 meters above ground or floor a substantial platform with hand rails should be provided. If the platform is suspended type then there should be double suspension. Every open side of floor or work place, every whole or opening through which person may fall should be closed or guarded by barriers. Where such provision are not possible, every person working at height more than 2 meters should be given and made to use safety belt.
- Slipping Hazard: Walkways scaffold platforms or other elevated working surfaces should be maintained in non-slippery condition. Mud oil grease and other substances causing slippery condition should be removed covered or sawdust or sand should be spread over it.
- Tripping Hazard: All passages, walkways and work places should be kept free from accumulation of dirt, debris and other materials, cables and hoses, which would cause tripping, and sharp projected objects, which could cut any worker, should also be removed or covered.
- Electrical Hazard: All electrical wiring installation should be done by licensed electrician only. At construction site only good quality TRS cables should be used and those should be laid at least 8 feet above the ground or floors. In case any cable is to be allowed lie on the ground the same should only be armoured cable or switchboard should be kept in the lock room inaccessible to other workers. Plug tops should be provided for all wires. All electrical equipment's should grounded all electrical portable tools must have proper earthing and they should be checked periodically.
- Drowning Hazard: Where workers are exposed to hazard of falling in to water in which one may drown, equipment for promptly rescuing person from water should be provided.
- Machinery Hazard: All dangerous parts of power driven machine used in construction work should be fully guarded or fenced. The guard and fences should be maintained in position when machines are in use. The

guard should be on all V belts chain drives gears sprockets projection on rotating shaft, Coupling and other revolving members.

- Working Areas: All floors platforms staircases and other working areas should be kept free from accumulation of dirt, debris, scattered materials and tools and sharp objects. All passages, walkways must always be free from unwanted materials.
- Corrosive substance and wet footings: Corrosive substance like lime, caustic soda, and acid should be carefully stored and handled. Protective equipment should be provided for handling of such substances. Similarly for hot substances, hot tar etc. boots and hand gloves should be provided. For working in wet condition, and concerning etc. foot ware and hand gloves should be provided.
- Hazard from flying particles and harmful rays: Appropriate goggles should be given for jobs like grinding, chipping, welding and gas cutting operations

4.6.2 SAFETY GUIDELINES FOR CIVIL / CONSTRUCTION RELATED WORKS:

- The places where workers are to perform work of any kind in construction work should be maintained and arranged in such a manner as to provide reasonable and adequate protection to the lives, limbs and health of such workers. It is also necessary to provide safety devices, safe construction equipment, materials, means, methods and procedure to ensure safety of the workers.
- For the performance of the work it is necessary to provide competent and experienced supervisors.
- It is also necessary, that every worker follow the rules, which are directly concern or affect his conduct. He should use safety devices, equipment, and tools provided for his personal protection.
- It is necessary to keep and maintained all safety devices and safety guards sound and operable. In case of damage these should be repaired or restored immediately.
- Every injury, however small it may be should be reported to the supervisor who in turn should report the sane to engineer concerned and to safety department.
- Appropriate Safety appliances like safety helmets, safety belts, goggles, hand gloves, boots as required for the job should be given and should be used by the workers.
- No machinery should be operated by the persons who are not authorized to do so.
- Any potential hazard, unsafe condition noticed, should be reported to the supervisor concerned for immediate rectification. If the unsafe condition cannot be rectified immediately or takes time to improve, the area should be barricaded.
- Good housekeeping must be maintained to the maximum possible extent. A clean area of working is always safe place to work. All roads, passage, walkway, aisles must always be clear off materials.

4.6.3 ROUTINE CIVIL / CONSTRUCTION RELATED WORKS: (EXCAVATION, WORKING ON FRAGILE ROOF AND DEMOLITION WORK)

a. EXCAVATION:

Excavation is a man-made cut, cavity, trench or depression formed by earth removal. Poorly planned excavations can result in damage to underground services, such as electrical cables, pipelines, sewers and drains. The consequence of damaged service lines is often complete

shutdown of operations resulting in major business losses. Therefore, following Precautions should be taken during Excavation Work

1. Before any excavation is started, Make sure that drawings of the area are available and all the components (underground cables, pipes and drains) are identified. For such cable or lines necessary precautions like insulated handled equipment or insulated hand gloves shall be taken.
2. Obtain excavation permits from the Authorized person before commencement of excavation work.
3. No person should be permitted to any excavated area unless proper slop, space, sheet pilling, shoring or other safe guard i.e. necessary for his protection is provided.
4. Where any person in an excavation is exposed to the hazard of falling or sliding material from any bank or sight more than 5 feet above his footing, adequate slope steps sheet pilling and bracing must be provided against the bank or side to eliminate such hazard.
5. Excavation must be checked after every rain or other hazards, which may increase the occurrence of slides and cave-ins.
6. Temporary sheet piling installed to permit construction of a wall or foundation or structure should be removed until the same has developed its full strength.
7. No over hangs be permitted in the excavation however, where it is not possible to avoid over hangs shoring adequate to support over handling materials duly provided.
8. Excavated material and other super impose lose should be placed at least 2 feet back from the edge of excavation and trenches should be piled or retain that no part thereof can fall into the excavation.
9. Bank should be stripped of loose rocks or other materials, which may slide, roll or fall upon the persons below.
10. Open size of the excavation where person may fall from 2 meters' height or more should be guarded by adequate barricades.

b. WORKING ON FRAGILE ROOF:

Fragile Roof is defined as "As a roof that does not have safety support and cannot withstand the weight of a person and any load he/she is carrying". Fragile roofs are dangerous as they can break at any time without notice when a person steps on it and accidents with fragile roofs are generally (99%) fatal. Therefore, following safety precautions shall be taken for working on fragile roofs.

a) Do not step on any sheet without obtaining proper safety training.
b) Before starting work (i.e. before climbing on the access ladder) ensure that the supervisor is available at site and he has got the work permit issued by the authorised person.
c) Working personnel should be clearly informed and instructed about hazards involved and safe working procedure to mitigate and prevent hazards.
d) Personnel working on roof should use necessary PPE's such as safety belt, hand gloves, shoes and helmets.
e) Safety belts shall be properly anchored with the anchorage points on the roof or to the lifeline available on roof or fall protection device.
f) Minimum number of employees should work on roof at a time.
g) Use suitable and sufficient access ladders, cat ladders, crawling boards etc. and fix them properly on the roof.
h) Do not use damaged/unsuitable ladders. Do not use makeshift arrangement.
i) Never step directly on any part of the roof. Always walk or step only on the ladders.
j) It is not safe anytime to walk on purlins. Do avoid it.

k) Do not run on roof.
l) Do not cut any sheet on the roof.
m) It is necessary to walk on ladders (and not on roof directly) while transporting the sheets on roof.
n) While working on the roof, ensure that no loose items are dropped down.
o) Place safety net blow the roof to protect fall form the roof.
p) Always use suitable and strong ropes for taking sheets from ground to the roof.
q) Never leave any loose items (tools, cut sheets, broken sheets) on the roof after the work is over.
r) Never use any electrical equipment without proper earthing.
s) Ensure sufficient illumination while you are working on the roof.

c. DEMOLITION WORK:

Before any demolition work is commenced and also during the progress of the work following precautions shall be taken to ensure the safety:

a) All roads and open area adjacent to the work site shall either be closed or suitably protected.
b) Appropriate warning signs shall be displayed for cautioning persons approaching the demolition area. The area shall be cordoned off properly.
c) Protection of adjacent building, underground service lines should be ensured. Underpinning operations shall not be permitted unless adequate measures against collapse of structure are ensured.
d) Before demolition operations begin, the Contractor shall ensure that the power on all electric service lines is shut off and the lines are cut or disconnected at or outside the demolition site. If it is necessary to maintain electric power during demolition operation, the required service lines shall be adequately protected against damage.
e) Persons handling heavy materials /equipment's shall wear safety shoes.
f) No floor, roof or other part of the building shall be overloaded with debris or materials that may render it unsafe.
g) Entries to the demolition area shall be restricted to authorized persons only

4.7 SAFE OPERATING PROCEDURES (SOP):

4.7.1 SOP FOR DEMOLITION

Safety instructions:

1. Supervisor should be competent and experienced in demolition work.
2. All workers should be sufficiently trained and competent to complete the task and duties safely.
3. Use correct PPE
4. Enclose the site properly and erect protective screen.
5. Access to the site should be barred for public.
5. Erect danger notice.
6. If required provide sufficient propping to prevent premature structural collapse or danger to adjacent property.
7. All ladders and other equipment's should be in good order.
8. Is there danger of becoming any floor overloaded?
9. If a crane is in use: a) all non-essential personnel (except the crane operator and rigger) clear of the danger area when the crane is being used. b) All crane windows properly protected and if requires fix FOPS(falling object protective structure) canopy.
10. Make arrangement of watering to keep down dust.

11. Arrange sufficient fire extinguishers or other fire- fighting equipment's ready at site and they should be readily accessible.
12. Follow good housekeeping practices for example are access pathways clear of unnecessary debris and equipment's.
13. Electrical equipment's must have current test certification and tagging.
14. Check all equipment's and plants daily to ensure proper running conditions and safety for use.
15. If necessary make availability of rescue equipment's and first aid kit.
16. Follow work permit system daily.

4.7.2 SAFE OPERATING PROCEDURE FOR EXACAVATION WORK

Hazards	Preventive measures
Excavation	
Survey of site - Injury due to bite of creatures	Remove Rank vegetation and clear the site. Wear proper PPE kit
Damage to underground Services .	Clearances from different department must be obtained for underground utilities. Common buried services found in a construction site are: i) Water mains (Water Supply section) ii) Electrical cables (Informing TATA, BEST, MbPA SMRS/NMRS for high voltage cables. Informing EESD /EEND for low voltage cables). iii)Drainages and Sewers (General Works) iv)Fuel pipes (BPCL/HPCL/IOCL/AEGIES/OPL section MbPA). v) Communication and Optic Fibre cables (P & R dept.) Tools and equipment used for the purpose of digging should be either shockproof or adequately insulated. • Work permit system should be strictly followed because it ensures assessment of safe conditions at the work site.
Accidents due to traffic jam/ conjunction Narrowing of roads Block of pedestrian access.	Clearance from MbPA road section and from Traffic authority. Diversion of traffic with proper sign boards Deploy additional manpower to assist Traffic Authority.
Accident due to old machinery	Fitness certificate of equipment's used at site to be verified. Certificates of operators operating equipment's to be verified.
Injury due to fall in trenches/ pits	Comply with hazard controls listed in the permit. i) Area around the excavated pit must be barricaded with sufficient height by appropriate means like sheets etc. in case of Project site Deploy a competent supervisor at work site during the work execution Workers working in excavation pit will be briefed on the potential hazards involved, escape routes and the emergency and rescue procedures when the need arises. ii) Adequate first aid and effective rescue equipment will be provided in close proximity to an excavation.

Planning	Proper communication with sketch/drawings showing position of underground utilities. Proper site to be allocated for dumping of debris. Proper planning of traffic diversion. Weakening or damages to adjacent structures if any.
Actual Excavation operation	Dewatering by means of dewatering pump of adequate capacity. Water to be discharged into nearest water gully/Manhole. Standby pumping arrangement for dewatering water

4.7.3 SAFE OPERATING PROCEDURE (SOP) FOR WORKING OVER OR NEAR WATER BODY

Working over or near water possesses drowning hazard. Therefore, to save precious life of person from drowning, Lifesaving Appliances (LSA) and Personal Floating Devices (PFD) are essential at wharves or at locations where work is to be performed over water.

Statutory requirement:

Regulation 15 of the Dock Workers (Safety, Health & Welfare) Regulations, 1990 has this provisions stated as below:

Reg15. Lifesaving appliances. - Provision for the rescue from drowning of dock workers shall be made and maintained, and shall include;
(a) a supply of life-saving appliances, kept in readiness on the wharf or quay, which shall be reasonably adequate having regard to all the circumstances; and
(b) means at or near the surface of the water at reasonable intervals for enabling a person in water to support himself or escape from the water which shall be reasonably adequate having regard to all the circumstances.

Further ILO's code of practice for Safety & Health at Port, has guidelines on LSA, which states adequate and suitable life-saving equipment should be provided and maintained for the rescue of anyone in danger of drowning.

Proactive approach: Following are the guidelines when work is to be performed over or near water.

a) All employees engage in the work over or near water shall be briefed about danger of drowning and how to rescue anyone who fell in the water.
b) All employees must wear an appropriate Personal Floating Device (PFD) like life jacket, safety belt, floatation suit, etc. and the supervisor shall ensure that all the employees are wearing PFD in proper manner.
c) Employees shall check their PFD are in working order before commencing the work at water body.
d) Keep adequate numbers of Lifesaving appliances (LSA) standby at the workplace for emergency assistance and rescue.
e) Rescue equipment should consist of a lifebuoy attached with throwing lines, life jackets, monkey ladder. The equipment should be prominently mounted at a location painted in a conspicuous color.
f) The location should be kept free of obstruction so as to be easily visible at all times.
g) All employees should know what to do in the event of an emergency and how to rescue the drowning person.

Rescue Procedure to save a drowning person: If anyone fell into the water;

a) At first instance do not jump into the water to help the victim.
b) Shout for help along the wharf so that people around come to know that someone fell in to the water and needs help.
c) Look for a lifebuoy or any other device and throw it towards the drowning person. Hold its throwing line with you because in case the lifebuoy falls away from the victim then you can pull it back and try again.
d) Once the drowning person holds the lifebuoy then assure him that necessary help is arriving till then he has to hold the device firmly.
e) Keep a constant watch on the person and keep him assured.
f) Take the help of bystanders to make calls for emergency assistance, to arrange for launch or craft for rescue operation or any other help in the rescue operation.
g) Call Fire Brigade and Ambulance on 022 6656 5656/6261 and also inform the VTMS control room on 022 6656 5035 / 5036 for seeking help of launch or craft to rescue the person in water.
h) If the victim is not able to hold a lifebuoy or floating device for floating himself then someone has to go into the water for rescue.
i) Even if you are a strong swimmer always take the assistance of a life jacket and swim towards back side of the drowning person and hold him at his waist and swim towards the landing steps.
j) If a monkey ladder is available, then use it to bring him up and if possible use a rope or mobile crane.

Care for the victim's aftermath: once the drowning person is taken out of the water.

a) Keep the rescued person on a dry surface in a comfortable position.
b) Watch for any injury marks.
c) If he is having difficulty in breathing, be sure to use ABC to check the person's **a**irway, **b**reathing, and **c**irculation.
d) First, check the airway for any material choked his mouth then clear it.
e) Check breathing by sensing exhalation of air from his nostril or heaving of chest.
f) Check his pulse at the wrist or neck for blood circulation.
g) Then start Cardio Pulmonary Resuscitation (CPR).
h) For CPR, tilt his head by placing your palm under his neck. Perform 30 chest compressions and tilt his head by putting his chin upward. Pinch his nostrils and give two rescue breaths.
i) Complete 30 compressions, and make sure the chest is going all the way down and coming back up. There is a high chance of breaking his ribs, so be careful.
j) If he starts breathing, then stop CPR but keep him under observation.
k) Shift the victim to hospital for medical treatment.

4.7.4 SOP FOR FUMIGATION IN THE HOLD

Safety instructions:

1. Fumigation should be carried out by competent specialist in that area.
2. During fumigation no dock-worker shall be allowed to enter in the hold.

3. After fumigation the hold shall be effectively ventilated and the atmosphere confirmed to be safe. It is recommended to check the Oxygen level, which should be normal.
4. Before allowing the dock-workers entering in the hold, ensure that no fumigant gases or fumigant residue are active and lack of Oxygen.
5. Immediately attend any complaint raised by dock-workers regarding irritation or obnoxious smell in the hold.
6. The dock-workers shall be instructed to not to take food or any chewable items in the hold.
7. Proper illumination should be maintained in the hold at night time to enable the dock-workers notice snake.

4.7.5 SAFE OPERATING PROCEDURE FOR SEWER CLEANING WORK

Hazards	**Preventive measures**
1. Accident at Road Level	
1. Accidents due to speeding vehicle, the workers are work at road level. They are, therefore, exposed to the accident due to speeding vehicle**.**	• Before starting the work barricade the road /site where work is required to be carried in such position that the driver can get an indication well in advance that some kind of work is going on ahead, which will cause him to drive watchfully. • During night time put red lamp or lantern or flasher on the road for indicating danger to the driver which will cause him to drive watchfully. • Always relight the blown off red lantern. • Always put 'Danger' flag over the open manhole on tripod stand, which should be painted with radium paint.
2. Keeping tools, equipment on site/ground can cause worker to get injured by hitting such tools, equipment.	Always keep tools and equipment in toolbox so that it will not fall in the manhole accidently.
3. Pedestrians can fall into the manhole if the same is kept open	Immediately put manhole guard tripod stand with 'Danger' flag on the manhole as soon as it is opened.
4. The vehicles may skid & accidents can occur, if sewage is overflowing on road.	Stop the overflow from the manhole by removing blockage / silt. The silt taken out from the manhole, should be put at such a place that it should not flow on the road.
5. Some peoples are very curious to see what type of work is carried out in manhole, they lean to watch the same & may fall into the manhole.	Barricade all the manholes where work is going on. Do not allow any pedestrian to come closer at the work site.
2. Accident in Sewer Line	
1. Suffocation due to Oxygen (O2) deficiency: Decreased oxygen level can be a result of variety of conditions	• Open at least two manholes on upstream and downstream sides from the manhole where work is to be carried out at least for one hour or till the favourable conditions are reached.

including the replacement of oxygen with another gas, such as Methane or Hydrogen Sulphide, consumption of oxygen by the decay of organic material contained in the waste water etc. Thus due to lower concentration of Oxygen in sewer a person experiences nausea, vomiting, inability to move & unconsciousness. Emotional instability and impaired judgment may also occur. At O2 level below 16.5%, they may immediately become too disoriented to get themselves out and eventually succumb to unconsciousness. If the O2 depletion is great enough, person become unconscious after one breath. Without rescue they can die within minutes.	• Take gas test for oxygen to confirm that it is in permissible limit using gas monitor or Davis lamp. After the gas test, if atmosphere in the manhole found oxygen deficient, use mechanical ventilation i.e. mechanical air blowers to blow off the other gases present in the manhole. • If the atmosphere in the manhole remains O2 deficient, it is then become necessary that the sewer worker entering into the manhole must wear all the necessary PPE such as self-contained breathing apparatus, gas mask, etc.
2. Presence of toxic gases: Due to decay of organic matter and chemical compositions in the silt various types of gases are generated. Some of them are toxic in nature e.g. Hydrogen Sulphide (H2S) gas. If any worker enters in such manholes without proper safety equipment, he may get affected by the poisonous gases present in the manhole and may succumb. Sometimes the gases are entrapped in the silt. These gases may come out while carrying out the work of de-silting and due to which sewer worker may get affected.	• Take gas test for hydrogen sulphide to confirm that it is in permissible limit using gas monitor. • Keep vent shafts in good working condition to allow toxic gases to escape by natural ventilation.
3. Presence of flammable gases: Various types of flammable gases e.g. Methane (CH4), Carbon Monoxide (CO) are generated in the silt present in the sewage network. In such conditions if any spark is generated by any means i.e. smoking etc. fire may take place in the manhole.	• Do not smoke near open manhole. • Take gas test using gas monitors for the presence of flammable gases. If these gases are present, remove them using mechanical ventilation. • Keep vent shafts in good working condition to allow flammable gases to escape by natural ventilation.
4. When choke is removed manually or it may clear automatically, the sewage	If sewer line is blocked/choked, make maximum efforts to remove the same from road level by means of various

flows along with foul gas. This gas can affect adversely the worker working at such place.	machines such as power rodding machine, jetting machine etc. Do not allow anybody to enter into such manholes
5. <u>Physical Injury:</u> The sewer workers are likely to receive physical injuries due to - i) Fall of any material on the worker working in the manhole from road level.	• Do not keep any tool, equipment near the open manhole. • Always wear a helmet while working in the manhole.
ii) Throwing tools to the worker working in the manhole from the road level .	Any tool, equipment if required by the sewer worker working in the manhole, then tie the items to a rope or keep the items in the silt drum and tie the silt drum to the rope. Lower the rope slowly till it reaches to the sewer worker. • Use intruder for lowering tools, equipment in the manhole, if they are heavy.
iii) Microbial Hazards: Microbial Hazards are due to the presence of microbes in sewage containing human and animal waste. If any sewer worker is exposed to such microbes by flashing of sewage on his skin then he can come into contact with the mucous membranes. The microbes present in sewage are fungi, bacteria, viruses, etc. All these can cause acute illness as well as chronic diseases. Sewer workers can be affected by acute symptom including respiratory distress, abdominal pains, diarrhoea and chronic diseases such as asthma and allergic alveoli's. In addition to inhalation, microbes can be transmitted through ingestion through contact with skin that is not intact.	• Do not allow to expose any part of body to come in contact with sewage by using PPE like wader suits, thigh wader suits, gum boots, hand gloves, face shields, etc. • After completion of work, store the PPE duly washed and cleaned. • Wash hands before eating, going to bathrooms etc. • Food, drink, anything that can be put into mouth should be kept away from areas of possible microbial contamination.
iv) Drowning: There is always a level difference if the sewer line gets locked/ choked. Choke is removed by using power rodding machine, jetting machine, manually or it may clear automatically due to the high head of sewage. As soon as the blockage gets removed, the sewage flows forcefully in the sewer line. If	• If sewer line is blocked/choked, make maximum efforts to remove the same from road level by means of various machines such as power rodding machine, jetting machine etc. Do not allow anybody to enter into such manholes. • If the blockage is not removed even after making maximum efforts from the road level, it has to be removed manually by entering into the manhole.

any worker is working at such places, he may get drowned with sewage.	In such cases, the harness belt of sewer worker going to remove the blockage, should be tied with the rope. Two workers at road level holding the rope should be deputed to constantly watch the sewer worker removing the choke and get him out of the manhole very quickly, if any unwanted condition arises . • Other end of the sewer line should be plugged with silt trap to prevent drowning of sewer worker and allows to pass sewage only. • The sewer worker should be provided with all necessary PPE such as self-contained breathing apparatus, diving suit etc.
v) In case of big sewers sudden rise in sewage level due to power failure in pumping station causes flooding in the sewer line, which is very dangerous for the worker working in the manhole at that time.	• As soon as pumps get stopped due to power failure or any other reason, it should be immediately communicated and informed to the Site In-charge. • If the sewer worker working in the manhole comes to know that the sewage level is increasing, he must stop the work and immediately come out of the manhole. • The sewer worker working in the manhole should wear harness belt, which should be tied with rope. The other end of the rope should be held by two workers at road level. The two workers should continuously watch worker working in the manhole and he should be immediately taken out, if sewage level found increasing.
vi) Electric Shock: While carrying out the digging work for locating the missing manhole or while taking trench for any other reason, the worker may hit the underground live electrical cable unknowingly and he may be electrocuted.	•Tools and equipment used for the purpose of digging should be either shockproof or adequately insulated. • Work permit system should be strictly followed because it ensures assessment of safe conditions at the work site.
vii) Harmful Industrial Effluents: Harmful industrial or hospital waste etc. are connected to sewer lines, due to which sewage becomes acidic or alkaline in nature. If the pH value of sewage is less than 3 or greater than 9, the skin gets infected and irritation to eye may cause to the sewer worker, if comes into direct contact with sewage worker.	• While working inside the sewer, the direct contact of sewage with body should be avoided by using PPE such as thigh wader, wader suit, gum boots, face shields, hand gloves, etc. • To avoid irritation to eyes safety goggles should be used. • Industrial waste or hospital waste should not be disposed off directly to the sewer line, but it should be disposed off only after carrying out suitable treatment over the same.

3. Others	
1. Use of Defective, Improper Tools, Wrong use of Tools: The tools which are used in sewer cleaning work must be inspected prior to use as they may cause injury. If the tools are not in safe condition e.g. spread jaws of spanner, broken/splinted hammer handle or pick axe handle, flat ended pick axe, use of pipe wrench in place of proper size spanner, etc.	• All the tools, equipment should be inspected before use especially leaving for the job. • If any tools, equipment found damaged or broken, replace the same immediately. • Do not use any damaged and defective tools. • Use appropriate tools designed for the operation/work.
2. Not concentrating on job: The workers on the road surface, if not keep constant watch on the sewer worker working in manhole, they may not be able to help or give rescue to the workers working in the manhole, which can result into serious accident.	• The sewer workers working at road level must constantly watch and communicate with the sewer worker working in the manhole. • If any unwanted situation arises or sewer worker working in the manhole stops communicating, he must be immediately taken out from the manhole.
3. Teasing, abusing at the time of working: This may lead quarrels in fighting or throwing stones, etc. for fun may cause injury to fellow worker.	• Do not tease or abuse while working. • Always concentrate on work.
4. Non-disposing silt at proper place: The silt should be disposed off in a such way that sewage should not flow on the road, which may otherwise cause skidding of vehicles in general and two wheelers in particular.	• Always dispose off the silt at such a place that sewage should not flow on the road. • Silt removed from the manhole and disposed off nearby should be taken to the dumping place/ground immediately.
5. Using short cut methods: Many times short cut is used to save time, money, etc. taking unnecessary risk such as throwing tools directly in the sewer may cause an injury to the sewer worker working in the manhole.	Instead of throwing tools, always work with safe method e.g. tie the required tools and equipment to the rope or keep the same in the silt drum or basket and tie with the rope, then lower the silt drum slowly into the manhole.
6. Not giving proper instructions before start of work: The instructions required to carry out a particular work must be given in advance so that all precautions can be taken in advance to avoid any accident. This will also saves time while carrying out that work.	• Site In-charge should give the information to sewer workers about the nature of work to be carried out before starting the work. He should also give the information about known hazards associated with the work site. • The instructions should proper and clear to avoid any confusion between them.

7. General Unsafe Actions of sewer workers while working in the manhole i) Not taking Gas Test before entering into the manhole. If worker enters in the manhole without proper gas test, there is a possibility that he may suffocate and may die due to higher concentration of gases like CO, CO2, CH4 & H2S or oxygen deficient atmosphere.	• Before entering into the manhole, gas test must be carried out using gas monitor to ensure the atmosphere in the manhole is safe for working. • If the result of gas test is unsatisfactory, use mechanical ventilation, such as air blowers for blown off the unwanted gases, till the gas monitor shows safe working atmosphere. • Do not enter into manhole without taking gas test. • If it is essential to enter into a manhole having unfavourable conditions, all necessary PPE should be used.
ii) Non-use of PPE: The Personal Protective Equipment are provided to protect the workers from possible hazards. Non-use of PPE accounts to unsafe action by workers.	Always use proper and necessary PPE such as safety helmets, hand gloves, harness belt, wader suit, gum boots, safety shoes, gas mask, safety goggles, self-contained breathing apparatus, etc.
iii) Using rope, rope ladder, silt drum without inspection: If rope, rope ladder, silt drum are not in proper condition, such as broken wires of rope above prescribed limit, bird-caged rope, extensively corroded bottom of silt drum, weak I-hooks of silt drum may break while in use causing injury.	Always inspect rope, rope ladder, silt drum before leaving the Chowky e.g. inspect the rope for breakage of cages, inspect silt drum for corroded bottom, weak hooks etc.
iv) Lifting heavy material from manhole while sewer worker is present in the manhole: Heavy material if lifted while sewer worker is present in the manhole, it may fall if it is improperly tied or due to breakage of rope.	While removing big stones, heavy material from the manhole, it should be properly tied to a rope and the sewer worker in the manhole shall come out first and then the material shall be lifted out.
v) Hurrying the work: Hurry may lead to worry. Each work has to be done within allotted time. Carrying out assigned job at higher speed with the intention to save time may lead to an accident.	Always work with safe method and procedure.
vi) No knowledge/Improper knowledge of signalling system: If depth of a manhole is approximately more than 20', oral communication generally fails.	• The workers working in the manhole and workers constantly watching him at the road level should adopt unique communicating signals. • Signals should be given regularly to ensure safety of that worker working in the manhole.

vii) Not opening of two manholes on either side of manhole where work is to be carried out: Due to decomposition of organic matter and chemical reaction, toxic gases such as H2S, CO, flammable gases such as CH4, CO etc. are generated in the silt. Before starting the work if these gases are not removed, the sewer worker entering into the manhole may suffocate or fire can take place if any source of ignition is introduced.	Open at least two manholes for at least one hour on either side of manhole where work is required to be carried out, for escaping the hazardous gases present in the manhole by natural ventilation.
viii) Conditions to be reported to higher authorities: Non-reporting of unsafe conditions such as dilapidated manholes, broken steps etc. may lead to subsequent accident to sewer worker.	Unsafe condition of sewer/manhole should be reported immediately to the higher authority.
ix) Not mixing scum with sewage before entering manhole: Gases are often trapped under scum and the Gas Monitor, therefore, may give false indication of a safe atmosphere. If sewer worker enters into such manholes and disturbs the scum, the trapped gases may come out, which may be harmful.	•Stir the scum from road level and allow to escape the entrapped gases before entering into manhole. • Take gas test by using gas monitor after stirring of scum till it shows favorable conditions.
x) Operating machinery without proper guard onto moving parts: In sewer cleaning operation, various types of machines are used. Moving parts of these machines, if not guarded, may cause injury, partial or permanent disability.	All the moving parts of machines should be properly guarded so that no body parts of operating workers are exposed to danger
xi) Improper handling of machinery: The machines such as power rodding machines, compressors, power bucket machines, blowers, etc. need shifting from place to place as per demand. The handling of these machines should be done carefully otherwise they may fall & cause injury in addition to damage to them.	• All the machines while transportation should be handled carefully and safely. • Always wear necessary personal protective equipment such as safety shoes and hand gloves etc. while transporting the machines and equipment.
xii) Improper assembly of machine parts: Various types	• Assemble all machine parts by using proper tools as per the prescribed

of machines parts are required to be assembled such as flexible rods of power rodding machine, bucket of power bucket machine etc. If the assembly of these parts is not done properly, it may cause harm to the operating workers due to miss-operations having the potential such as flying off of such parts.	procedure. • Check the assembled parts periodically for their locational operation.
xiii) Resuming duty under influence of liquor / alcohol: If any worker starts his duty with consumption of alcohol, it will not only damage his body but also cause financial loss to him. Under influence of drug, human mind cannot remain conscious all the time, which can lead to accident.	Do not allow the sewer worker to attend his duty, if found under influence of liquor/alcohol.

4.7.6 S.O.P. FOR WORKING ON ROOF

Hazards	**Preventive measures**
1) Access to Roof	
a) Placing ladder for reaching to roof**.** i) Hit by ladder while shifting it towards working point. ii) Fall or slip of ladder at working point. b) Fall of person while climbing on roof from ladder. c) Fall of person while climbing on ladder.	1) No person shall stand in the path of movement of Ladder. 2) Ladder should be placed at 75, degree angle to the ground on firm surface and firmly hold by two persons. 3) Ladder should be in sound condition. 4) Worker Should follow three point contact technique while climbing on ladder. 5) Ladder should reach three feet above the roof. 6) Ladder should be secure to the roof.
2. Working on roof.	

a) Fall of Person. b) Fall of tools. c) Fall of material.	1) Use fall arrester system i.e. use Safety belt and its life line to be hooked to a firm structure properly. 2) Use all PPEs 3) Fix safety net beneath the working point on roof 4)Keep tools in tool kit well secured to life line. 5) Keep the area below clear & barricaded the working point

4.8 CHECKLISTS:

4.8.1 CHECKLIST FOR WORK PERMIT TO WORK AT HEIGHT

Sr. No. - Date:
Work Order No. -
Location of Work -
Valid from the date & time _____ to _____ date & time.
Name of the Agency, who will be carrying this Job -
Name of the Site Supervisor –

Sr. No	Measure to be taken	Yes	No	Remarks
1	If no permanent safe access to work area exist, then proper and safe temporary access is provided.			
2	Every open side or opening into or through which person likely to fall have been covered or guarded by an effective barrier to prevent falls. If covers are being used for opening, then those are securely fixed to prevent its accidental displacement.			
3	Every open side of staircase is provided with a sound handrail and lower rail or other effective means and maintained.			
4	Secure handhold or foothold is provided for any person, who has to work at a place from which he would liable to fall: i) a distance of more than 2 meters; or ii) which is likely to cause drowning or asphyxiation.			
5	If Measure at No. 4 is not practicable, other suitable means like safety harness or safety belt or fall arrest system is provided.			
6	If a Safety harness or Safety belt is provided, then i) it is in sufficient quantity and in sound condition. ii) it has a provision of suitable and secured anchorage iii) the anchorage is not being lower than the level of working position of the person wearing the harness or belt or there is sufficient height clearance for fall arrest. iv) harness/ belt, life line & their all attachment is of adequate strength. v) ensure that it is being always used by the person in the performance of his work. vi) in case of life line, it is attached to sufficient anchorage point. vii) it is provided with padding, wrapping or similar means to protect it from contact with sharp edges or sharp objects. viii) carried inspection of belt/harness/life line before use by an employee & those which shows any indication of wear, damage & deterioration, which affects its strength are removed from the site? ix) Person wearing safety belt/harness have been instructed in proper method of wearing and using it, as well as attaching it to the life line.			
7	If Safety Net is provided, then i) it is in sound condition ii) it is of sufficient size & strength to catch any person for whose protection, it is used. iii) it is located as to cover the area of possible fall. iv) it is attached to sufficient anchorages or supports outside & beyond the possible area of possible fall. v) it is supported at a height sufficient to prevent sagging to any surface or object beneath, and give impact to fall for the person.			
8	If ladder or step ladder is provided, then i) it is of good construction, sound material and of adequate strength. ii) it's footing is on firm, non-slip & even level surface. iii) it is as far as possible securely fixed so that it cannot move either from its top nor its bottom point of rest. iv) If (iii) above is not practicable then a person has been stationed at the base of ladder all the time to prevent slipping or falling. v) it has sufficient rise & adequate handhold to a height at least one meter above the place of landing of a person working thereat. vi) its firmly secured to prevent undue swaying or undue sagging. vii) no missing or defective rung in the ladder.			
9	If work platform is provided, then i) it is of adequate dimension & sufficiently wide to walk without any risk of tumbling or losing balance.			

	ii) if a person liable to fall therefrom for a distance of more than 3 meters, then as far as practicable be provided with sufficient & suitable guardrails or edge protection to a height of one meter above the landing place. iii) If (ii) above is not possible, then suitable means like safety harness or safety belt or fall arrest system is provided. iv) it is capable to support load of workers, equipment & material.			
10	Piling, shoring and bracing of adequate strength is used in a trench, excavation to protect any person against falling or sliding material			
11	Measures have been taken to prevent falling of objects in the area below the working zone. If not possible, then this is barricaded to prevent entry of person & to protect them from any fall of object			
12	Weather condition such as rain, wind speed, sun glare, etc. and surface condition at working site such as slippery, sharp objects is acceptable			
13	Before commencement of work, the work area has been surveyed for assessment of hazard like crosshead electricity contact, inhalation of fumes or steam, unsuitable surface condition, moving machine parts, etc.			
14	Means of contact in case of emergency and rescue plan, in case of fall arrester, is readily available.			
15	All reasonably practicable steps have been taken to eliminate any foreseeable risk involved in working.			
16	Persons exposed to risks are informed about its nature and safe work procedure and it is implemented to eliminate & control these risks.			
17	Ensure that adequate supervision is provided to ensure safe work practices for working at heights, are followed			
18	Ensure that method statement, safe work procedure and risk assessment is available for any framework erection, dismantling or shifting is carried out.			
19	Ensure that persons involved in this work is adequately trained.			
20	Tool Box Talk is given to the workers to explain them about hazards associated in the work and its preventive measures.			

We have checked all the items in the checklist and are satisfied that the entries made are correct to the best of my knowledge. Further, I will carry out necessary repetitive checks, if required.

Concerned In-Charge of the work/Contractor

All the relevant aspects of the Work Permit System are checked and complied.

Section-in Charge of MbPA

8.2 CHECKLIST FOR DEMOLITION WORK

Sr. No. - Date:
Tender No.-
Work Order No. -
Location of Work -
Valid from the date & time _____ to _____ date & time.
Name of the contractor, who will be carrying this Job -
Name of the Junior Engineer –
Name of contractor Engineer –

Sr. No	Measure to be taken	Yes	No	Remarks
1	Are utilities such as power, water, sewage, etc…decommissioned? If not is it safe to proceed? Are there enough precautionary measures in place?			
2	Has a competent supervisor, experienced in demolition work, been appointed?			
3	Are all onsite employees sufficiently trained and competent to complete their tasks and duties safely?			
4	Tool Box Talk is given to the workers to explain them about hazards associated in the work and its preventive measures.			
5	Are all site personnel wearing the correct PPE kit.			
6	Is the site properly enclosed and are protective screens erected?			
7	Have danger notices been erected? Is all access to the site by the public barred?			
8	If required, is there sufficient propping to prevent premature structural collapse or damage to adjacent property?			
9	Are all ladders and other equipment is in good order?			
10	Are any floors in danger of being overloaded?			
11	If a crane is in use : (a) Are all non-essential personnel (except the crane operator and rigger) clear of the danger area when the crane is being used? (b) Are all crane windows properly protected, and does the crane require a FOPS (falling object protective structure) canopy fitted.			
12	Are operatives/ dock workers / other agencies / pedestrians / public adequately protected?			
13	Is sufficient watering taking place to keep down dust?			
14	Are there sufficient fire extinguishers or other fire-fighting equipment onsite, and are they readily accessible?			
15	Are good housekeeping practices being maintained, for example: are access pathways clear of unnecessary debris and materials/ equipment?			
16	Does all electrical equipment have current test certification and tagging to verify safety for use?			
17	Do plant and equipment being used onsite have daily checks conducted by the operator(s) to ensure proper running conditions and safety for use			
18	Do all onsite elevated work platforms and cranes have current certification to verify safety for use?			
19	Are rescue equipment/ first aid kit available if necessary?			
20	Is the area cleared of any hazardous chemicals?			
21	Are utilities such as power, water, sewage, etc…decommissioned? If not is it safe to proceed? Are there enough precautionary measures in place?			

We have checked all the items in the checklist and are satisfied that the entries made are correct to the best of my knowledge. Further, I will carry out necessary repetitive checks, if required.

Concerned In-Charge of the work/Contractor

All the relevant aspects of the Work Permit System are checked and complied.

Section-in Charge of MbPA

4.8.3 CHECKLIST FOR EXACAVATION

Sr. No. - Date:
Work Order No. -
Location of Work -
Valid from the date & time _____ to _____ date & time.
Name of the Agency, who will be carrying this Job -
Name of the Site Supervisor –

Sr. No	Measure to be taken	Yes	No	Remarks
1	Identify existing under & above utility services			
2	Proper Access / Exit available for work area.			
3	Daily housekeeping of the work area completed on priority basis.			
4	Excavated material kept away from excavated edge or removed from location.			
5	Ensure that flag man available at vehicles movement area.			
6	Shoring/ sloping/ benching provided to inside of soft/collapsible excavation area.			
7	Soft & Hard barricade provided around excavation area.			
8	Safety Sign board display at site / Excavation area.			
9	Warning (Barricading) tape / flashlight during night provided around excavation.			
10	A competent Engineer / Supervisor in place.			
11	Ensure to use certified machinery.			
12	Ensure all round vision for machine operators.			
13	Ensure operator is competent and have valid driving license.			
14	If ladder are place secure it.			
15	PPE's provides are safety Helmet, Safety goggles, safety shoes, hand gloves, dust mask, reflector jacket.			
16	If ladder are place secure it.			
17	Tool Box Talk is given to the workers to explain them about hazards associated in the work and its preventive measures.			

Period of Validity - Permit will be valid for the day for which it is made. If job/work prolongs then it should be renewed or fresh permit may be issued.

We have checked all the items in the checklist and are satisfied that the entries made are correct to the best of my knowledge. Further, I will carry out necessary repetitive checks, if required.

Concerned In-Charge of the work/Contractor

All the relevant aspects of the Work Permit System are checked and complied.

Section-in Charge of MbPA

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CHAPTER 5: REPAIR AND MAINTENANCE WORKS

At Mumbai Port Operational and Maintenance, related works / activities are continuously carried out on day-to-day basis. Various departments of MbPA executes these works /activities by way of outsourcing through private contractors or sometimes MbPA own staff carry out the work of repair and maintenance work. The repair and maintenance work need to carry out very carefully as various risks are associated with that and any negligence to safety may cause accidents.

It was observed that one of the foremost causes of accidents and fires is the miss-operation of equipment or unplanned proper safety precautions. This usually occurs because of violation of the Safe operating procedures of operation, or in an attempt to take short cuts. The need for alertness to possible dangers is an obvious one.

Following are the risks associated with the repair and maintenance work / activities. Therefore, flowing **General Safety precautions** shall be taken before commencement of any repair and maintenance work/ activity.

5.1 GENERAL SAFETY PRECAUTIONS FOR REPAIRS AND MAINTENANCE WORKS:

- Remember that Safety Operations take priority over all other work.
- It is of particular importance that appropriate safety precautions /measures should be taken before undertaking of any major /minor maintenance work. Don not sacrifice Safety precautions to save time.
- Ensure that any system, machinery or equipment is operated strictly as per the safe operating procedure.
- To undertake maintenance, work the guards and covers on machinery, fencing and railing around machinery, walkways, stairways, platforms, sumps, pits, etc. shall not be removed without displaying cautionary board to warn the people to that effect.
- Safety apparatus and Firefighting apparatus is to be kept at ear marked location and ensured that they are easily accessible and in hygienic / usable condition at all the times.
- Any Employee should not be permitted to work if he is sick, under the influence of intoxicants or otherwise incapable of performing their duties in safe way

During the currency of work.

- Safety equipment /PPEs prescribed for particular job such as goggles or protection of eyes, hand gloves for protection of hands, PVC aprons/ PVC suits to protect against corrosive liquid splash, respirators/masks to protect against poisonous gases, etc. must be worn.
- The proper tools must be used for the job. Tools must be maintained in good condition. This applies not only to hand-tools but also to power operated hand-tools and lifting tackle, etc.
- It is the duty of the Engineer-in-charge / Supervisor of the work to ensure that equipment is adequate to the task to be performed and that no avoidable risk is taken
- When work is being carried out at higher elevation than ensure that tools and materials are not left in position where they can fall down, and to protect personals form falling objects, a safety net must be laid below, where the maintenance work is to be carried out.
- Where it is necessary to open manholes or remove sections of flooring. It is the responsibility of who-so-ever in-charge of the work to ensure that

manholes and floor sections are cordoned off until the manhole covers and floor sections are replaced.

- All temporary scaffolds, platforms, etc. erected for the purpose of maintenance jobs should be removed promptly after the completion of the job.

In case of Emergency

- One of the foremost cause of accidents and fires is the miss-operation of equipment or unplanned maintenance job without taking proper safety precautions. At the time of any emergency, it is the responsibility of the supervisor to take immediate and proper action to bring the system to safe condition as per the operating instructions as well as to see that there is no panic amongst the personnel present in the vicinity.
- It is also the responsibility of the supervisor to evacuate the personnel from the Section, if necessary, and take a roll call so as to ensure that no one is left behind.
- In case the emergency gets out of control, the Emergency Control Plan will come into force.

5.2 WORK PERMITS FOR REPAIR AND MAINTENANCE WORKS:

1. At Mumbai port most of the occasions the repair and maintenance work has to be carried out on pipelines, structures, buildings, floors or yard areas, and sometimes employees may have to enter confined spaces such as tanks, pits, sumps etc. Many hazards have to be tackled when persons are engaged on such work. These hazards require a procedure to be followed to make the equipment, pipeline or structures safe for carrying out the repair, maintenance or inspection work.
2. It is necessary that all the jobs of repair, inspection, maintenance and entry into confined space are covered under the safety permit procedure.
3. Depending upon the nature of the job and risk involved, the appropriate shall be obtained and No job of repair, maintenance, inspection and entry into confined space can start unless the Safety Work Permit is obtained.
4. A safety permit is a form to be completed by all concerned with copies issued to the appropriate departments/concerned supervisor as shown on the form, so as to ensure that safe working conditions are maintained BEFORE A JOB IS STARTED AND DURING THE CURRENCY OF THE JOB.
5. When safety permits cover the performance of work by contractors, the departmental supervisors looking after the work of contractor will be responsible to see that the contractor and his employees are properly instructed in all precautions which must be observed to ensure safety.
6. It is personal responsibility of those initiating, accepting and collaborating in signing safety permits to ensure that all precautions necessary to prevent injury to personal or damage to property/equipment/etc. are duly observed.
7. All safety permits except safe entry permit must be issued to individuals and not to department. Where work covered by a safety permits extends over more than one shift, full and complete arrangements must be made for passing on responsibility to named person.
8. Safe entry permit shall be displayed on entry points of confined space informing all concerned required to enter the said confined space, regarding conditions inside the confined space, precautions to be followed and safety appliances to be used.
9. If the work requires entering into confined spaces such as tanks, pits, sumps, ballast chamber, fore peak tanks, etc., it shall be ensured with suitable gas detection system that there is no build up of flammable/toxic gases. Before undertaking any job in such conditions suitable ventilation shall be carried out. Such site may require to introduce temporary

ventilation. If the area has restricted or no natural air supply workers may have to use breathing apparatus to provide an air supply.

10. Safety permits must be made out in specific forms describing the work out in specific terms, there must be personal contact between the person issuing the permit and the person to whom it is issued., The work to be done should be described orally and the precautions mentioned on the permit should be repeated.
11. Where more than one permit are issued for a single job, equivalent number of tags must be placed on valves or locks on switches, which are isolating the equipment.
12. In general the permits are to be initiated by the operating personnel and issued to the maintenance personnel.
13. When in doubt whether a permit should be initiated or a 'No Permit Certificate' should be endorsed on Maintenance Job Card, always initiated and issue a permit.
14. Initiator authoriser and permittee of safety work permits of all classes, and the officers of senior status of the section concerned have got the authority to stop jobs covered by the Safety Work Permit at any stage if the conditions are unsafe due to change in process conditions or other reasons.

h. TYPES OF WORK PERMIT

1. General Work Permit (Cold Work Permit)

(i) It is also called "**Cold Work Permit**". It is issued for relatively low-risk jobs. Example: Routine maintenance done on machines

2. Hot Work Permit (Fire Permit)

(i) HOT WORK: Any work activity involving the use of tools or equipment, which can generate heat, flame, sparks or any source of ignition. Example: Welding / gas cutting in a hazardous area.

(ii) Jobs like electric arc welding, brazing, gas soldering, and oxygen-acetylene cutting and welding require Hot Work Permits before work begins.

3. WORK AT HEIGHT PERMIT– ABOVE 2M

(i) What is work at height?

(ii) It is work at any place from which a person could fall a distance liable to cause personal injury

(iii) Includes : access and egress, and work at or below ground level; but not stairways or slips or trips on the level

(iv) This permit is generally issued when a work has to be carried out at a height of 2m or above on a temporary structure.

4. EXCAVATION WORK PERMIT

What is excavation?

(i) It is a man-made cut, cavity, trench or depression formed by earth removal.

(ii) An Excavation Work Permit is essential before starting work.

(iii) Permit issued for carrying out any kind of work on underground pipelines, power cables, etc. are covered under this.

(iv) Cases where depth is less, but the soil condition is unstable and there is chance for a collapse, should be covered under this permit.

5. Electrical Work Permit – HT / LT

(i) Specific permit to be issued for work on HT and LT installations.

(ii) Only qualified and competent persons should be authorized to work.
(iii) Document the level of authorization and responsibility
(iv) Special PPE should be provided as needed
(v) Adequate control for lockout / tag out system

6. Confined Space Entry (CSE) Permit

(i) What is a confined space?

(ii) It is a space large enough that an employee can enter and perform assigned work, has limited or restricted means for entry or exit, and not designed for continuous employee occupancy.

(iii) These permits are issued when an employee needs to enter and work inside a confined space**.**

(iv) Examples: Working inside a tank or silo, Working inside deep pits or trenches, etc.

i. ESSENTIAL INFORMATION REQUIRD ON WORK PERMIT

1. Description of work to be done
2. Exact location of the job
3. Date and time – start and end
4. Details of potential hazards
5. Safety measures taken by permit issuer
6. Safety measures to be taken by the executor of job, including PPE to be used
7. Preparatory works carried out- Tools testing, Isolation
8. Emergency procedure
9. Name of employees on the job
10. Name and signature of person(s) authorizing the W.P.
11. Name and signature of person accepting the W.P.
12. Date and time of issue of W.P.
13. Renewal of validity of W.P.

5.3 GENERAL WORKING CONDITIONS:

The following general working conditions shall be maintained at site for execution of any repair and maintenance job.

5.3.1 HOUSEKEEPING

a. General requirements.

1. The employer shall establish and maintain good housekeeping practices to eliminate hazards to employees to the extent practicable.

2. The employer shall eliminate slippery conditions, on walkways and working surfaces as necessary. If it is not practicable for the employer to remove slippery conditions, the employer either shall:

(i) Restrict employees to designated walkways and working surfaces where the employer has eliminated slippery conditions; or

(ii) Provide slip-resistant footwear.

3. The employer shall store materials in a manner that does not create a hazard for employees.

4. The employer shall maintain easy and open access to each fire-alarm box, fire-call station, fire-fighting equipment, and each exit, including ladders, staircases, scaffolds, and gangways.

5. The employer shall dispose of flammable and combustible substances, such as paint thinners, solvents, rags, scrap, and waste, or store them in covered fire-resistant containers at the end of each work shift or when the job is completed, whichever occurs first.

b. Walkways.

1. In addition to the requirements in paragraph (a) above. the employer also shall ensure that each walkway:
   - **(i)** Provides adequate passage;
   - **(ii)** Is clear of debris, including solid and liquid wastes, that may create a hazard for employees;
   - **(iii)** Is clear of tools, materials, equipment, and other objects that may create a hazard for employees; and
   - **(iv)** Is clear of hoses and electrical service cords.

     The employer shall:

     (A) Place each hose and cord above walkways in a location that will prevent injury to employees and damage to the hoses and cords;

     (B) Place each hose and cord underneath walkways;

     (C) Place each hose and cord on walkways, provided the hoses and cords are covered by crossovers or other means that will prevent injury to employees and damage to the hoses and cords; or

     (D) Protect each hose and cord by other suitable means.
2. While a walkway or part of a walkway is being used as a working surface, the employer shall cordon off that portion to prevent it from being used as a walkway.

c. Working surfaces.

In addition to the requirements in paragraph (a) above, the employer also shall ensure that each working surface:

1. Is cleared of tools, materials, and equipment that are not necessary to perform the job in progress;
2. Is cleared of debris, including solid and liquid wastes, at the end of each workshift or job, whichever occurs first;
3. Is maintained, so far as practicable, in a dry condition. When a wet process is used, the employer shall maintain drainage and provide false floors, platforms, mats, or other dry standing places. When the employer demonstrates that this procedure is not practicable, the employer shall provide each employee working in the wet process with protective footgear.

5.3.2 ILLUMINATION

a. General Requirements.

1. The employer shall ensure that each work area and walkway is adequately lighted whenever an employee is present and working.
2. When adequate illumination is not obtainable by permanent lighting sources, temporary lighting may be used as supplementation.
3. The employer shall ensure that neither matches nor open-flame devices are used for lighting.

b. Temporary lights. The employer shall ensure that temporary lights meet the following requirements:

1. Lights with bulbs that are not completely recessed are equipped with guards to prevent accidental contact with the bulb;
2. Lights are equipped with electric cords designed with sufficient capacity to safely carry the electric load;
3. Connections and insulation on electric cords are maintained in a safe condition;

4. Lights and lighting stringers are not suspended solely by their electric cords unless they are designed by the manufacturer to be suspended in this way;
5. Lighting stringers do not overload branch circuits;
6. Branch circuits are equipped with over-current protection with a capacity that does not exceed the rated current-carrying capacity of the cord used;
7. Splices have insulation with a capacity that exceeds that of the original insulation of the cord; and
8. Exposed, non-current-carrying metal parts of lights are grounded. The employer shall ensure that grounding is provided either through a third wire in the cord containing the circuit conductors or through a separate wire that is grounded at the source of the current.

c. Portable lights.

1. In any dark area that does not have permanent or temporary lights, where lights are not working, or where lights are not readily accessible, the employer shall provide portable or emergency lights and ensure that employees do not enter those areas without such lights.
2. Where the only means of illumination on a vessel or vessel section are from lighting sources that are not part of the vessel or vessel section, the employer shall provide portable or emergency lights for the safe movement of each employee. If natural sunlight provides sufficient illumination, portable or emergency lights are not required.

d. Explosion-proof, self-contained lights. The employer shall provide and ensure that each employee uses only explosion-proof, self-contained temporary and portable lights, approved for hazardous conditions by a nationally recognized testing laboratory (NRTL), in any area that the atmosphere is determined to contain a concentration of flammable vapours that are at or above 10 percent of the lower explosive limit (LEL).

5.3.3 CONTROL OF HAZARDOUS ENERGY (LOCKOUT/TAGS-PLUS)

While servicing of machinery, equipment, and systems when the energization or startup of machinery, equipment, or systems, or the release of hazardous energy, could endanger an employee. Therefore following precautions shall be taken to ensure safety form the release of hazardous energy:

a. Lockout/tags-plus program. The employer shall establish and implement a written program and procedures for lockout and tags-plus systems to control hazardous energy during the servicing of any machinery, equipment, or system in shipyard employment. The program shall cover:

1. Procedures for lockout/tags-plus systems while servicing machinery, equipment, or systems in accordance with paragraph (c) of this section;
2. Procedures for protecting employees involved in servicing any machinery, equipment, or system in accordance with paragraphs (d) through (m) of this section;
3. Specifications for locks and tags-plus hardware in accordance with paragraph (n) of this section;
4. Employee information and training in accordance with paragraph (o) of this section;
5. Incident investigations in accordance with paragraph (p) of this section; and
6. Program audits in accordance with paragraph (q) of this section.

b. General requirements.

1. The employer shall ensure that, before any authorized employee performs servicing when energization or startup, or the release of hazardous energy, may occur, all energy sources are identified and isolated, and the machinery, equipment, or system is rendered inoperative.

2. If an energy-isolating device is capable of being locked, the employer shall ensure the use of a lock to prevent energization or startup, or the release of hazardous energy, before any servicing is started, unless the employer can demonstrate that the utilization of a tags-plus system will provide full employee protection as set forth in paragraph (c)(6) of this section.

3. If an energy-isolating device is not capable of being locked, the employer shall ensure the use of a tags-plus system to prevent energization or startup, or the release of hazardous energy, before any servicing is started.

4. Each tags-plus system shall consist of:

(i) At least one energy-isolating device with a tag affixed to it; and

(ii) At least one additional safety measure that, along with the energy-isolating device and tag required in (c)(4)(i) of this section, will provide the equivalent safety available from the use of a lock.

5. the employer shall ensure that each energy-isolating device for any machinery, equipment, or system is designed to accept a lock whenever the machinery, equipment, or system is extensively repaired, renovated, modified, or replaced, or whenever new machinery, equipment, or systems are installed.

(i) Does not own the machinery, equipment, or system; or

(ii) Builds or services a vessel or vessel section according to customer specifications

6. **Full employee protection**

(i) When a tag is used on an energy-isolating device that is capable of being locked out, the tag shall be attached at the same location that the lock would have been attached, and;

(ii) The employer shall demonstrate that the use of a tags-plus system will provide a level of safety equivalent to that obtained by using a lock. In demonstrating that an equivalent level of safety is achieved, the employer shall:

(iii) Demonstrate full compliance with all tagsplus-related provisions of this standard; and

(iv) Implement such additional safety measures as are necessary to provide the equivalent safety available from the use of a lock.

7. **Lockout/tags-plus coordination**

(i) The employer shall establish and implement lockout/tags-plus coordination when:

(A) Employees on vessels and in vessel sections are servicing multiple machinery, equipment, or systems at the same time; or

(B) Employees on vessels, in vessel sections, and at landside facilities are performing multiple servicing operations on the same machinery, equipment, or system at the same time.

(ii) The coordination process shall include a lockout/tags-plus coordinator and a lockout/tagsplus log. Each log shall be

specific to each vessel, vessel section, and landside work area.

(iii) The employer shall designate a lockout/ tags-plus coordinator who is responsible for overseeing and approving:
(A) The application of each lockout and tags-plus system;
(B) The verification of hazardous-energy isolation before the servicing of any machinery, equipment, or system begins; and
(C) The removal of each lockout and tags-plus system.

(iv) The employer shall ensure that the lockout/ tags-plus coordinator maintains and administers a continuous log of each lockout and tags-plus system. The log shall contain:
(A) Location of machinery, equipment, or system to be serviced;
(B) Type of machinery, equipment, or system to be serviced;
(C) Name of the authorized employee applying the lockout/tags-plus system;
(D) Date that the lockout/tags-plus system is applied;
(E) Name of authorized employee removing the lock or tags-plus system; and
(F) Date that lockout/tags-plus system is removed

c. Lockout/tags-plus written procedures

1. The employer shall establish and implement written procedures to prevent energization or start-up, or the release of hazardous energy, during the servicing of any machinery, equipment, or system. Each procedure shall include:

(i) A clear and specific outline of the scope and purpose of the lockout/tags-plus procedure;

(ii) The means the employer will use to enforce compliance with the lockout/tags-plus program and procedures; and

(iii) The steps that must be followed for:
(A) Preparing for shutting down and isolating of the machinery, equipment, or system to be serviced, in accordance with paragraph (e) of this section;
(B) Applying the lockout/tags-plus system, in accordance with paragraph (f) of this section;
(C) Verifying isolation, in accordance with paragraph (g) of this section;
(D) Testing the machinery, equipment, or system, in accordance with paragraph (h) of this section;
(E) Removing lockout/tags-plus systems, in accordance with paragraph (i) of this section;
(F) Starting up the machinery, equipment, or system that is being serviced, in accordance with paragraph (j) of this section;
(G) Applying lockout/tags-plus systems in group servicing operations, in accordance with paragraph (k) of this section;
(H) Addressing multi-employer worksites involved in servicing any machinery, equipment, or system, in accordance with paragraph (l) of this section; and
(I) Addressing shift or personnel changes during servicing operations, in accordance with paragraph (m) of this section.

2. The employer's lockout procedures do not have to be in writing for servicing machinery, equipment, or systems, provided that all of the following conditions are met:

(i) There is no potential for hazardous energy to be released (or to reaccumulate) after shutting down, or restoring energy to, the machinery, equipment, or system;

(ii) The machinery, equipment, or system has a single energy source that can be readily identified and isolated;

(iii) The isolation and lock out of that energy source will result in complete de-energization and deactivation of the machinery, equipment, or system, and there is no potential for reaccumulation of energy;

(iv) The energy source is isolated and secured from the machinery, equipment, or system during servicing;

(v) Only one lock is necessary for isolating the energy source;

(vi) The lock is under the exclusive control of the authorized employee performing the servicing;

(vii) The servicing does not create a hazard for any other employee; and

(viii) The employer, in utilizing this exception, has not had any accidents or incidents involving the activation or reenergization of this type of machinery, equipment, or system during servicing.

d. Procedures for shutdown and isolation

1. Before an authorized employee shuts down any machinery, equipment, or system, the employer shall:

(i) Ensure that the authorized employee has knowledge of;

(A) The source, type, and magnitude of the hazards associated with energization or startup of the machine, equipment, or system;

(B) The hazards associated with the release of hazardous energy; and

(C) The means to control these hazards; and

(ii) Notify each affected employee that the machinery, equipment, or system will be shut down and deenergized prior to servicing, and that a lockout/tags-plus system will be implemented.

2. The employer shall ensure that the machinery, equipment, or system is shut down according to the written procedures the employer established.
3. The employer shall use an orderly shutdown to prevent exposing any employee to risks associated with hazardous energy.
4. The employer shall ensure that the authorized employee relieves, disconnects, restrains, or otherwise renders safe all potentially hazardous energy that is connected to the machinery, equipment, or system.

e. Procedures for applying lockout/tags-plus systems

1. The employer shall ensure that only an authorized employee applies a lockout/tags-plus system.
2. When using lockout systems, the employer shall ensure that the authorized employee affixes each lock in a manner that will hold the energy isolating device in a safe or off position.
3. When using tags-plus systems, the employer shall ensure that the authorized employee affixes a tag directly to the energy-isolating

device that clearly indicates that the removal of the device from a safe or off position is prohibited.

4. When the tag cannot be affixed directly to the energy-isolating device the employer shall ensure that the authorized employee locates it as close as safely possible to the device, in a safe and immediately obvious position.
5. The employer shall ensure that each energyisolating device that controls energy to the machinery, equipment, or system is effective in isolating the machinery, equipment, or system from all potentially hazardous energy source(s).

f. Procedures for verification of de-energization and isolation

1. Before servicing machinery, equipment, or a system that has a lockout/tags-plus system, the employer shall ensure that the authorized employee, or the primary authorized employee in a group lockout/tags-plus application, verifies that the machinery, equipment, or system is deenergized and all energy sources isolated.

2. The employer shall ensure that the authorized employee, or the primary authorized employee in a group lockout/tags-plus application, continues verifying deenergization and isolation while servicing the machinery, equipment, or system.

3. Each authorized employee in a group lockout/ tags-plus application who will be servicing the machinery, equipment, or system must be given the option to verify that the machinery, equipment, or system is deenergized and all energy sources isolated, even when verification is performed by the primary authorized employee.

g. Procedures for testing. In each situation in which a lockout/tags-plus system must be removed temporarily and the machinery, equipment, or system restarted to test it or to position a component, the employer shall ensure that the authorized employee does the following in sequence:

1. Clears tools and materials from the work area;
2. Removes nonessential employees from the work area;
3. Removes each lockout/tags-plus system in accordance with paragraph (h) of this section;
4. Restarts the machinery, equipment, or system and then proceeds with testing or positioning; and
5. After completing testing or positioning, deenergizes and shuts down the machinery, equipment, or system and reapplies all lockout/ tags-plus systems in accordance with paragraphs (e)-(g) of this section to continue servicing.

h. Procedures for removal of lockout and tags-plus systems

1. Before removing any lockout/tags-plus system and restoring the machinery, equipment, or system to use, the employer shall ensure that the authorized employee does the following:
   - **(i)** Notifies all other authorized and affected employees that the lockout/tags-plus system will be removed;
   - **(ii)** Ensures that all employees in the work area have been safely positioned or removed; and
   - **(iii)** Inspects the work area to ensure that nonessential items have been removed and machinery, equipment, or system components are operationally intact.

2. The employer shall ensure that each lock or tags-plus system is removed by the authorized employee who applied it.
3. When the authorized employee who applied the lockout/tags-plus system is not available to remove it, the employer may direct removal by another authorized employee, provided the employer developed and incorporated into the lockout/tags-plus program the specific procedures and training that address such removal, and demonstrates that the specific procedures used provide a level of employee safety that is at least as effective in protecting employees as removal of the system by the authorized employee who applied it. After meeting these requirements, the employer shall do the following in sequence:
    (i) Verify that the authorized employee who applied the lockout/tags-plus system is not in the facility;
    (ii) Make all reasonable efforts to contact the authorized employee to inform him/her that the lockout/tags-plus system has been removed; and
    (iii) Ensure that the authorized employee who applied the lock or tags-plus system has knowledge of the removal before resuming work on the affected machinery, equipment, or system.

i. Procedures for startup

1. Before an authorized employee turns on any machinery, equipment, or system after servicing is completed, the employer shall ensure that the authorized employee has knowledge of the source, type, and magnitude of the hazards associated with energization or startup, and the means to control these hazards.

2. The employer shall execute an orderly startup to prevent or minimize any additional or increased hazard(s) to employees. The employer shall perform the following tasks before starting up the machinery, equipment, or system:
    (i) Clear tools and materials from the work area;
    (ii) Remove any non-essential employees from the work area; and
    (iii) Start up the machinery, equipment, or system according to the detailed procedures the employer established for that machinery, equipment, or system.

j. Procedures for group lockout/tags-plus. When more than one authorized employee services the same machinery, equipment, or system at the same time, the following procedures shall be implemented:

1. **Primary authorized employee.** The employer shall:
    (i) Assign responsibility to one primary authorized employee for each group of authorized employees performing servicing on the same machinery, equipment, or system;
    (ii) Ensure that the primary authorized employee determines the safe exposure status of each authorized employee in the group with regard to the lockout/tags-plus system;
    (iii) Ensure that the primary authorized employee obtains approval from the lockout/tags-plus coordinator to apply and remove the lockout/tagsplus system; and
    (iv) Ensure that the primary authorized employee coordinates the servicing operation with the coordinator when required by paragraph (c)(7)(i) of this section.
2. **Authorized employees.** The employer shall either:

(i) Have each authorized employee apply a personal lockout/tags-plus system; or

(ii) Use a procedure that the employer can demonstrate affords each authorized employee a level of protection equivalent to the protection provided by having each authorized employee apply a personal lockout/tags-plus system. Such procedures shall incorporate a means for each authorized employee to have personal control of, and accountability for, his or her protection such as, but not limited to, having each authorized employee:

(A) Sign a group tag (or a group tag equivalent), attach a personal identification device to a group lockout device, or performs a comparable action before servicing is started; and

(B) Sign off the group tag (or the group tag equivalent), remove the personal identification device, or perform a comparable action when servicing is finished.

k. Procedures for multi-employer worksites

1. The host employer shall establish and implement procedures to protect employees from hazardous energy in multi-employer worksites. The procedures shall specify the responsibilities for host and contract employers.
2. **Host employer responsibilities.** The host employer shall carry out the following responsibilities in multi-employer worksites:
   (i) Inform each contract employer about the content of the host employer's lockout/tags-plus program and procedures;
   (ii) Instruct each contract employer to follow the host employer's lockout/tags-plus program and procedures; and
   (iii) Ensure that the lockout/tags-plus coordinator knows about all servicing operations and communicates with each contract employer who performs servicing or works in an area where servicing is being conducted.
3. **Contract employer responsibilities.** Each contract employer shall perform the following duties when working in a multi-employer worksite:
   (i) Follow the host employer's lockout/tags-plus program and procedures;
   (ii) Ensure that the host employer knows about the lockout/tags-plus hazards associated with the contract employer's work and what the contract employer is doing to address these hazards; and
   (iii) Inform the host employer of any previously unidentified lockout/tags-plus hazards that the contract employer identifies at the multi-employer worksite.

l. Procedures for shift or personnel changes

1. The employer shall establish and implement specific procedures for shift or personnel changes to ensure the continuity of lockout/tags-plus protection.
2. The employer shall establish and implement provisions for the orderly transfer of lockout/ tags-plus systems between authorized employees when they are starting and ending their workshifts, or when personnel changes occur during a workshift, to prevent energization or startup of the machinery, equipment, or system being serviced or the release of hazardous energy.

m. Lockout/tags-plus materials and hardware

1. The employer shall provide locks and tags-plus system hardware used for isolating, securing, or blocking machinery, equipment, or systems from all hazardous-energy sources.
2. The employer shall ensure that each lock and tag is uniquely identified for the purpose of controlling hazardous energy and is not used for any other purpose.
3. The employer shall ensure that each lock and tag meets the following requirements:
    - **(i) Durable**
      (A) Each lock and tag is capable of withstanding the existing environmental conditions for the maximum period of time that servicing is expected to last;
      (B) Each tag is made so that weather conditions, wet or damp conditions, corrosive substances, or other conditions in the work area where the tag is used or stored will not cause it to deteriorate or become illegible;
    - **(ii) Standardized**
      (A) Each lock and tag is standardized in at least one of the following areas: colour, shape, or size; and
      (B) Each tag is standardized in print and format;
    - **(iii) Substantial**
      (A) Each lock is sturdy enough to prevent removal without the use of extra force or unusual techniques, such as bolt cutters or other metal-cutting tools;
      (B) Each tag and tag attachment is sturdy enough to prevent inadvertent or accidental removal;
      (C) Each tag attachment has the general design and basic safety characteristics of a one-piece, all environment-tolerant nylon tie;
      (D) Each tag attachment is non-reusable, attachable by hand, self-locking, and non-releasable, and has a minimum unlocking strength of 50 pounds;
    - **(iv) Identifiable**. Each lock and tag indicates the identity of the authorized employee applying it; and
    - **(v)** Each tag warns of hazardous conditions that could arise if the machinery, equipment, or system is energized and includes a legend such as one of the following: “Do Not Start,” “Do Not Open,” “Do Not Close,” “Do Not Energize,” or “Do Not Operate.”

n. Information and training

1. **Initial training.** The employer shall impart training to each employee.
2. **General training content**. The employer shall train each employee who is, or may be, in an area where lockout/tags-plus systems are being used so they know:
    - **(i)** The purpose and function of the employer’s lockout/tags-plus program and procedures;
    - **(ii)** The unique identity of the locks and tags to be used in the lockout/tags-plus system, as well as the standardized color, shape or size of these devices;
    - **(iii)** The basic components of the tags-plus system: an energy-isolating device with a tag affixed to it and an additional safety measure;
    - **(iv)** The prohibition against tampering with or removing any lockout/tags-plus system; and

(v) The prohibition against restarting or reenergizing any machinery, equipment, or system being serviced under a lockout/tags-plus system.

3. **Additional training requirements for affected employees**. In addition to training affected employees in the requirements in paragraph (o)(2) of this section, the employer also shall train each affected employee so he/she knows:
   - **(i)** The use of the employer's lockout/tags-plus program and procedures;
   - **(ii)** That affected employees are not to apply or remove any lockout/tags-plus system; and
   - **(iii)** That affected employees are not to bypass, ignore, or otherwise defeat any lockout/tags-plus system.

4. **Additional training requirements for authorized employees**. In addition to training authorized employees in the requirements in paragraphs (n)(2) and (n)(3) of this section, the employer also shall train each authorized employee so he/she knows:
   - **(i)** The steps necessary for the safe application, use, and removal of lockout/tags-plus systems to prevent energization or startup or the release of hazardous energy during servicing of machinery, equipment, or systems;
   - **(ii)** The type of energy sources and the magnitude of the energy available at the worksite;
   - **(iii)** The means and methods necessary for effective isolation and control of hazardous energy;
   - **(iv)** The means for determining the safe exposure status of other employees in a group when the authorized employee is working as a group's primary authorized employee;
   - **(v)** The requirement for tags to be written so they are legible and understandable to all employees;
   - **(vi)** The requirement that tags and their means of attachment be made of materials that will withstand the environmental conditions encountered in the workplace;
   - **(vii)** The requirement that tags be securely attached to energy-isolating devices so they cannot be accidentally removed while servicing machinery, equipment, or systems;
   - **(viii)** That tags are warning devices, and alone do not provide physical barriers against energization or startup, or the release of hazardous energy, provided by locks, and energy-isolating devices; and
   - **(ix)** That tags must be used in conjunction with an energy-isolating device to prevent energization or startup or the release of hazardous energy.

5. **Additional training for lockout/tags-plus coordinator.** In addition to training lockout/ tags-plus coordinators in the requirements in paragraphs (n)(2), (n)(3), and (n)(4) of this section, the employer shall train each lockout/tags-plus coordinator so he/she knows:
   - **(i)** How to identify and isolate any machinery, equipment, or system that is being serviced; and
   - **(ii)** How to accurately document lockout/tags-plus systems and maintain the lockout/tags-plus log.

6. Employee retraining.

(i) The employer shall retrain each employee, as applicable, whenever:

(A) There is a change in his/her job assignment that presents new hazards or requires a greater degree of knowledge about the employer's lockout/tags-plus program or procedures;

(B) There is a change in machinery, equipment, or systems to be serviced that presents a new energy-control hazard;

(C) There is a change in the employer's lockout/ tags-plus program or procedures; or

(D) It is necessary to maintain the employee's proficiency.

(ii) The employer also shall retrain each employee, as applicable, whenever an incident investigation or program audit indicates that there are:

(A) Deviations from, or deficiencies in, the employer's lockout/tags-plus program or procedures; or

(B) Inadequacies in an employee's knowledge or use of the lockout/tags-plus program or procedures.

(iii) The employer shall ensure that retraining establishes the required employee knowledge and proficiency in the employer's lockout/tagsplus program and procedures and in any new or revised energy-control procedures.

7. Upon completion of employee training, the employer shall keep a record that the employee accomplished the training, and that this training is current. The training record shall contain at least the employee's name, date of training, and the subject of the training.

5.4 SELECTION AND HANDLING OF TOOLS:

The use of hand and portable power tools is essential for carrying out any works, if tools are not properly handles they becomes major sources of accidents.

The accidents due to tools are easily preventable by observing the following safety precautions and practices.

5.4.1 GENERAL PRECAUTIONS

a. Hand lines, slings, tackles of adequate strength, or carriers such as tool bags with shoulder straps shall be provided and used to handle tools, materials, and equipment so that employees will have their hands free when using ship's ladders and access ladders. The use of hose or electric cords for this purpose is prohibited.
b. When air tools of the reciprocating type are not in use, the dies and tools shall be removed.
c. All portable, power-driven circular saws shall be equipped with guards above and below the base plate or shoe. The upper guard shall cover the saw to the depth of the teeth, except for the minimum arc required to permit the base to be tilted for bevel cuts. The lower guard shall cover the saw to the depth of the teeth, except for the minimum arc required to allow proper retraction and contact with the work. When the tool is withdrawn from the work, the lower guard shall automatically and instantly return to the covering position.
d. The moving parts of machinery on a dry dock shall be guarded.

e. Before use, pneumatic tools shall be secured to the extension hose or whip by some positive means to prevent the tool from becoming accidentally disconnected from the whip.
f. The moving parts of drive mechanisms, such as gearing and belting on large portable tools, shall be adequately guarded.
g. Headers, manifolds and widely spaced hose connections on compressed air lines shall bear the word "air" in letters at least 1-inch high, which shall be painted either on the manifolds or separate hose connections, or on signs permanently attached to the manifolds or connections. Grouped air connections may be marked in one location.
h. Before use, compressed air hose shall be examined. Visibly damaged and unsafe hose shall not be used.

5.4.2 HAND TOOLS

a. Employers shall not issue or permit the use of unsafe hand tools.
b. Select the right tool for the job. The wrong selection and misuse of common hand tool is always a frequent cause of accidents. The examples of unsafe practices are:
   (i) Using a file for a pry**.**
   (ii) Using a wrench for a hammer
   (iii) Using a plier instead of proper wrench

c. Keep tools in good condition. Defective tools should not be used but should be sent for effective repairs or replacement. A few examples of tools in poor condition are:
   (i) Keep tools in good condition. Defective tools should not be used but should be sent for effective repairs or replacement. A few examples of tools in poor condition are:
   (ii) Wrenches with cracked or worn out jaws.
   (iii) Screw driver with sharp point or broken handle
   (iv) Hammer with loose head or cracked handle
   (v) Dull saw.

d. Use tool in the right way:
   After selecting a proper tool in good condition, it is important that the tool should be used in the right way. Examples of not using the tools in the right way are:
   (i) Screwdriver applied to the object held in the hands.
   (ii) Knives pulled toward the body.

e. Keep tools in a safe place. Tools should be kept in their proper places. Many accidents have occurred when tools were left or kept in unsafe places such as:
   (i) Hap hazardously lying tools at overhead locations.
   (ii) Sharp tools kept in pockets.
   (iii) Tools lying on floors, in passages, entrances, etc.

f. Carrying tools:
   Tools should be carried out when they might interfere with using both hand freely while using a ladder or climbing on a structure. A toolbox or similar container should be used to hoist the tools from the ground to the job or vice-versa.

g. Tools should not be left on scaffolds, overhead piping, on top of the stepladder and in other locations from where they can fall on persons below.

h. Impact tools, such as drift pins, wedges, and chisels, shall be kept free of mushroomed heads.

i. The wooden handles of tools shall be kept free of splinters or cracks and shall be kept tight in the tool.

j. Leaving tools overhead is especially dangerous where there is vibration or men are moving about.

k. One of the most important aspects of preventing tool injury is using proper personal protective equipment. In all operations where one metal hand tool strikes another, where equipment or material is struck by metal tool or where the cutting action of a tool causes particles of fly, high protect is needed by the user of the tool and by other employees who may be exposed to flying particle. Goggles or face shields should be worn when wood working or cutting tools such as chisels, brace and bits, planes, scrappers and saw are used head high or overhead with the chance of particles falling or flying into the eye. Eye protection should also be used on jobs like cutting wires and cables, and drilling, chipping concrete, removing nails from scrap wood, shovelling materials head- high, using wrenches and hammers overhead where particles of material or debris may fall. In addition to the goggles and face shields, aprons, gloves, helmets and respirators, etc. must be used, whenever necessary to avoid injuries from flying materials, scrap objects and tools.

5.4.3 ELECTRIC TOOLS

a. Electric shock is the main hazard from electrically powered tools. Careless handling and poor maintenance of electric tools contribute accidents like electric flash, burn, shock which may cause serious falls and injuries resulting in death. The following simple rules should be observed to prevent accidents from electric tools.
b. Periodic Inspection:
    1. A thorough inspection will discover operating defects, which can be corrected and will thus prevent costly breakdown, repair charges, and help to ensure safe operations.
    2. Defects in electric tools should be brought to the notice of the Engineer / Supervisor In-charge for arranging prompt repairs.
    3. A register should be maintained for periodic inspection, and may maintenance job done should be entered in the register with date and necessary remarks.
c. Use only proper tools. Before handling or using portable electric tool, one should understand its construction well enough to apprehend its hazard, which will also enable him to inspect the equipment and spot unsafe conditions in it.
d. The frames of portable electric tools and appliances, except double insulated tools approved by Underwriters' Laboratories, shall be grounded either through a third wire in the cable containing the circuit conductors or through a separate wire which is grounded at the source of the current.
e. Grounding circuits, other than by means of the structure of the vessel on which the tool is being used, shall be checked to ensure that the circuit between the ground and the grounded power conductor has resistance which is low enough to permit sufficient current to flow to cause the fuse or circuit breaker to interrupt the current.
f. Portable electric tools which are held in the hand shall be equipped with switches of a type which must be manually held in the closed position.
g. Worn or frayed electric cables shall not be used

h. Careful training is needed in the use of power tools since they operate so much faster than hand tools that they can get away from the hold of untrained person and cause serious hazards.
i. Always fit or disconnect accessories after switching off the power and do not forget to put the guards of the equipment in position before using it.
j. For work with electric tool in wet locations or in metal tanks and metal cover places, always use insulated platforms and other insulating protective equipment to avoid inadvertent electric shock. If possible, avoid using electric equipment in such places and use air powered tools.
k. Flexible cables shall not be used for portable or transportable motors, generators, transformers, rectifiers, electric drills, electric sprayers, welding sets or any other portable or transportable apparatus unless they are heavily insulated and adequately protected from mechanical injury. When the protection is by means of a metallic covering, it shall be in metallic connection with the frame of any such apparatus, and earthed.
l. One should not use a portable electric tool without grounding it.
m. The most important factor to prevent electric tool accident is not to misuse it. Take care of the electric tools avoiding dropping them, dragging electric cords over rough floors, objects and allowing them to be exposed to mechanical damage due to falling of heavy material or run over by vehicles.

5.4.4 ABRASIVE WHEELS

1. Floor stand and bench mounted abrasive wheels used for external grinding shall be provided with safety guards (protection hoods). The maximum angular exposure of the grinding wheel periphery and sides shall be not more than 90 degrees, except that when work requires contact with the wheel below the horizontal plane of the spindle, the angular exposure shall not exceed 125 degrees. In either case the exposure shall begin not more than 65 degrees above the horizontal plane of the spindle. Safety guards shall be strong enough to withstand the effect of a bursting wheel.
2. Floor and bench mounted grinders shall be provided with work rests which are rigidly supported and readily adjustable. Such work rests shall be kept a distance not to exceed 1 /8 inch from the surface of the wheel.
3. Cup type wheels used for external grinding shall be protected by either a revolving cup guard or a band type. All other portable abrasive wheels used for external grinding shall be provided with safety guards (protection hoods) meeting the requirements of paragraph (5) below, except as follows:
   (i) When the work location makes it impossible, in which case a wheel equipped with safety flanges as described in paragraph (6) below shall be used.
   (ii) When wheels 2 inches or less in diameter which are securely mounted on the end of a steel mandrel are used.
4. Portable abrasive wheels used for internal grinding shall be provided with safety flanges (protection flanges) meeting the requirements of paragraph (6) below, except as follows:
   (i) When wheels 2 inches or less in diameter which are securely mounted on the end of a steel mandrel are used.
   (ii) If the wheel is entirely within the work being ground while in use.
5. When safety guards are required, they shall be so mounted as to maintain proper alignment with the wheel, and the guard and its fastenings shall be of sufficient strength to retain fragments of the wheel in case of accidental breakage. The maximum angular exposure of the grinding wheel periphery and sides shall not exceed 180 degrees.

6. When safety flanges are required, they shall be used only with wheels designed to fit the flanges. Only safety flanges of a type and design and properly assembled so as to insure that the pieces of the wheel will be retained in case of accidental breakage shall be used.
7. All abrasive wheels shall be closely inspected and ring tested before mounting to ensure that they are free from cracks or defects.
8. Grinding wheels shall fit freely on the spindle and shall not be forced on. The spindle nut shall be tightened only enough to hold the wheel in place.
9. The power supply shall be sufficient to maintain the rated spindle speed under all conditions of normal grinding. The rated maximum speed of the wheel shall not be exceeded.
10. All employees using abrasive wheels shall be protected by eye protection equipment in accordance with the requirements of Subpart I of this Part except when adequate eye protection is afforded by eye shields which are permanently attached to the bench or floor stand.

5.4.5 POWER ACTUATED FASTENING TOOLS

1. **General precautions.**
   - **(i)** Power actuated fastening tools shall be tested each day before loading to ensure that the safety devices are in proper working condition. Any tool found not to be in proper working order shall be immediately removed from service until repairs are made.
   - **(ii)** Powder actuated fastening tools shall not be used in an explosive or flammable atmosphere.
   - **(iii)** All tools shall be used with the type of shield or muzzle guard appropriate for a particular use.
   - **(iv)** Fasteners shall not be driven into very hard or brittle materials such as cast iron, glazed tile, surface hardened steel, glass block, live rock, face brick or hollow title.
   - **(v)** Fasteners shall not be driven into soft materials unless such materials are backed by a substance that will prevent the pin or fastener from passing completely through and creating a flying missile hazard on the opposite side.
   - **(vi)** Unless a special guard, fixture or jig is used, fasteners shall not be driven directly into materials such as brick or concrete within 3 inches of the unsupported edge or corner, or into steel surfaces within 1 /2 inch of the unsupported edge or corner. When fastening other material, such as 2 x 4 inch lumber to a concrete surface, fasteners of greater than 7 /32 inch shank diameter shall not be used and fasteners shall not be driven within 2 inches of the unsupported edge or corner of the work surface.
   - **(vii)** Fasteners shall not be driven through existing holes unless a positive guide is used to secure accurate alignment.
   - **(viii)** No attempt shall be made to drive a fastener into a spalled area caused by an unsatisfactory fastening.
   - **(ix)** Employees using powder actuated fastening tools shall be protected by personal protective equipment in accordance with the requirements of Subpart I of this Part.

2. **Instruction of operators.** Before employees are permitted to use powder actuated tools, they shall have been thoroughly instructed by a competent person with respect to the requirements of paragraph (a) above and the safe use of such tools as follows:
   - **(i)** Before using a tool, the operator shall inspect it to determine that it is clean, that all moving parts operate freely and that the barrel is free from obstructions.

(ii) When a tool develops a defect during use, the operator shall immediately cease to use it and shall notify his supervisor.

(iii) Tools shall not be loaded until just prior to the intended firing time and the tool shall not be left unattended while loaded.

(iv) The tool, whether loaded or empty, shall not be pointed at any person, and hands shall be kept clear of the open barrel end.

(v) In case of a misfire, the operator shall hold the tool in the operating position for at least 15 seconds and shall continue to hold the muzzle against the work surface during disassembly or opening of the tool and removal of the powder load.

(vi) Neither tools nor powder charges shall be left unattended in places where they would be available to unauthorized persons.

5.4.6 PNEUMATIC TOOLS

Air powered pneumatic tools offer somewhat similar risk and hazard as electric tools, except risks of electric shock or burn and some special hazards of their own. For the prevention of pneumatic tool accidents, it is essential that one should be well trained in their use and safe handling. The following safety practices should be observed strictly to avoid accidents.

a. Air hose of the pneumatic tool should be handled carefully. It should be kept out of the way of traffic or falling materials to avoid tripping hazard and / or mechanical damage.
b. The air hose connecting couplings or joints should be checked for proper fitting, and additional spring clip or chains should be connected to prevent lashing and shipping of air hose in the event of an accidental breakage or disconnection of coupling.
c. The operator of pneumatic tools should always be on the watch for breaking of steel drill because, if it breaks, he may lose his balance and fall, and flying parts may strike on the body.
d. Always use safety belt with life line while working on heights with pneumatic tools.
e. Use personal protective equipment according to the job hazardous.
f. Where two chippers are working on the same job, they should face in opposite directions, back to back to prevent cuts from flying chips.
g. Compressed air should not be used for dusting the body or dress.
h. Pneumatic tools should be checked before use. Ensure that trigger operates properly and it does not operate accidentally. The devices provided to hold the tube, bit, etc. should be in position and in perfect condition so that they may not be shoot accidentally from the barrel and cross accident.

5.5 WORKING INSIDE CONFINED AND ENCLOSED SPACES AND OTHER DANGEROUS ATMOSPHERS:

Sometimes employees may require to enter an enclosed or confined space such as vessels, tanks, pits, sewers and other such equipment for the purpose of inspection, repair maintenance work.

"Dangerous atmosphere" means an atmosphere that may expose employees to the risk of death, incapacitation, impairment of ability to self-rescue (i.e., escape unaided from a confined or enclosed space), injury, or acute illness.

Unlike working in open atmospheres, entering and working inside such confined spaces involve different types of hazards such as starting of agitators/or equipment, entry of presence of steam or explosive, toxic and/or corrosive liquid or fluid and oxygen deficiency.

Further the sludge or scale sticking to the sides of a confined space or accumulated inside a confined space may cause danger. Therefore following safety measures shall be taken for working inside confined spaces.

5.5.1 WORK PERMITS FOR WORK INSIDE CONFINED SPACE

Any work is to carried out in inside the confined space for that work permit is necessary, the work permit shall include-

(a) The task involved
(b) Identified hazards
(c) Precautions to be taken
(d) Responsibilities of agencies involved

A separate Safe Entry Permit should be prepared and displayed at all entry points of the confined space.

For execution of work inside confined space another Safety Work Permit for the work to be executed shall be prepared and issued in addition to Safe Entry Permit.

5.5.2 PRECAUTIONS AND THE ORDER OF TESTING BEFORE ENTERING CONFINED AND ENCLOSED SPACES AND OTHER DANGEROUS ATMOSPHERES

Before entering confined and enclosed spaces and other dangerous atmospheres, the employer shall ensure that atmospheric testing is performed in the following sequence: oxygen content, flammability, toxicity.

a. Oxygen content.

1. The employer shall ensure that the confined and enclosed spaces and other dangerous atmospheres are visually inspected and tested by a competent person to determine the atmosphere's oxygen content prior to initial entry into the space by an employee:
2. If the space to be entered contains an oxygen deficient atmosphere, the space shall be labeled "Not Safe for Workers" or, if oxygen-enriched, "Not Safe for Workers—Not Safe for Hot Work." If an oxygen-deficient or oxygen-enriched atmosphere is found, ventilation shall be provided at volumes and flow rates sufficient to ensure that the oxygen content is maintained at or above 19.5 percent and below 22.0 percent by volume. The warning label may be removed when the oxygen content is equal to or greater than 19.5 and less than 22.0 percent by volume.
3. An employee may not enter a space where the oxygen content, by volume, is below 19.5 percent or above 22.0 percent. Exception: An employee may enter for emergency rescue or for a short duration for installation of ventilation equipment necessary to start work in the space provided:
   - **(i)** The atmosphere in the space is monitored for oxygen content, by volume, continuously; and
   - **(ii)** Respiratory protection and other appropriate personal protective equipment and clothing are provided in accordance with chapter on Personal Protective Equipment's (PPEs) of this manual.

b. **Flammable atmospheres.**

1. The employer shall ensure that confined and enclosed spaces and other dangerous atmospheres that contain or have contained combustible or flammable liquids or gases are:

(i) Inspected visually by the competent person to determine the presence of combustible or flammable liquids; and

(ii) Tested by a competent person prior to entry by an employee to determine the concentration of flammable vapours and gases within the space.

2. If the concentration of flammable vapours or gases in the space to be entered is equal to or greater than 10 percent of the lower explosive limit, the space shall be labelled "Not Safe for Workers" and "Not Safe for Hot Work." Ventilation shall be provided at volumes and flow rates sufficient to ensure that the concentration of flammable vapours is maintained below 10 percent of the lower explosive limit. The warning labels may be removed when the concentration of flammable vapours is below 10 percent of the lower explosive limit.
3. An employee may not enter a space where the concentration of flammable vapours or gases is equal to or greater than 10 percent of the lower explosive limit. Exception: An employee may enter for emergency rescue or for a short duration for installation of ventilation equipment necessary to start work in the space, provided:
   (i) No ignition sources are present;
   (ii) The atmosphere in the space is monitored continuously;
   (iii) Atmospheres at or above the upper explosive limit are maintained; and
   (iv) Respiratory protection and other appropriate personal protective equipment and clothing are provided in accordance with chapter on Personal Protective Equipment's (PPEs) of this manual.

c. **Toxic, corrosive, irritant or fumigated atmospheres and residues.**
1. The employer shall ensure that spaces contain or have contained liquids, gases, or solids that are toxic, corrosive or irritant are:
   (i) Inspected visually by the competent person to determine the presence of toxic, corrosive, or irritant residue contaminants; and
   (ii) Tested by a competent person prior to initial entry by an employee to determine the air concentration of toxics, corrosives, or irritants within the space.
2. If a space contains an air concentration of a material which exceeds permissible exposure limit (PEL) or Immediately dangerous to life or health (IDLH), the space shall be labelled "Not Safe for Workers." Ventilation shall be provided at volumes and flow rates which will ensure that air concentrations are maintained within the PEL or, in the case of contaminants for which there is no established PEL, below the IDLH. The warning label may be removed when the concentration of contaminants is maintained within the PEL or below IDLH level.
3. If a space cannot be ventilated to within the PELs or is IDLH, the space must be re-test by competent person until the space can be certified "Enter with Restrictions" or "Safe for Workers."
4. An employee may not enter a space whose atmosphere exceeds a PEL or is IDLH. Exception: An employee may enter for emergency rescue, or for a short duration for installation of ventilation equipment provided:
   (i) The atmosphere in the space is monitored continuously;

(ii) Respiratory protection and other necessary and appropriate personal protective equipment and clothing are provided in accordance with chapter on Personal Protective Equipment's (PPEs) of this manual.

d. **Training of employees entering confined and enclosed spaces or other dangerous atmospheres.**

1. The employer shall ensure that each employee that enters a confined or enclosed space and other areas with dangerous atmospheres is trained to perform all required duties safely.

2. The employer shall ensure that each employee who enters a confined space, enclosed space, or other areas with dangerous atmospheres is trained to:

(i) Recognize the characteristics of the confined space;

(ii) Anticipate and be aware of the hazards that may be faced during entry;

(iii) Recognize the adverse health effects that may be caused by the exposure to a hazard;

(iv) Understand the physical signs and reactions related to exposures to such hazards;

(v) Know what personal protective equipment is needed for safe entry into and exit from the space;

(vi) Use personal protective equipment; and

(vii) Where necessary, be aware of the presence and proper use of barriers that may be needed to protect an entrant from hazards.

3. The employer shall ensure that each entrant into confined or enclosed spaces or other dangerous atmospheres is trained to exit the space or dangerous atmosphere whenever:

(i) The employer or his or her representative orders evacuation;

(ii) An evacuation signal such as an alarm is activated; or

(iii) The entrant perceives that he or she is in danger.

4. The employer shall provide each employee with training:

(i) Before the entrant begins work addressed by this section; and

(ii) Whenever there is a change in operations or in an employee's duties that presents a hazard about which the employee has not previously been trained.

5. The employer shall certify that the training required by paragraphs (d)(1) through (d)(4) of this section has been accomplished.

(i) The certification shall contain the employee's name, the name of the certifier, and the date(s) of the certification.

(ii) The certification shall be available for inspection by the Assistant Secretary, the Director, employees, and their representatives.

e. **Rescue teams.**

1. The employer shall either keep their rescue team standby or be in touch with the MbPAs Fire Department so that they will respond promptly to a request for rescue service.

The employer shall either establish a shipyard rescue team or arrange for an outside rescue team which will respond promptly to a request for rescue service.

2. Employer shall ensure that the personals deployed for Working inside confined and enclosed spaces or other dangerous are:

(i) trained to use the personal protective equipment including respirators and any rescue equipment necessary for making rescues.

(ii) trained to perform his or her rescue functions.

(iii) At least one person amongst persons deployed shall maintain current certification in basic first aid which includes maintenance of an airway, control of bleeding, maintenance of circulation and cardiopulmonary resuscitation (CPR) skills.

3. Shipyard rescue teams shall meet the following criteria:

4. (i) Each employee assigned to the shipyard team shall be provided with and trained to use the personal protective equipment he or she will need, including respirators and any rescue equipment necessary for making rescues from confined and enclosed spaces and other dangerous atmospheres.

5. (ii) Each employee assigned to the shipyard rescue team shall be trained to perform his or her rescue functions including confined and enclosed and other dangerous atmosphere entry.

6. (iii) Shipyard rescue teams shall practice their skills at least once every 12 months. Practice drills shall include the use of mannequins and rescue equipment during simulated rescue operations involving physical facilities that approximate closely those facilities from which rescue may be needed.5

7. (iv) At least one person on each rescue team shall maintain current certification in basic first aid which includes maintenance of an airway, control of bleeding, maintenance of circulation and cardiopulmonary resuscitation (CPR) skills.

8. (2) The employer shall inform outside rescue teams of the hazards that the team may encounter when called to perform confined and enclosed space or other dangerous atmosphere rescue at the employer's facility so that the rescue team can be trained and equipped.

f. **Exchanging hazard information between employers**.

Each employer whose employees work in confined and enclosed spaces or other dangerous atmospheres shall ensure that all available information on the hazards, safety rules, and emergency procedures concerning those spaces and atmospheres is exchanged with any other employer whose employees may enter the same spaces

5.5.3 CLEANING AND OTHER COLD WORK

a. The employer shall ensure that manual cleaning and other cold work are not performed in the following spaces:

1. Spaces containing or having last contained bulk quantities of combustible or flammable liquids or gases; and

2. Spaces containing or having last contained bulk quantities of liquids, gases or solids that are toxic, corrosive or irritating.

b. Requirements for performing cleaning or cold work.

1. Liquid residues of hazardous materials shall be removed from work spaces as thoroughly as practicable before employees start cleaning operations or cold work in a space. Special care shall be taken to prevent the spilling or the draining of these materials into

the water surrounding the vessel, or for shore-side operations, onto the surrounding work area.

2. Testing shall be conducted by a competent person to determine the concentration of flammable, combustible, toxic, corrosive, or irritant vapours within the space prior to the beginning of cleaning or cold work.

3. Continuous ventilation shall be provided at volumes and flow rates sufficient to ensure that the concentration(s) of:

- **(i)** Flammable vapour is maintained below 10 percent of the lower explosive limit;7 and
- **(ii)** Toxic, corrosive, or irritant vapours are maintained within the permissible exposure limits and below IDLH levels.

4. Testing shall be conducted by the competent person as often as necessary during cleaning or cold work to assure that air concentrations are below 10 percent of the lower explosive limit and within the PELs and below IDLH levels. Factors such as, but not limited to, temperature, volatility of the residues and other existing conditions in and about the spaces are to be considered in determining the frequency of testing necessary to assure a safe atmosphere.

5. Spills or other releases of flammable, combustible, toxic, corrosive, and irritant materials shall be cleaned up as work progresses.

6. An employee may not enter a confined or enclosed space or other dangerous atmosphere if the concentration of flammable or combustible vapours in work spaces exceeds 10 percent of the lower explosive limit. Exception: An employee may enter for emergency rescue or for a short duration for installation of ventilation equipment provided:

- **(i)** No ignition sources are present;
- **(ii)** The atmosphere in the space is monitored continuously;
- **(iii)** The atmosphere in the space is maintained above the upper explosive limit; and
- **(iv)** Respiratory protection, personal protective equipment, and clothing are provided in accordance with chapter on Personal Protective Equipment's (PPEs) of this manual.

7. A competent person shall test ventilation discharge areas and other areas where discharged vapours may collect to determine if vapours discharged from the spaces being ventilated are accumulating in concentrations hazardous to employees.

8. If the tests required in paragraph (b)(7) of this section indicate that concentrations of exhaust vapours that are hazardous to employees are accumulating, all work in the contaminated area shall be stopped until the vapours have dissipated or been removed.

9. Only explosion-proof, self-contained portable lamps, or other electric equipment approved by a National Recognized Testing Laboratory (NRTL) for the hazardous location shall be used in spaces described in paragraph (a) of this section until such spaces have been certified as "Safe for Workers."

10. The employer shall prominently post signs that prohibit sources of ignition within or near a space that has contained flammable or combustible liquids or gases in bulk quantities:

- **(i)** At the entrance to those spaces;
- **(ii)** In adjacent spaces; and
- **(iii)** In the open area adjacent to those spaces.

11. All air moving equipment and its component parts, including duct work, capable of generating a static electric discharge of sufficient

energy to create a source of ignition, shall be bonded electrically to the structure of a vessel or vessel section or, in the case of land-side spaces, grounded to prevent an electric discharge in the space.

12. Fans shall have non-sparking blades, and portable air ducts shall be of non-sparking materials.

5.5.4 HOT WORK

"Hot work" means any activity involving riveting, welding, burning, the use of powder-actuated tools or similar fire-producing operations. Grinding, drilling, abrasive blasting, or similar spark-producing operations are also considered hot work except when such operations are isolated physically from any atmosphere containing more than 10 percent of the lower explosive limit of a flammable or combustible substance

a. Hot work requiring testing by the authorized person.

1. The employer shall ensure that hot work is not performed in or on any of the following confined and enclosed spaces and other dangerous atmospheres, boundaries of spaces or pipelines until the work area has been tested and certified by the authorized person as "Safe for Hot Work":
   - **(i)** Within, on, or immediately adjacent to spaces that contain or have contained combustible or flammable liquids or gases.
   - **(ii)** Within, on, or immediately adjacent to fuel tanks that contain or have last contained fuel; and
   - **(iii)** On pipelines, heating coils, pump fittings or other accessories connected to spaces that contain or have last contained fuel.
2. The certificate issued by the authorized person shall be posted in the immediate vicinity of the affected operations while they are in progress and kept on file for a period of at least three months from the date of the completion of the operation for which the certificate was generated.

b. Hot work requiring testing by a competent person.

1. Hot work is not permitted in or on the following spaces or adjacent spaces or other dangerous atmospheres until they have been tested by a competent person and determined to contain no concentrations of flammable vapours equal to or greater than 10 percent of the lower explosive limit:
   - **(i)** Dry cargo holds,
   - **(ii)** The bilges,
   - **(iii)** The engine room and boiler spaces for which a authorized person certificate is not required under paragraph (a)(1)(i) of this section,
   - **(iv)** Land-side confined and enclosed spaces or other dangerous atmospheres not covered by paragraph (a)(1) of this section.

5.5.5 MAINTENANCE OF SAFE CONDITIONS

a. **Preventing hazardous materials from entering.** Pipelines that could carry hazardous materials into spaces that have been certified "Safe for Workers" or "Safe for Hot Work" shall be disconnected, blanked off, or otherwise blocked by a positive method to prevent hazardous materials from being discharged into the space.

b. **Alteration of existing conditions.** When a change that could alter conditions within a tested confined or enclosed space or other dangerous atmosphere occurs, work in the affected space or area shall be stopped. Work may not be resumed until the affected space or area is visually inspected and retested and found to comply with 5.5.2, 5.5.3 and 5.5.4 of this manual, as applicable.

c. **Tests to maintain the conditions of the authorized person's certificates.** A competent person shall visually inspect and test each space certified as "Safe for Workers" or "Safe for Hot Work," as often as necessary to ensure that atmospheric conditions within that space are maintained within the conditions established by the certificate after the certificate has been issued.

d. **Change in the conditions of authorized person's certificate.** If a competent person finds that the atmospheric conditions within a certified space fail to meet the applicable requirements of 5.5.2, 5.5.3 and 5.5.4 of this manual, work in the certified space shall be stopped and may not be resumed until the space has been retested by the authorized person and a new certificate issued in accordance with 5.5.4(a).

e. **Tests to maintain a competent person's findings**. After a competent person has conducted a visual inspection and tests required in 5.5.2, 5.5.3 and 5.5.4 at above and determined a space to be safe for an employee to enter, he or she shall continue to test and visually inspect spaces as often as necessary to ensure that the required atmospheric conditions within the tested space are maintained.

f. **Changes in conditions determined by competent person's findings.** After the competent person has determined initially that a space is safe for an employee to enter and he or she finds subsequently that the conditions within the tested space fail to meet the requirements of 5.5.2, 5.5.3 and 5.5.4, at above, as applicable, work shall be stopped until the conditions in the tested space are corrected to comply with 5.5.2, 5.5.3 and 5.5.4, as applicable

5.5.6 WARNING SIGNS AND LABELS

a. **Employee comprehension of signs and labels.** The Employer shall ensure that each sign or label posted to comply with the following requirements is presented in a manner that can be perceived and understood by all employees.
b. **Posting of large work areas.** A warning sign or label required above need not be posted at an individual tank, compartment or work space within a work area if the entire work area has been tested and certified: not safe for workers, not safe for hot work, and if the sign or label to this effect is posted conspicuously at each means of access to the work area.

5.6 WELDING, CUTTING AND HEATING:

5.6.1 VENTILATION AND PROTECTION IN WELDING, CUTTING AND HEATING

a. The provisions of this section shall apply to all ship repairing, shipbuilding, and shipbreaking operations; except that paragraph (e)

of this section shall apply only to ship repairing and shipbuilding. Paragraph (g) of this section shall apply only to ship repairing.

b. Mechanical ventilation requirements.

Mechanical ventilation shall meet the following requirements:

(i) Mechanical ventilation shall consist of either general mechanical ventilation systems or local exhaust systems.

(ii) General mechanical ventilation shall be of sufficient capacity and so arranged as to produce the number of air changes necessary to maintain welding fumes and smoke within safe limits.

(iii) Local exhaust ventilation shall consist of freely movable hoods intended to be placed by the welder or burner as close as practicable to the work. This system shall be of sufficient capacity and so arranged as to remove fumes and smoke at the source and keep the concentration of them in the breathing zone within safe limits.

(iv) Contaminated air exhausted from a working space shall be discharged into the open air or otherwise clear of the source of intake air.

(v) All air replacing that withdrawn shall be clean and respirable.

(vi) Oxygen shall not be used for ventilation purposes, comfort cooling, blowing dust or dirt from clothing, or for cleaning the work area.

c. Welding, cutting and heating in confined spaces.

1. Except as provided in paragraphs (c)(3) and (d)(2) of this section either general ventilation meeting the requirements of paragraph (b) of this section shall be provided whenever welding, cutting or heating is performed in a confined space.

2. The means of access shall be provided to a confined space and ventilation ducts to this space shall be arranged in accordance with 5.8.4 (b) (1) and (2).

3. When sufficient ventilation cannot be obtained without blocking the means of access, employees in the confined space shall be protected by air line respirators in accordance with the requirements of 9.4 of manual, and an employee on the outside of such a confined space shall be assigned to maintain communication with those working within it and to aid them in an emergency.

d. Welding, cutting or heating of metals of toxic significance.

1. Welding, cutting or heating in any enclosed spaces involving the metals specified below shall be performed with either general mechanical or local exhaust ventilation meeting the requirements of paragraph (b) above:
   - **(i)** Zinc-bearing base or filler metals or metals coated with zinc-bearing materials.
   - **(ii)** Lead base metals.
   - **(iii)** Cadmium-bearing filler materials.
   - **(iv)** Chromium-bearing metals or metals coated with chromium-bearing materials.
2. Welding, cutting or heating in any enclosed spaces involving the metals specified below shall be performed with local exhaust ventilation in accordance with the requirements of paragraph (b) above or employees shall be protected by air line respirators in accordance with the requirements of 9.4:
   - **(i)** Metals containing lead, other than as an impurity, or metals coated with lead-bearing materials.
   - **(ii)** Cadmium-bearing or cadmium coated base metals.
   - **(iii)** Metals coated with mercury-bearing metals.

(iv) Beryllium-containing base or filler metals. Because of its high toxicity, work involving beryllium shall be done with both local exhaust ventilation and air line respirators.

3. Employees performing such operations in the open air shall be protected by filter type respirators, and employees performing such operations on beryllium-containing base or filler metals shall be protected by air line respirators, in accordance with the requirements of 9.4 of manual.
4. Other employees exposed to the same atmosphere as the welders or burners shall be protected in the same manner as the welder or burner.

e. Inert-gas metal-arc welding.

1. Since the inert-gas metal-arc welding process involves the production of ultraviolet radiation of intensities of 5 to 30 times that produced during shielded metal-arc welding, the decomposition of chlorinated solvents by ultraviolet rays, and the liberation of toxic fumes and gases, employees shall not be permitted to engage in, or be exposed to the process until the following special precautions have been taken:
   (i) The use of chlorinated solvents shall be kept at least two hundred (200) feet from the exposed arc, and surfaces prepared with chlorinated solvents shall be thoroughly dry before welding is permitted on such surfaces.
   (ii) Helpers and other employees in the area not protected from the arc by screening as provided in 5.6.5 (e) shall be protected by filter lenses meeting the requirements of 9.3 (a). When two or more welders are exposed to each other's arc, filter lens goggles of a suitable type meeting the requirements of 9.3 (a) shall be worn under welding helmets or hand shields to protect the welder against flashes and radiant energy when either the helmet is lifted or the shield is removed.
   (iii) Welders and other employees who are exposed to radiation shall be suitably protected so that the skin is covered completely to prevent burns and other damage by ultraviolet rays. Welding helmets and hand shields shall be free of leaks and openings, and free of highly reflective surfaces.
   (iv) When inert-gas metal-arc welding is being performed on stainless steel, the requirements of paragraph (d)(2) above shall be met to protect against dangerous concentrations of nitrogen dioxide.

f. General welding, cutting, and heating.

1. Welding, cutting and heating not involving conditions or materials described in paragraph (c), (d) or (e) above may normally be done without mechanical ventilation or respiratory protective equipment, but where, because of unusual physical or atmospheric conditions, an unsafe accumulation of contaminants exists, suitable mechanical ventilation or respiratory protective equipment shall be provided.
2. Employees performing any type of welding, cutting or heating shall be protected by suitable eye protective equipment in accordance with the requirements of 9.3 (a).

g. Residues and cargoes of metallic ores.

1. Residues and cargoes of metallic ores of toxic significance shall be removed from the area or protected from the heat before ship repair work which involves welding, cutting or heating is begun.

5.6.2 WELDING, CUTTING AND HEATING IN WAY OF PRESERVATIVE COATINGS

a. Before welding, cutting or heating is commenced on any surface covered by a preservative coating whose flammability is not known, a test shall be made by a competent person to determine its flammability. Preservative coatings shall be considered to be highly flammable when scrapings burn with extreme rapidity.
b. Precautions shall be taken to prevent ignition of highly flammable hardened preservative coatings. When coatings are determined to be highly flammable they shall be stripped from the area to be heated to prevent ignition, or, where shipbreaking is involved, the coatings may be burned away under controlled conditions. A 11 /2 inch or larger fire hose with fog nozzle, which has been uncoiled and placed under pressure, shall be immediately available for instant use in the immediate vicinity, consistent with avoiding freezing of the hose.
c. **Protection against toxic preservative coatings.**
    1. In enclosed spaces, all surfaces covered with toxic preservatives shall be stripped of all toxic coatings for a distance of at least 4 inches from the area of heat application or the employees shall be protected by air line respirators meeting the requirements of 9.4 of manual.
    2. In the open air, employees shall be protected by a filter type respirator in accordance with the requirements of 9.4 of manual.
d. Before welding, cutting or heating is commenced in enclosed spaces on metals covered by soft and greasy preservatives, the following precautions shall be taken:
    1. A competent person shall test the atmosphere in the space to ensure that it does not contain explosive vapors, since there is a possibility that some soft and greasy preservatives may have flash points below temperatures which may be expected to occur naturally. If such vapors are determined to be present, no hot work shall be commenced until such precautions have been taken as will ensure that the welding, cutting or heating can be performed in safety.
    2. The preservative coatings shall be removed for a sufficient distance from the area to be heated to ensure that the temperature of the unstripped metal will not be appreciably raised. Artificial cooling of the metal surrounding the heated area may be used to limit the size of the area required to be cleaned.

e. Immediately after welding, cutting or heating is commenced in enclosed spaces on metal covered by soft and greasy preservatives, and at frequent intervals thereafter, a competent person shall make tests to ensure that no flammable vapours are being produced by the coatings. If such vapours are determined to be present, the operation shall be stopped immediately and shall not be resumed until such additional precautions have been taken as are necessary to ensure that the operation can be resumed safely.

5.6.3. WELDING, CUTTING AND HEATING OF HOLLOW METAL CONTAINERS AND STRUCTURES

The provisions of this section shall apply to ship repairing, shipbuilding and shipbreaking.

a. Drums, containers, or hollow structures which have contained flammable substances shall, before welding, cutting, or heating is

undertaken on them, either be filled with water or thoroughly cleaned of such substances and ventilated and tested.

b. Before heat is applied to a drum, container, or hollow structure, a vent or opening shall be provided for the release of any built-up pressure during the application of heat.

c. Before welding, cutting, heating or brazing is begun on structural voids such as skegs, bilge keels, fair waters, masts, booms, support stanchions, pipe stanchions or railings, a competent person shall inspect the object and, if necessary, test it for the presence of flammable liquids or vapours. If flammable liquids or vapours are present, the object shall be made safe.

d. Objects such as those listed in paragraph (c) of this section shall also be inspected to determine whether water or other non-flammable liquids are present which, when heated, would build up excessive pressure. If such liquids are determined to be present, the object shall be vented, cooled, or otherwise made safe during the application of heat.

e. Jacketed vessels shall be vented before and during welding, cutting or heating operations in order to release any pressure which may build up during the application of heat.

5.6.4 GAS WELDING AND CUTTING

The provisions of this section shall apply to ship repairing, shipbuilding and shipbreaking.

a. Transporting, moving and storing compressed gas cylinders.

1. Valve protection caps shall be in place and secure. Oil shall not be used to lubricate protection caps.
2. When cylinders are hoisted, they shall be secured on a cradle, sling board or pallet. They shall not be hoisted by means of magnets or choker slings.
3. Cylinders shall be moved by tilting and rolling them on their bottom edges. They shall not be intentionally dropped, struck, or permitted to strike each other violently.
4. When cylinders are transported by vehicle, they shall be secured in position.
5. Valve protection caps shall not be used for lifting cylinders from one vertical position to another. Bars shall not be used under valves or valve protection caps to pry cylinders loose when frozen. Warm, not boiling, water shall be used to thaw cylinders loose.
6. Unless cylinders are firmly secured on a special carrier intended for this purpose, regulators shall be removed and valve protection caps put in place before cylinders are moved.
7. A suitable cylinder truck, chain, or other steadying device shall be used to keep cylinders from being knocked over while in use.
8. When work is finished, when cylinders are empty or when cylinders are moved at any time, the cylinder valves shall be closed.
9. Acetylene cylinders shall be secured in an upright position at all times except, if necessary, for short periods of time while cylinders are actually being hoisted or carried.

b. Placing cylinders.

1. Cylinders shall be kept far enough away from the actual welding or cutting operation so that sparks, hot slag or flame will not reach them. When this is impractical, fire resistant shields shall be provided.

2. Cylinders shall be placed where they cannot become part of an electrical circuit. Electrodes shall not be struck against a cylinder to strike an arc.
3. Fuel gas cylinders shall be placed with valve end up whenever they are in use. They shall not be placed in a location where they would be subject to open flame, hot metal, or other sources of artificial heat.
4. Cylinders containing oxygen or acetylene or other fuel gas shall not be taken into confined spaces.

c. Treatment of cylinders.

1. Cylinders, whether full or empty, shall not be used as rollers or supports.
2. No person other than the gas supplier shall attempt to mix gases in a cylinder. No one except the owner of the cylinder or person authorized by him shall refill a cylinder. No one shall use a cylinder's contents for purposes other than those intended by the supplier. Only cylinders bearing Interstate Commerce Commission identification and inspection markings shall be used.
3. No damaged or defective cylinder shall be used.

d. **Use of fuel gas.** The employer shall thoroughly instruct employees in the safe use of fuel gas, as follows:

1. Before connecting a regulator to a cylinder valve, the valve shall be opened slightly and closed immediately. (This action is generally termed "cracking" and is intended to clear the valve of dust or dirt that might otherwise enter the regulator.) The person cracking the valve shall stand to one side of the outlet, not in front of it. The valve of a fuel gas cylinder shall not be cracked where the gas would reach welding work, sparks, flame or other possible sources of ignition.
2. The cylinder valve shall always be opened slowly to prevent damage to the regulator. To permit quick closing, valves on fuel gas cylinders shall not be opened more than 11 /2 turns. When a special wrench is required, it shall be left in position on the stem of the valve while the cylinder is in use so that the fuel gas flow can be shut off quickly in case of an emergency. In the case of manifolded or coupled cylinders, at least one such wrench shall always be available for immediate use. Nothing shall be placed on top of a fuel gas cylinder, when in use, which may damage the safety device or interfere with the quick closing of the valve.
3. Fuel gas shall not be used from cylinders through torches or other devices which are equipped with shut-off valves without reducing the pressure through a suitable regulator attached to the cylinder valve or manifold.
4. Before a regulator is removed from a cylinder valve, the cylinder valve shall always be closed and the gas released from the regulator.
5. If, when the valve on a fuel gas cylinder is opened, there is found to be a leak around the valve stem, the valve shall be closed and the gland nut tightened. If this action does not stop the leak, the use of the cylinder shall be discontinued, and it shall be properly tagged and removed from the vessel. In the event that fuel gas should leak from the cylinder valve rather than from the valve stem and the gas cannot be shut off, the cylinder shall be properly tagged and removed from the vessel. If a regulator attached to a

cylinder valve will effectively stop a leak through the valve seat, the cylinder need not be removed from the vessel.

6. If a leak should develop at a fuse plug or other safety device, the cylinder shall be removed from the vessel.

e. **Fuel gas and oxygen manifolds.**

1. Fuel gas and oxygen manifolds shall bear the name of the substance they contain in letters at least one (1) inch high which shall be either painted on the manifold or on a sign permanently attached to it.
2. Fuel gas and oxygen manifolds shall be placed in safe and accessible locations in the open air. They shall not be located within enclosed spaces.
3. Manifold hose connections, including both ends of the supply hose that lead to the manifold, shall be such that the hose cannot be interchanged between fuel gas and oxygen manifolds and supply header connections. Adapters shall not be used to permit the interchange of hose. Hose connections shall be kept free of grease and oil.
4. When not in use, manifold and header hose connections shall be capped.
5. Nothing shall be placed on top of a manifold, when in use, which will damage the manifold or interfere with the quick closing of the valves.

f. **Hose.**

1. Fuel gas hose and oxygen hose shall be easily distinguishable from each other. The contrast may be made by different colors or by surface characteristics readily distinguishable by the sense of touch. Oxygen and fuel gas hoses shall not be interchangeable. A single hose having more than one gas passage, a wall failure of which would permit the flow of one gas into the other gas passage, shall not be used.
2. When parallel sections of oxygen and fuel gas hose are taped together not more than 4 inches out of 8 inches shall be covered by tape.
3. All hose carrying acetylene, oxygen, natural or manufactured fuel gas, or any gas or substance which may ignite or enter into combustion or be in any way harmful to employees, shall be inspected at the beginning of each shift. Defective hose shall be removed from service.
4. Hose which has been subjected to flashback or which shows evidence of severe wear or damage shall be tested to twice the normal pressure to which it is subject, but in no case less than two hundred (200) psi. Defective hose or hose in doubtful condition shall not be used.
5. Hose couplings shall be of the type that cannot be unlocked or disconnected by means of a straight pull without rotary motion.
6. Boxes used for the stowage of gas hose shall be ventilated.

g. **Torches.**

1. Clogged torch tip openings shall be cleaned with suitable cleaning wires, drills or other devices designed for such purpose.

2. Torches shall be inspected at the beginning of each shift for leaking shutoff valves, hose couplings, and tip connections. Defective torches shall not be used.

3. Torches shall be lighted by friction lighters or other approved devices, and not by matches or from hot work.

h. **Pressure regulators.** Oxygen and fuel gas pressure regulators including their related gauges shall be in proper working order while in use.

5.6.5 ARC WELDING AND CUTTING:
The provisions of this section shall apply to ship repairing, shipbuilding and shipbreaking.

a. **Manual electrode holders.**
1. Only manual electrode holders which are specifically designed for arc welding and cutting and are of a capacity capable of safely handling the maximum rated current required by the electrodes shall be used.
2. Any current carrying parts passing through the portion of the holder which the arc welder or cutter grips in his hand, and the outer surfaces of the jaws of the holder, shall be fully insulated against the maximum voltage encountered to ground.

b. **Welding cables and connectors.**
1. All arc welding and cutting cables shall be of the completely insulated, flexible type, capable of handling the maximum current requirements of the work in progress, taking into account the duty cycle under which the arc welder or cutter is working.
2. Only cable free from repair or splices for a minimum distance of ten (10) feet from the cable end to which the electrode holder is connected shall be used, except that cables with standard insulated connectors or with splices whose insulating quality is equal to that of the cable are permitted.
3. When it becomes necessary to connect or splice lengths of cable one to another, substantial insulated connectors of a capacity at least equivalent to that of the cable shall be used. If connections are effected by means of cable lugs, they shall be securely fastened together to give good electrical contact, and the exposed metal parts of the lugs shall be completely insulated.
4. Cables in poor repair shall not be used. When a cable other than the cable lead referred to in paragraph (b)(2) of this section becomes worn to the extent of exposing bare conductors, the portion thus exposed shall be protected by means of rubber and friction tapes or other equivalent insulation.

c. **Ground returns and machine grounding**.
1. A ground return cable shall have a safe current carrying capacity equal to or exceeding the specified maximum output capacity of the arc welding or cutting unit which it services. When a single ground return cable services more than one unit, its safe current carrying capacity shall equal or exceed the total specified maximum output capacities of all the units which it services.
2. Structures or pipe lines, except pipe lines containing gases of flammable liquids or conduits containing electrical circuits, may be used as part of the ground return circuit, provided that the pipe or structure has a current carrying capacity equal to that required by paragraph (c)(1) of this section.
3. When a structure or pipe line is employed as a ground return circuit, it shall be determined that the required electrical contact exists at all joints. The generation of an arc, sparks or heat at any point shall cause rejection of the structure as a ground circuit.
4. When a structure or pipe line is continuously employed as a ground return circuit, all joints shall be bonded, and periodic

inspections shall be conducted to ensure that no condition of electrolysis or fire hazard exists by virtue of such use.

5. The frames of all arc welding and cutting machines shall be grounded either through a third wire in the cable containing the circuit conductor or through a separate wire which is grounded at the source of the current. Grounding circuits, other than by means of the vessel's structure, shall be checked to ensure that the circuit between the ground and the grounded power conductor has resistance low enough to permit sufficient current to flow to cause the fuse or circuit breaker to interrupt the current.
6. All ground connections shall be inspected to ensure that they are mechanically strong and electrically adequate for the required current.

d. **Operating instructions.** Employers shall instruct employees in the safe means of arc welding and cutting as follows:
   1. When electrode holders are to be left unattended, the electrodes shall be removed and the holders shall be so placed or protected that they cannot make electrical contact with employees or conducting objects.
   2. Hot electrode holders shall not be dipped in water, since to do so may expose the arc welder or cutter to electric shock.
   3. When the arc welder or cutter has occasion to leave his work or to stop work for any appreciable length of time, or when the arc welding or cutting machine is to be moved, the power supply switch to the equipment shall be opened.
   4. Any faulty or defective equipment shall be reported to the supervisor.

e. **Shielding.** Whenever practicable, all arc welding and cutting operations shall be shielded by non-combustible or flame-proof screens which will protect employees and other persons working in the vicinity from the direct rays of the arc.

5.6.6 CUTTING & WELDING OF PIPE LINES

1. Only properly qualified and experienced welders shall do the job.
2. Before starting the job, the engineer in-charge of the work should check the welder's qualification certificates.
3. All these jobs shall be started only after getting the safety permit.
4. Comfortable welding platform shall be provided for sitting, standing or lying down position for the welder by proper scaffolding.
5. Depending on the material of construction of the pipe to be welded & considering its thickness, proper welding electrodes or filler wire should be selected and proper welding procedure should be decided and given to the welder. Care should be taken to carry out the desired preheating and post heating operations.
6. If high voltage cables are passing in the vicinity of the pipe to be welded, the pipeline should be checked for magnetisation and if it is magnetised, demagnetisation should be carried out before starting the welding.
7. The use of all the necessary PPEs should be ensured throughout the cutting & welding operation.
8. The pipeline should be thoroughly purged and clearance should be taken from the concern department before starting the cutting or welding operation.
9. The welder should be given compulsory break of 5-10 minutes after every one hour of continuous welding. If the welding job is in a confined space or in a difficult position, the break should be given after every half an hour.

10. If the welding job is to be done on round the clock basis, then different welders should be employed for each shift and no welder should be made to work continuously for more than a shift.
11. The leakages in and around the welding job should be sealed before starting the job. If the job is at a height, then the gas lines, electrical cables, acid lines etc., should be adequately protected from flying sparks or hot metal particles with the help of sheet metal or asbestos cloth.
12. Fire extinguishing arrangement should be kept ready at the site.
13. All gas cylinders should be maintained in good condition and no leakage should be allowed from any fitting or tubing. This should be checked by soap bubble test before starting the job.
14. No copper based fittings or tubing's should be utilised for acetylene gas use to avoid formation of any explosive matter.
15. As far as possible damaged hoses or cables should not be used during cutting or welding operation. Leaky hose should be immediately replaced. If damaged cable is to be used due to unavoidable circumstances, the damaged portion should be covered with thick insulating tape.
16. Loose contact in all electrical connections should be avoided. If the loose contact is inherent or it can't be attended immediately, then care should be taken to avoid overheating and melting of the contact points by switching off the machine from time to time.
17. Only industrial plugs should be used for all welding electrical connections.
18. Proper Earthing should be provided with the help of clamps or a bolted terminal.
19. Use of proper current, proper heat input, slag removal, dye penetrant testing etc., are of utmost importance to avoid repetition of welding job.
20. Even though industrial radiography is normally called X-Ray of the weld joint, it is mostly done with iridum192 isotope and the radiographic film is exposed to Gamma Rays and not X-Rays. Exposure to Gamma rays is more harmful than exposure to X rays. Hence the area where radiography is to be done should be cordoned off completely. Radiography should be done preferably at odd hours when human movement is minimum in the plant area.
21. As the radiation from the radiography source travel in all directions with same strength cordoning of the area in horizontal as well as vertical plane is also required.
22. Radiography should be carried out only after the weld joint cools down to ambient temperature.
23. The exposure time depends on the strength of the radiographic source and the thickness of the job. The radiographer should be informed about the thickness of the job well in advance. The strength of the source should be such that the exposure time required at site to complete the radiography is minimum.
24. The radiographer gets exposed to some degree of radiation. It is mandatory for the radiographer here to wear a badge given by BARC, which measures the degree of exposure to the radiation. The radiographer should not be allowed to start the job unless he wears such valid badge.
25. Since the radiographer gets exposed to some degree of radiation, he should not be allowed to do the radiography continuously. Taking rest in between two exposures should be mandatory for the radiographer.
26. Prolonged exposure to radiation causes loss of blood cells. In case of accidental exposure to radiation the affected person should be given nourishing food like milk, banana etc., and then given some rest before consulting a doctor.

5.6.7 REPAIR & MAINTENANCE WORK ON VALVES / FITTINGS / SECTION Of PIPES

a. Before work is performed on a valve, fitting, or section of piping in a piping system where employees may be subject to injury from the direct escape of water, oil, or other medium at a high temperature, the employer shall insure that the following steps are taken:
   1. The isolation and shutoff valves connecting the dead system with the live system or systems shall be secured, blanked, and then locked or tagged, in accordance with 5.3.3, indicating that employees are working on the systems. The lock or tag shall not be removed or the valves unblanked until it is determined that this may be done without creating a hazard to the employees working on the system, or until the work on the system, or until the work on the system is completed, in accordance with 5.3.3. When valves are welded instead of bolted, at least two isolation and shutoff valves connecting the dead system with the live system or systems shall be secured, and then locked or tagged, in accordance with 5.3.3.
   2. Drain connections to the atmosphere on all of the dead interconnecting systems shall be opened for visual observation of drainage.

5.7 <u>WORKING AT HEIGHT:</u> Refer section 4.4 of this manual.

5.7.1 SAFETY GUIDELINES FOR WORKING AT HEIGHT: Refer section 4.4.1 of this manual.

5.7.2 ACCESS TO WORKPLACE AT HEIGHT: Refer section 4.4.2 of this manual.

5.7.3 CARRYING OF TOOLS AND ACCESSORIES: Refer section 4.4.3 of this manual.

5.7.4 SAFETY PRECAUTIONS FOR CARRYING OUT THE WORK AT HEIGHT: Refer section 4.4.4 of this manual.

5.7.5 SAFETY PRECAUTIONS DURING THE PROGRESS OF WORK AT HEIGHT Refer section 4.4.5 of this manual.

5.7.6 SAFETY PRECAUTIONS ON COMPLETION OF WORK AT HEIGHT: Refer section 4.4.6 of this manual.

5.8 <u>SCAFFOLDS, LADDERS AND OTHER WORKING SURFACES:</u>

5.8.1 SCAFFOLDS OR STAGING : Refer section 4.5.1 of this manual.

5.8.2 LADDERS: Refer section 4.5.2 of this manual.

5.8.3 GUARDING OF DECK OPENINGS AND EDGES : Refer section 4.5.3 of this manual.

5.8.4 ACCESS TO CARGO SPACES AND CONFINED SPACES

a. Cargo spaces.
   1. There shall be at least one safe and accessible ladder in any cargo space which employees must enter.
   2. When any fixed ladder is visibly unsafe, the employer shall prohibit its use by employees.

3. Straight ladders of adequate strength and suitably secured against shifting or slipping shall be provided as necessary when fixed ladders in cargo spaces do not meet the requirements of paragraph (a)(1) above. When conditions are such that a straight ladder cannot be used, a Jacob's ladder may be used.

Jacob's ladders.

a. Jacob's ladders shall be of the double rung or flat tread type. They shall be well maintained and properly secured.

b. Jacob's ladder shall either hang without slack from its lashings or be pulled up entirely

4. When cargo is stowed within 4 inches of the back of ladder rungs, the ladder shall be deemed "unsafe" for the purpose of this section.

5. Fixed ladders or straight ladders provided for access to cargo spaces shall not be used at the same time that cargo drafts, equipment, materials, scrap or other loads are entering or leaving the hold. Before using these ladders to enter or leave the hold, the employee shall be required to inform the winchman or crane signalman of his intention.

b. Confined spaces.

1. More than one means of access shall be provided to a confined space in which employees are working and in which the work may generate a hazardous atmosphere in the space except where the structure or arrangement of the vessel makes this provision impractical.
2. When the ventilation ducts required by these regulations must pass through these means of access, the ducts shall be of such a type and so arranged as to permit free passage of an employee through at least two of these means of access.

5.8.5 WORKING SURFACES

a. When firebox floors present tripping hazards of exposed tubing or of missing or removed refractory, sufficient planking to afford safe footing shall be laid while work is being carried on within the boiler.

b. When employees are working aloft, or elsewhere at elevations more than 5 feet above a solid surface, either scaffolds or a sloping ladder, meeting the requirements of this Subpart, shall be used to afford safe footing, or the employees shall be protected by safety belts and lifelines. Employees visually restricted by blasting hoods, welding helmets, and burning goggles shall work from scaffolds, not from ladders, except for the initial and final welding or burning operation to start or complete a job, such as the erection and dismantling of hung scaffolding, or other similar, no repetitive jobs of brief duration.

c. For work performed in restricted quarters, such as behind boilers and in between congested machinery units and piping, work platforms at least 20 inches wide meeting the requirements of 4.5.1 shall be used. Backrails may be omitted if bulkheading, boilers, machinery units, or piping afford proper protection against falling.

d. When employees are boarding, leaving, or working from small boats or floats, they shall be protected by personal flotation devices meeting.

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CHAPTER 6: ELECTRICAL SAFETY

ELECTRICAL SAFETY AT WORKPLACE

The establishments handling supply, transformation, distribution and using electrical energy are required to comply with the following statutory acts and rules with modifications, revisions or extensions thereto in force.

a) Indian Electricity Act, 1910
b) Indian Electricity Rules, 1956
c) Factories Act, 1948 and rules there under.

6.1 ELECTRICAL HAZARDS:

Employees working on Electrical equipment must be caution and allot all time because of special nature of the electricity, recognising the seriousness of consequences which might results from any mishap. There are many unanticipated unusual happening that can lead to trouble. The Electrical hazards can be broadly classified under the following headings:

(a) Electric shocks to person
(b) Fire and Explosion due to use of Electric equipment's in hazardous environment (where flammable gases a vapours might be present).
(c) Hazards due to static electricity.

(a) Electric Shock

The most common cause of electric shock is usually owing to failure of insulation between the conductor and the metal enclosure or frame of an electrical apparatus. An electric current will affect the muscles or nerves passing through it.

In case of an electric shock

- Do not touh a person who is direct contact with a live electrical conductor.
- Pull the plug a switch-off the current from the main supply.
- Victim may be push out form the live wire/conductor with the help of dry and non-conductive material without touching the victim.
- Ask for medical help and start artificial respiration.

(b) Fire and Explosion

- Loose connections/overloading in the electrical circuit causes spark, hence care to be taken to terminate the cable with proper fittings.
- The equipment to be operated on worked in correct manner so as to avoid dangers due to misuse.
- The equipment's to be periodically inspected and repaired a renewed if found to be defective/deteriorated.
- In confined space or flammable gas or vapour atmosphere a little spark can ignite and may cause explosion.

(c) Static Electricity

It is generated when certain substance come in contact and are separated or rubbed on each other/together. The generated electric charge it flows between the gap of two charged / bodies a spark is developed. If the surrounding atmosphere contains/concentrate flammable gases or vapours could get ignited causing. fire and /or explosion may cause problems such as-

- Sensitive instruments may give wrong readings.
- Agglomeration of flaming power in pipeline will affect stopping of its flow.

- Person comes in contact with statically charged body may not get a very stray electric shock but will cause involuntary action to that person thereby causing an accident.

To prevent spark over two bodies: suitable bonding directly a through earth to be provided. Thus all metal equipment's, machines and tools to be earthed to avoid generation of static current.

6.2 PERMIT TO WORK FOR ELECTRICL REPAIR AND MAINTENACE WORKS:

(a) '**Permit to work**" is a mandatory document for doing maintenance, repair cleaning and construction work on or near electrical circuits / apparatus. The main aim of introduction of this system is to ensure protection guaranty to workmen and equipment.

The following procedure is adopted for ensuring safety to the workmen and equipment.

i. De-energize, isolate and lock the circuit / apparatus to be worked upon.
ii. Earth the circuit / apparatus at suitable point.
iii. Provide safeguards against danger from neighbouring live circuits / apparatus.

(b) The safe operation will be possible by complete understanding between the permit holder and permit issuing authority regarding additional precautions, information's and cautions to be taken in the performance of the work covered by the permit. In other words, the purpose of "**Permit to work"** is to avoid accident due to faulty accident caused by thoughtlessness', haste, improper method and lack of understanding.

(c) The "**Permit to work"** should be obtained before working on circuits / apparatus such as H.T. and L.T. switchgears, Motor control centres, H.T. isolators, etc. However, for working on individual L.T. motors / lighting circuits, "Permit to work" is necessary. This will ensure that the equipment has been properly de-energised isolated and danger tag provided. The "Work Permit" must be returned to Shift In charge after the maintenance job is over or at the end of the day, giving status of the work done.

(d) The "Permit to work" and "Permission slip" shall be issued by Shift in charge only a receipt of application form concerned. "Permit to work" or "Permission slip" shall be issued in INDIVIDUL'S NAME and not to the department or section.

(e) The "Permit to work" shall be provided in triplicate in books of 100 forms with serial numbers. The original form shall be blue colour, duplicate pink and triplicate of white colour. The original shall be issued to the permittee, duplicate to the Safety Officer and the triplicate shall be retained in the book of the issuing section.

(f) The "Permission slip" should be in duplicate with serial numbers. The original copy will be given to the Permittee, retaining the duplicate copy by the issuing section.

6.3 AUTHORIZATION TO WORK ON ELECTRICAL LINES & APPARATUS:

a) All voltage shall be considered dangerous even though may not be enough to produce serious shocks.

b) No work of any nature shall be done on any electrical circuit or apparatus and no entry in protected areas shall be made except on the authority of a "Permit To Work" with protection guaranty. The only relaxation to this rule shall be in the case of simple replacements such as renewal of a fused lamp or fuses, but these shall be done by authorised electricians with all necessary precautions.

c) No person shall work on any live electrical circuit or apparatus and no person shall assist such persons on such work, unless he is authorised in

that behalf on the authority of Permit to work after taking necessary safety measures, and approved by the Chief Electrical Engineer.

6.4 ISOLATION OF EQUIPMENT FROM DANGER FOR REPAIR AND MAINTENANCE:

a. The provisions of this section shall apply to all the repair and maintenance works.
b. Before an employee is permitted to work on an electrical circuit, except when the circuit must remain energized for testing and adjusting, the circuit shall be de-energized and checked at the point at which the work is to be done to insure that it is actually de-energized. When testing or adjusting an energized circuit a rubber mat, duck board, or other suitable insulation shall be used underfoot where an insulated deck does not exist.
c. De-energizing the circuit shall be accomplished by opening the circuit breaker, opening the switch, or removing the fuse, whichever method is appropriate. The circuit breaker, switch, or fuse location shall then be locked out or tagged in accordance with 5.3.3.
d. When work is performed immediately adjacent to an open-front energized board or in back of an energized board, the board shall be covered or some other equally safe means shall be used to prevent contact with any of the energized parts.

6.5 SAFETY PRACTICES TO BE FOLLOWED WHILE HANDLING ELECTRICAL EQUIPMENT:

a) No job should be started without obtaining the proper safety work permit. The safe working conditions indicated in the safety permit should be maintained throughout the period of work.
b) Safety wears like hand gloves, rubber shoes, and neon testers, test lamps, etc. should be checked for unsafe conditions before use.
c) Do not tamper with electrical wiring. In case of any difficulty / problem, do not attempt any repair yourself. Contact or call on the Electrician / Electrical Supervisor for doing needful. Persons holding Wiremen's permit / supervisor's license only are authorised to work on electrical installations.
d) Use only three pin plugs for hand lamps, floodlights and single phase portable tools. Ensure proper 'phase', 'neutral' and 'ground connections. Strictly avoid unsafe practice of inserting bare wires directly into power sockets. This is hazardous and could cause accidents.'
e) Do not shift the medium voltage portable electrical equipment unless it is disconnecting from supply lines. Before shifting, get clearance in writing from the Electrical Supervisor. All medium voltage (400 V) portable electrical equipment's should have isolating switch on the equipment for isolation. Earthing of such equipment by two separate and distinct earth connections is mandatory. Earthing joints should be firm and conductor adequate cross sections. Use four pin plugs and ensure correct polarity of phase and ground connections.
f) Ensure that the cables and wires are protected from mechanical damage. Do not run the cables on hot vessels, hot pipes and leave them trailing on the ground. Unless very long cable is required, intermediate joints shall be avoided. Ensure that the joint is fully tight and properly insulated with insulating tape of good quality.
g) Protect the portable electrical equipment from dripping liquids, dust, moisture, rain, etc.
h) Welding should be done by qualified welders.
i) Safety wares like hand gloves, rubber shoes, face shield, etc. should be used while doing welding jobs.
j) Ensure that welding holder is properly insulated dry and clean.

k) Whenever wet and moist conditions prevail, transformers welding sets should not be used.
l) Welding cables should be preferably without joints unless long cable lengths are involved. Joints, if required, should be firm and insulated. For ground wire, separate welding cable should be drawn from machine to job. Structural earths should not be used for ground return path since this is unsafe practice, which could fire hazard due to loose structural connections.
m) Use only 24-volt inspection lamps.
n) Ensure general safe working conditions and good housekeeping in / around the job area.
o) In case of an accident necessitating medical attendance / first aid, it shall be reported immediately to the supervisor who will inform the concerned officer and steps shall immediately be taken to afford necessary medical attention and other statutory formalities.

6.6 DO's & DONT's FOR ELECTRICLA REPAIR AND MAINTENACE WORK

DO's

a) Only qualified person should undertake electrical repairs.
b) Threat all circuits as 'LIVE' unless ensured after testing to 'DEAD'.
c) Ensure that extension cord is free from cuts, damage, kinks, joints, etc.
d) Check that the pin of the sockets are not loose.
e) Ensure easy and clear access to put ON or OFF the supply.
f) Indicate switches ON or OFF the supply.
g) Check frequently the valves of electrical parameters like voltage and amperage.
h) Check periodically the equipment's, circuits breakers etc. by competent person.
i) While using any portable electrical equipment ensure that they are properly earthed.
j) Use work permits in areas whenever required.
k) Identify electrical hazards and report them immediately to concerned authority (maintenance/safety/fire).
l) In case of sort circuits or fires, put off the main switches immediately.
m) Know first aid procedures, in case of electrical-shock.
n) Use dry sand, CO2 or DCP for electrical fire.

DONT's

a) Don't have any unsafe temporary connections viz. bare joints wiring.
b) Don't work wet on electrical equipment.
c) Don't use trial and error methods with electrical circuits.
d) Fuses are saviour, don't temper with them, don't replace a 'Blown' fuse unless the faults is detected and rectified.
e) Don't just operate any switch unless you know the consequences.
f) Don't overload an electrical point.
g) Don't use water for extinguishing electrical fire.
h) Don't crowed combustible / flammable things near electrical mains/switches.
i) In case of lightening don't stand besides or rest against tall structures.
Don't poke anything – finger, knife, scissors or whatever in to a power point

6.7 TEMPORARY ELECTRICAL CONNECTIONS:

a) The Electrical Department should give temporary connection only after receiving the requisition in the standard form duly signed by the supervisor of the requisitioning department.
b) The electrician giving connection should make all entries in the requisition and obtain counter signature of his supervisor after making the connections.

c) The connections should be given at a clean and dry area and, as far as possible, using short cables. For longer lengths, extension boards should be used.
d) The temporary connection cables should be laid properly on the racks of support.
e) The grounding should be checked at the plug with the help of test lamp.
f) Equipment should be checked for adequate and proper grounding connections with the help of a bell tester.
g) The grounding point should be clean and free from rust, paint, dirt, etc. and the ground line should be continuous, heavy size and without joints.
h) The connections should be given only by using proper terminators and plugs. Screw should be used to connect the wires instead of twisting them to make connections. The cable should be either clamped or tied at the point of connection.
i) The equipment should be de-energized by switching off the supply at remote end.
j) Only HRC fuses of lowest capacity required should be used on temporary connection circuit.
k) Always check for supply with the lamp and tester assuming that all points are live.
l) The supply isolating point should be shown to the supply user
m) While shifting the equipment, the supply should be cut off at the remove point and the local point. After cutting off the supply only, remove the ground wire.
n) The electrician giving connection should know first the 'phase' and 'ground' on the lead. Marking should be provided on the lead to identify the 'phase' and the 'ground' of the cable.
o) While inserting the plug, the isolating switch should be kept off.
p) In confined spaces, only 24 volts lights should be provided. In confined spaces and other areas which are likely to contain flammable gases / vapours / fumes; only explosion proof lights and their fixtures should be provided.
q) Connections should not be given to defective transformer and hand lamps.
r) Hand lamp should not be kept on combustible materials.
s) The portable transformer used for low voltage lamp and equipment's should be kept well away from the confined spaces and areas containing flammable gases / vapours.
t) All three phase equipment's should be grounded with two separate and distinct ground connections.
u) All the equipment's on the apparatus should be grounded.
v) Before switching on the supply for any equipment, it should be ensured that the switch on the equipment is in 'off' position.
w) For a three phase connection, only four core cable should be used - the fourth core being used as one ground. For a single-phase connection, only three-core cable should be used- the third core being used as a ground wire.
x) In cases where second ground is required, the same should be provided by using a separate grounding wire.

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CHAPTER 7: FIRE FIGHTING

7.1 GENERAL INFORMATION ABOUT FIRE PREVENTION:

I. The term 'FIRE PREVENTION' means taking all such necessary precautions to prevent fires from occurring. Generally, the term is accepted in such broader sense and may be conveniently divided into two parts.

a) Exercising precautions to prevent fires from actually occurring.
b) The precautions for minimizing or restricting the effect of fire when it does occur, along with the prevention of loss of lives from fire and panic.

II. Fire prevention largely depends upon a careful habit. It is the duty of every employee to prevent fire by strictly observing the following rules.

a) Smoking, open flames, and non-flame proof electrical equipment and tools are prohibited in all areas where flammable liquids or gases are stored, processed or being used. Such areas are demarcated and 'Danger Area' caution boards are displayed.
b) The waste dump such as oiled rags; papers, cotton waste and other scrap combustible materials should be kept in closed bins, which must be emptied regularly.
c) The passage and aisles should never be blocked and fire-fighting equipment should be within easy access.
d) Whenever there is a leakage of flammable substance, either through equipment for pipeline, it must be attended immediately.
e) Portable heating devices like blowlamp, stoves, etc. should not be used in flammable atmosphere or near combustible materials.
f) All employees should be familiar with the location and proper use of fire extinguishers.
g) Employees should be in case of fire, dial **0220 6656 5062** and inform fire station about
    - His name,
    - Location of fire and
    - Any chemicals / materials involved.

7.2 CLASSES OF FIRE:

For better utilization of the principles of elimination of fire, it is necessary to know the classes of fire their characteristics. Fires have been classified as **A, B, C and D** class fires.

a. 'A' Class Fires:

1. The 'A' Class fires are generally known as 'Carbonaceous' fires i.e. fires involving materials of organic origin such as wood, furniture, paper, skin, cloth, grass etc. Carbonaceous materials burn with the evolution of carbon dioxide, leaving as behind. These types of fires include fires in domestic apartments, dry vegetation godowns, lumber stores or any other area where wooden packaging cases are stored, and grass fires.

2. If solid combustible materials are not adequately cooled during firefighting operations, they my re-ignite and for this reason, water, by virtue of cooling properties, is the best extinguishing media.

b. 'B' CLASS FIRES:

FLAMMABLE LIQUIDS

1. This type of fire involves petroleum products, oils and lubrications. Hence, they are generally called as POL (Petroleum, Oil, Lubricant)

fires. This class includes methanol, alcohol, naphtha and other flammable liquid fires.

2. This type of fire can be expected in almost all areas where flammable liquids are processed, handled or stored.

3. The most suitable forms of extinguishing agents for use on small fires is flammable liquids which do not mix with water, are foam, carbon dioxide and Dry Powder.

c. 'C' CLASS FIRES:

GAS FIRES

1. The best method of extinguishing fires of gas leaking from equipment, pipe lines and vessels is to allow the flame to continue, keeping the surroundings cool with water spray to absorb heat and prevent the spread of fire.

2. In the mean time, reduce flow of gas to minimum positive pressure for easy extinguishments of the flame. If possible, introduce steam or inert gas in the system.

3. Cut off the gas immediately after extinguishing the fire.

4. Some times stopping the flow of gas without extinguishing the flame may cause flash back and explosion. Similarly, it may be dangerous if the fire is extinguished and the gas is allowed to flow. Undoubtedly a toxic concentration can cause gas poisoning accidents or an explosive gas mixtures may be formed, which, if ignited, could cause for greater danger than if the original fire had been allowed to burn.

d. 'D' CLASS FIRES:

a) This class of fires is also called 'Metallic Fires" involving metal which have been to the ignition stage. Metals like Sodium, Potassium, Aluminium, Zinc etc. are generally involved in this class of fires.
b) Normal extinguishing agents are ineffective on this class of fires. These fires are best controlled by covering with special dry chemicals are granular material which exclude oxygen and do not react or combine adversely with the metal.

7.3 CAUSES OF FIRE AND PREVENTIVE MEASURES:

a. Electrical:

Electrical equipment may give rise to fire as a result of overheating or short circuit. These defects may be caused due to one or more of the following factors.

1. Short circuits caused primarily by damage of breakdown of insulation.
2. Circuits over loaded beyond capacity giving rise to over heating particularly at weak spots such as loose connections.
3. Over loading on an electrical equipment.
4. Use of non-explosion proof electrical fittings in fire dangerous areas.

Preventive measures:

1. Proper maintenance.
2. Use of correct type of electrical equipment in fire-dangerous areas.

b. Smoking

Throwing lighted materials, and negligent smoking in areas where there is a chance of material getting ignited, can cause fires.

Preventive measures:

1. Smoking should be strictly prohibited in fire dangerous areas.
2. Smoking should be permitted only in safe areas such as lunchrooms, office rooms, welfare blocks, etc.
3. Regulations should be made known to all and strictly enforced.

c. Friction

Hot bearings, misaligned or broken machine parts, choking or jamming of materials, poor adjustment of power drives and conveyors can cause fires.

Preventive measures:

Periodical preventive maintenance.

d. Open Flames

Sparks, arcs, naked flames and hot metal from cutting and welding operations.

Preventive measures:

Safety work permit system should be followed.

e. Spontaneous Ignition

Materials such as sodium sulfide, oil seeds, oily wastes, rubbish, and rags are capable of spontaneous combustion.

Preventive measures:

1. Good housekeeping.
2. Removal of wastes regularly and cleaning of ducts, flues, etc. frequently.
3. Isolation and segregation of storage subject to spontaneous heating, and adequate ventilation.

f. Hot Surface

Exposure of combustible materials to hot surface of boilers and furnaces, hot ducts, flues, electric lamps, etc. can cause fires.

Preventive Measures:

Provision of sufficient clearance, insulation and air circulation between hot surfaces and combustibles.

g. Chemical Action

Fires due to chemical action can result from:

1. Chemical processes getting out of control,
2. Chemicals reacting with other materials and
3. Disregard to operational instructions.

Preventive measures;

1. Proper operation, instrumentation, and control of process.
2. Educating personnel on operating procedures and emergency operations.
3. Careful handling and storage of fire dangerous chemicals.

h. Static Electricity

At Jawahar Dweep and OPL Pir-Pau, hazardous liquids are transported through pipelines. The flow of organic liquids over a speed of 0.7 meters per second generates static electricity. The static electric charges thus accumulated due to flow of organic liquids must be discharged by means of earthing provided to the

equipment or else they get discharged in the form of spark, which can be a source of fire.

Preventive measures:

(a) Bonding and earthing of equipment.
(b) Dehumidification or ionization of the atmosphere.

7.4 ACTION TO BE TAKEN ON THE OUTBREAK OF FIRE:

a. By person Discovering Fire:

1. Shout 'Fire' to alert.
2. Next-person coming at the scene will immediately inform the fire station.
3. Guide the fire brigade party to the exact location.

b. Sectional head of the of the affected area:

1. Ring up to fire-fighting salvage party.
2. In addition send a runner to fire station and Security/Safety Officer for information.
3. Switch off the electric supply of the affected area.
4. Inform the maintenance department to send their technician to attend in case situation demands.
5. Maintain a record of sequence.

c. Action by office in the close vicinity of Fire.

1. Evacuate all persons working in,
2. Switch off the Electricity.
3. Available person may help the salvage party if required.

d. Action by Fire Department

1. Proceed with the available facilities to the scene of fire and get into action immediately. If necessary locks of the building should be broken /opened by using the correct device.

e. Action by Maintenance Department

Water supply will be adequately maintained.

f. Action by Medical Department

Immediate adequate first aid treatment to give and arrange for the evacuation of injured person for proper treatment in hospital if necessary.

g. Action by Traffic Department

Arrange to provide the ambulance/vehicles along with Driver for evacuation of injured person.

h. Action by Power Station

To cut-off electric supply to that section as per the specific instruction form senior level responsible person from Maintenance Department/Fire Department/Safety Department

i. Action by Security/CISF

1. Make arrangement for availability of key of the building affected to the scene of fire.
2. Brief about the incidence to senior authorities as they desired.
3. Not to allow unauthorised person.

7.5 PORTABLE FIRE EXTINGUISHERS FOR VARIOUS CLASSES OF FIRE:

a. Soda Acid Extinguishers for **class 'A' Fires:**

These extinguishers are usually of two gallons capacity. As the name suggests the chemicals employed are Sodium Bicarbonate Solution and Sulphuric Acid.

i) Description: The extinguishers have got two containers inner and the outer. In the outer container, the solution of sodium bicarbonate is filled up to the level while a hermetically sealed sulphuric acid bottle will be placed in a inner container, connected to the cap through a plunger rod. The extinguisher is actuated by bringing in the two chemicals together to liberate carbon dioxide as under:

$2NaHCO_3 + H_2SO_4 = Na_2SO_4 + 2H_2O + 2CO_2$

The Carbon dioxide thus liberated pressurizes and pushes out the liquid / water through the nozzle in the form of a jet.

ii) Operation:

a) Invert the extinguishers holding by bottom handle

b) Strike the knob on floor or any hard surface

c) Direct the jet towards the location of fire keeping the extinguishers inverted only.

b. Carbon Dioxide Extinguisher for Class B and C Fires:

1. These are available in cylinders of 5, 10, 15, 50 lbs. capacity, provided with a release valve and a horn for directing the gas on the seat out fire. The Carbon dioxide puts out the fire by smothering of the fire by displacement of oxygen due to high velocity at which it comes out and by cooling effect due to rapid physical change.
2. **Operation:** Pull out the locking pin on the cylinder valve. Open the valve and direct the horn at the base of the fire. Continue the operation even after putting out the fire as the gas (CO_2) will cool the matter and avoid recurrence of fire on the same matter.
3. **Advantages:** The CO_2 snow is dry and non-toxic. It will not harm materials or fine machine parts. Being non-conductor of electricity, it is very suitable for electrical fire and electrical equipment on fire. It is very useful on mobile equipment, uneven burning surfaces, oil drums, paint spray booths and other confined spaces. It can extinguish the fire at inaccessible position as CO2 gas can penetrate up to such locations.
4. **Disadvantages:** It is not suitable for open fires outdoors since wind current may disperse the gas. If present in large quantities in enclosed / confined spaces, it posses a breathing problem. As the throw of the gas is not long, person requires to approach close to the fire while using this extinguisher.

c. Foam Extinguisher for Class A and B Fires:

1. They are available in two sizes. The 2-gallon (9 liters) extinguisher is a portable one while the 10-gallon (40 liters) extinguishers is mounted on trolley. The 34 gallons extinguishers mounted on wheels are also available.
2. The foam is produced and expelled through nozzle in the form of a jet by the interaction of two solutions, namely sodium bicarbonate in the outer container and aluminium sulphate in the inner container. The reaction takes places as follows:

   $\mathbf{Al_2(SO_4)_3 + 6NaHCO_3 = 2Al(OH)_3 + 3Na_2SO_4 + 6CO_2.}$
3. **Use:** Foam extinguishers is the best suited for POL and solvent fires. It extinguishes the fire by blanketing effect, cooling effect being very

little. These extinguishers should never be used on electrical and metallic fires.

4. **Operation:**
   i) Pull the know on the cap
   ii) Turn upside down.
   iii) Direct the foam jet in such a manner that it should not strike the burning liquid surface but it should be rolled on over the burning liquid without stirring it up, to give blanketing effect.
5. **Advantages:**
   i) It coats the burning surface and excludes oxygen.
   ii) It floats on liquids.
   iii) It has considerable heat resisting qualities. It acts as an insulator and serves to prevent re-ignition.
6. **Disadvantages:**
   i) Foam freely mixes with certain liquids and renders them unusable. It is a good conductor of electricity and hence cannot be used on energized equipments.

d. Dry Chemical powder Extinguisher for Class B, C & D Fires:

1. They are available in our plant in capacities of 10 lb. and 50 lb. The Dry Chemical Extinguisher consists of an internally or externally mounted cartridge of carbon dioxide or nitrogen gas which, when the top is punctured or the cartridge valve is opened, expels chemically processed sodium bi-carbonate powder in the outer shell through the hose and nozzle. The inert gas and the chemical action of powder smother the fire.
2. **Operation:**
   i) Carry the extinguisher to the fire**.**
   ii) Keep extinguisher UPRIGHT, and remove plunger guard clip.
   iii) Strike the plunger hard.
   iv) Direct the discharge at the base of flame, control flow by squeeze grip provided at the discharge end of the hose.
3. **After Use:**
   Open cap and remove the empty cartridge and container, clean discharge hose and nozzle. Extinguisher should be immediately refilled after use even though only partially discharged. Before recharging, hose should be cleaned of all dry chemical powder.
4. We have 10 lb. 20 lb. capacity, internally mounted CO_2 cartridge, plunger type extinguishers. we also have 50 lb. wheeled unit. Dry powder used in these extinguishers is generally a mixture of:
   Sodium Bicarbonate : 97%
   Magnesium Stearate : 1.5%
   Magnesium Carbonate : 1%
   Tri Calcium Phosphate : 0.5%
   The first being the extinguishing agent and the others are additives to avoid caking of the material.
   The action of dry chemical powder, in putting out the fire, is due to the blanketing of powder, which is expelled by carbon dioxide from the punctured cartridge, and due to evolution of carbon dioxide from Sodium-Bicarbonate and its consequent cooling effect.
5. **Advantages:**
   i) Sodium Bi-carbonate is relatively stable on heating and covers the burning surface, which starves the fire.
   ii) The powder is non-conductor of electricity, non-toxic and non corrosive

6. **Disadvantages:**

i) Some dry powder extinguishers have a limited range and require approaching close to the fire.

ii) When dry powder is used on some solvents, it dissolves and becomes ineffective.

iii) The dust of dry chemical gives no permanent blanketing or insulating effect and re-ignition is possible

The dust deposit may present difficult cleaning problem.

iv) The extinguisher is unsuitable for deep-seated fires or to out door fire in windy weather.

7.6 STANDARD OPERATING PROCEDURE FOR FIRE FIGHTING

(A) ON DUTY FIRE MAN IN FIRE CONTROL ROOM-

(i) On receipt of message on duty fire man will write down all information and call back on the telephone nos. given by the caller to confirm about the fire.

(ii) After confirming he will press the 'Fire Bell'.

(iii) He will contact PSFO and Asstt. PSFO.

(iv) Ensure electrical power is isolated by MEED at fire site and sufficient illumination is available at surrounding area.

(v) After obtaining necessary orders he will deploy necessary crew and send them to attend the incidence along with necessary equipments and fire tender.

(vi) He will maintain the communication with the riding officer turnout with fire vehicle.

(vii) He will inform the VTMS / Port control.

(viii) He will write all the information received from fire site in occurrence book

(ix) He will provide all the help or reinforcement required at fire ground by informing the officer present at fire station.

(x) He will activate the CRISIS management group if situation is beyond control & evacuation has to be carried out, by informing P.A. of Chairman, Dy. Chairman, and all HODs, after the message received from the Sr. Section leader from the fire ground

(B) FIRE CREW

(i) Fire crew turn out to attend the call within 40 seconds and shall reach the spot and inform the control room about the site situation

(ii) Fire crew under guidance of Sr. Section leader and orders of PSFO will decide the course of action for tackling fire and carry out the fire fighting operation to extinguish the fire .

(iii) Fire crew will also carry out necessary rescue operation and shift the casualties to the hospital in ambulance.

(iv) Fire staff will communicate with seniors from the seat of the fire/ close to fire source of fire to tackle it as quickly as possible.

(v) Fire crew will use the resource provided by seniors to tackle the fire and save the life & property of Mumbai Port Trust.

(C) CONTROL ROOM SUPERVISORS

(i) Control room supervisors keep the reinforcement, ready (if required) and all emergency nos. ready at desk.

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CHAPTER 8: FIRST-AID

The first-aid is the immediate and temporary treatment given to the victim of an accident or sudden illness/till effective medical aid arrives. It's purpose is to preserve life, assist recovey and prevent aggravation, until the service of a DOCTOR can be obtained or during transporting to the hospital. In no case, first aid should be considered as a substitute for a treatment by a qualified medical authority.

First aid is not an exact science the essentials for the saving of life are not altered by variations in existing conditions. The order of treatment varies greatly and is determined by physical condition as well as the nature of the injuries.

8.1 MEDICAL SERVICES AND FIRST AID:

a. General requirement. The employer shall ensure that emergency medical services and first aid are readily accessible.

b. Advice and consultation. The employer shall ensure that healthcare professionals are readily available for advice and consultation on matters of workplace health.

c. First aid providers.

1. The employer shall ensure that there is an adequate number of employees trained as first aid providers at each worksite during each workshift unless:
   - **(i)** There is an on-site clinic or infirmary with first aid providers during each workshift; or
   - **(ii)** The employer can demonstrate that outside first aid providers (i.e., emergency medical services) can reach the worksite within five (5) minutes of a report of injury or illness. The employer must take appropriate steps to ascertain that emergency medical assistance will be readily available promptly if an injury or illness occurs.
2. The employer shall ensure that a first aid provider is able to reach an injured/ill employee within five (5) minutes of a report of a serious injury, illness, or accident such as one involving cardiac arrest, acute breathing problems, uncontrolled bleeding, suffocation, electrocution, or amputation.
3. The employer shall use the following factors in determining the number and location of employees who must have first aid training: size and location of each worksite; the number of employees at each worksite; the hazards present at each worksite; and the distance of each worksite from hospitals, clinics, and rescue squads.
4. The employer shall ensure that first aid providers are trained to render first aid, including cardiopulmonary resuscitation (CPR).
5. The employer shall ensure that each first aid provider maintains current first aid and CPR certifications, such as issued by the Red Cross, American Heart Association, or other equivalent organization.

d. First aid supplies.

1. The employer shall provide and maintain adequate first aid supplies that are readily accessible to each worksite. An employer's onsite infirmary or clinic containing first aid supplies that are readily accessible to each worksite complies with this requirement.
2. The employer shall ensure that the placement, content, and amount of first aid supplies are adequate for the size and location of each worksite, the number of employees at each worksite, the

hazards present at each worksite, and the distance of each worksite from hospitals, clinics, and rescue squads.

3. The employer shall ensure that first aid supplies are placed in a weatherproof container.
4. The employer shall maintain first aid supplies in a dry, sterile, and serviceable condition.
5. The employer shall replenish first aid supplies as necessary to ensure that there is an adequate supply when needed.
6. The employer shall inspect first aid supplies at sufficient intervals to ensure that they are adequate and in a serviceable condition.

e. Quick-drenching and flushing facilities. Where the potential exists for an employee to be splashed with a substance that may result in an acute or serious injury, the employer shall provide facilities for quick-drenching or flushing the eyes and body. The employer shall ensure that such a facility is located for immediate emergency use within close proximity to operations where such substances are being used.

f. Basket stretchers.

1. The employer shall provide an adequate number of basket stretchers, or the equivalent, readily accessible to where work is being performed.
2. The employer shall ensure each basket stretcher, or the equivalent, is equipped with:
   - **(i)** Permanent lifting bridles that enable the basket stretcher, or the equivalent, to be attached to hoisting gear capable of lifting at least 5,000 pounds (2,270 kg);
   - **(ii)** Restraints that are capable of securely holding the injured/ill employee while the basket stretcher, or the equivalent, is lifted or moved; and
   - **(iii)** A blanket or other suitable covering for the injured/ill employee.

3. The employer shall store basket stretchers, or the equivalent, and related equipment (i.e., restraints, blankets) in a clearly marked location in a manner that prevents damage and protects the equipment from environmental conditions.
4. The employer shall inspect stretchers, or the equivalent, and related equipment at intervals that ensure the equipment remains in a safe and serviceable condition, but at least once a year.

8.2 FIRST AID FOR VARIOUS INJURIES/SITUATIONS:

a. FAINTING

1. Place victim in lying down position with head lower than the rest of the body.
2. Loosen his clothing at neck, chest and waist.
3. Ensure plenty of fresh air.
4. Sprinkle his face and chest with cold water.
5. Put smelling salt or ammonia to nose if it is a hysterical case.
6. Rub limbs towards head.

b. SPRAINS

1. Ensure absolute rest for the victim till the arrival of a doctor.
2. The affected joint should not be moved. If possible elevate the affected joint.
3. Apply firs bandage on the affected joint and keep it cold and wet using water.

c. WOUNDS, CUTS, ABRASIONS.

1. The most common injury resulting from an accident tis a cut or abrasion are superficial first stem the bleeding than clean them carefully and thoroughly with water. After cleaning, cover them with a bandage.
2. Serious cuts and wounds should always be treated by a Doctor in such cases first-aid held as restricted to the application of a dressing and bandage.
3. Abrasion may appear relatively light and insignificant however, it is often more of an infection risk than an open wound.
4. All deeper cuts and abrasion which are the result of accidents occurring while working outside should be treated by a doctor to avoid tetanus(Lockjaw).
5. If an old wound or sore shows sign of being infected (swelling, disconaning or pain), it should be treated by competent Medical personnel.

d. STEMMING HEAVY BLEEDING.

If the injured person is bleeding, try to stop the bleeding by using pressure on the wound and by placing the injured limb in a raised position.

In most of the cases this is all that is required to stem the flow of blood.

The injured person should be with feet up except in cases of head or chest injury or difficulty in breathing.

e. EYE INJURIES

The greatest possible care should be taken in the case of injuries to the eye or the area surrounding at.

Foreign body or part in the eye is one of the most common eye complaint. If you get a mote in your eye, and it is near the surface you can rinse it out or very carefully wipe it way a swab of cotton on the corner of a clean handkerchief.

If the object has become wedged in the eye. It would be removed by a doctor.

It the eye is exposed to the brilliant light from an electric arc. In welding work, it can become inflamed and irritated. The best thing to do in such a case is to get in touch with a doctor as soon as possible.

f. BROKEN LIMBS, SPRAINS, DISLOCATIONS

In case, where a fractured limb is suspected, then injured person should have his limb immobilizes to prevent the break from getting worse and to alleviate the pain.

Use a sprint a coupled of stick or even a rolled up newspapers, place the support on the outside of the clothing and secure it with a bandage.

The sprint or support should be long enough to cover the joints above and below the break in the bone.

To avoid unnecessary pressure on the break, wedging can be inserted between the splint, wedging can be inserted between the splint and limb.

When there as an open wound on the broken wound, use a dressing to cover the wound before applying the splint.

g. INJURIES FROM ELECTRICITY.

Electric shocks affect the heart and can rapidly be fatal. Additional injuries could occur of the victim, when shocked, should fall from a scaffolding ladder or any elevated place.

If the injure person is still touching an electric device the current should be cut off immediately by switching it off, use something that is long

dry clean and nonconductive to move the person away from the source or the source way from the person.

Once the injured person has been pulled away from the live current cardio-pulmonary resuscitation should be applied if needed. Do not waste time mainly the injured person to sick by a another spot.

h. BURN

1. If a person's clothing has caught fire, the best way of quenching the flame as to roll the person, on the floor or in a blanket. After extinguishing the flames make sure the person is breathing. Cool the burn with water, cover the burn, and make sure that the victim gets to hospital as early as possible. Do not under any circumstances, try to remove the victim's cloths. If the area of burn is larger than palm of your hand or the victim's facial burns, you can place a protective bandage over the injury. The victim must be taken to hospital or doctor as quickly as possible after such preliminary measures.
2. In the case of more serious burns, it is very likely that the victims will suffer from shock you should always be prepared to take the necessary measures to prevent severe shock.
3. If in the case of burn smaller than the size of your palm, you can start immediately by rinsing the burn under running water, or use the distilled water, in the first aid but never use flour, butter, cream, alcoholic, iodine as such like substances or burns. Never pierce as blister on a burn.

8.3 CHEMICAL BURNS DUE TO ACID AND ALKALIES:

1. Eye

(i) Immediately wash the affected eye with copious amount of water from eye wash fountain or tap, at least for 15 minutes.
(ii) Do not use any oil or oily ointment.
(iii) Put on a sterile bandage and send patient to hospital.

2. Skin

(i) Immediately wash the affected portion with copious amount of water from safety shower or water hose, for about 15 minutes.
(ii) Remove affected clothing.
(iii) Do not touch the burnt area without washing hands thoroughly with soap and water.
(iv) Do not apply any oil or ointment.
(v) Put on sterile bandage and send patient to hospital.

3. Ingestion

Ingestion or swallowing of even dilute solutions of acid and alkalis causes severe burns of lips, mouth, throat and stomach. Observe the following in such cases.

(i) Do not attempt to induce vomiting.
(ii) Do not give anything by mount if the patient is unconscious.
(iii) If the patient is conscious, encourage him to wash out his mouth with water and give him plenty of water to drink except in case of sulphuric acid, and then milk or sufficient water to drink.
(iv) Send for a doctor.

8.4 INGESTION (SWALLOWING) OF OTHER CHEMICALS (OTHER THAN ACIDS & ALKALIES):

a) Induce vomiting with salt and tickling of the throat.
b) Give a glass or two of milk.
c) Treat shock.
d) Transfer patient to hospital.

8.5 SNAKE BITE:

The aim of First Aid treatment is to prevent the venom injected by the fangs of the snake from reaching the general circulation.

a) Apply a constrictive bandage on the heart side of the bite, tightly enough to stop the circulation through the veins of the bitten limb (there is no need to arrest the arterial circulation in the limb). The constrictive bandage, which is applied in case of bite on limbs, should be kept on for half an hour and then relaxed for half a minute. Construction should be maintained until antivenin can be obtained but if after three hours (with intermittent relaxation) the patient develops to symptoms, it can be removed. A constructive bandage is useless if applied more than one hour after the bite has occurred.
b) Bath the wound. If available, water made dark red with permanganate of potash should be used.
c) When the constructive bandage has been applied and the surface cleaned, cut deep 3/4th x 3/4th cross into the soft tissues of the region of the bite in the length of the limb with a sharp knife, the blade of which has been passed through flame or kept in spirit. This will encourage bleeding and help to wash the venom from the bite.
d) Seek medical aid.
e) Only in an emergency and when the above measures are not applicable suck the wound and spit out the poison. This procedure is not without danger, when there is an ulcer in mouth and stomach.
f) Keep the casualty absolutely at rest.
g) Give hot and sweet tea or coffee and keep him harm.
h) Should breathing fail, apply artificial respiration.

8.6 FIRST AID IN CASE OF A HEART ATTACK:

a) Every second counts, hence act promptly.
b) Never allow the patient to move. Moving may stop the heart.
c) Loosen the tight clothing's and open the buttons of the dress.
d) Clear the room of people and allow the patient to breathe freely.
e) Calm the patient, if he panics.
f) Don't give the patient anything to drink or eat, if there is vomiting, wipe the mouth.
g) If the patient has a past history of heart disease, place a Sorbitrate / Nitroglyerine tablet under his tongue.
h) Call the fire department and call an ambulance immediately and take the patient to FAP/OHC/RCF hospital. Patient will be then transferred to an intensive Cardiac Care Unit (ICCU).

8.6.1 HOW TO USE RESUSCITATOR

a) Lay the victim on back, till head well back placing raiser (clothing, head pad sand or pillow) under shoulder.
b) Clear air passage of any foreign matter, water or froth and bring tongue forward.
c) Holt resuscitator mask tightly against face with narrow portion over nose. Support mask from chin side. Squeeze bladder 10 – 15 times a minute. Observe that chest rises and falls regularly.
d) If medical oxygen is to be connected to resuscitator, connect oxygen supply tube to oxygen inlet provided on the resuscitator valve assembly. Maintain Oxygen flow at the rate of 1 litter per minute.

8.7 RESPIRATION FALIURE-ARTIFICIAL RESPIRATION:

If a person has collapsed, become unconscious, and there is no movement of the chest, then the victim has stopped breathing, support the back of the neck with one hand, and place the other hand on the forehead. Bend the injured person's head as far back as you can. Pinch nose and start blowing air into through mouth.

If the person has possibly injured neck, grasp the chin and pull it away from the neck without moving the neck.

Keep an eye on the injured person's chest and when it rises you know that the lungs have started taking in air.

Repeat the blowing action once every five seconds, continue with artificial respiration until the injured person starts breathing or medical personnel takes-over.

a. TIPS TO REMEMBER:

1. Move the injured person / patient, if there is immediate threat of further injury.
2. Be calm.
3. If artificial respiration is needed start it without delay.
4. Loose the tight clothing, belt.
5. If there is bleeding, control it.
6. Treat for shock.
7. Dress all wounds & burns.
8. Keep the patient injury down quietly.
9. Support all fractures on both sides of fracture area & apply well-padded splints.
10. If heart stops, heart massage should be given by a trained first-aider.
11. Transport patient carefully to a doctor or hospital.

8.7.1 MOUTH TO MOUTH RESPIRATION

This method is very easy and can be administered by untrained person, without any equipment, as under.

1. Look for falling back of tongue, and bring it forward. Also, look for any foreign body and remove it. This will clear the respiratory passage.
2. Take a deep breath in and by closing nostrils of the casualty keep your mouth on the mouth of casualty with lips air tight and coinciding with casualty lips and blow the expired air in casualty's mouth at the rate of 5 – 6 times per minute.
3. Observe elevation of the chest of casualty. Continue the method till casualty starts breathing or the Resuscitator is made available.
4. Do not discontinue artificial respiration till the casualty starts breathing or the doctor declares it to be dead.
5. This is the only method for rendering artificial respiration to drowned person. This can be used in case of new-born babies who do not cry immediately after deliver.

8.7.2 MOUTH TO NOSE METHOD

This method is used when the casualty is having burns injury or skin disease in or around mouth.

1. Keep casualty's lower jaw tightly compressed against the upper jaw and after full inspiration blow air in the nostrils of casualty by keeping lips air tight around the nose of casualty.
2. Notice any elevation of chest of the casualty and if it is not found, look for the causes of obstruction as in mouth-to-mouth method.
3. When elevation is effected, continue the method at the rate of 5 - 6 time per minute till casualty starts breathing of his own.

4. Never discontinue the artificial respiration till doctor declares that the casualty is dead.

8.8 TIPS TO REMEMBER FOR FIRST-AID:

With a serious injury or illness, follow these rules.

a) Move patient only if there is immediate threat of further injury to him/her.
b) Be calm.
c) Take charge and give orders.
d) If artificial respiration is needed, start it without delay.
e) If there is bleeding, control it.
f) Treat for shock (Reassure the victim)
g) Keep the patient lying down quietly?
h) Dress all wounds and burns.
i) Support all fractures on both sides of fracture area and apply well-padded splints.
j) If possible remove cause of accident, e.g. Putting off current, closing valves etc
k) Loosen the tight clothing, belt etc.
l) If the heart stops, heart massage should be given by a trained first-aider while another first-aider gives artificial respiration.
m) Call ambulance from Fire Department.
n) Transport patient carefully to a hospital or doctor at First Aid Post.

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CHAPTER 9: PERSONAL PROTECTIVE EQUIPMENTS

9.1 GENERAL REQUIREMENTS:

a. **Provision and use of equipment.** The employer shall provide and shall ensure that each affected employee uses the appropriate personal protective equipment (PPE) for the eyes, face, head, extremities, torso, and respiratory system, including protective clothing, protective shields, protective barriers, personal fall protection equipment, and lifesaving equipment, meeting the applicable provisions of this Subpart, wherever employees are exposed to work activity hazards that require the use of PPE.

b. **Hazard assessment and equipment.** The employer shall assess its work activity to determine whether there are hazards present, or likely to be present, which necessitate the employee's use of PPE. If such hazards are present, or likely to be present, the employer shall:
   1. Select the type of PPE that will protect the affected employee from the hazards identified in the occupational hazard assessment;
   2. Communicate selection decisions to affected employees;
   3. Select PPE that properly fits each affected employee; and
   4. Verify that the required occupational hazard assessment has been performed through a document that contains the following information: occupation, the date(s) of the hazard assessment, and the name of the person performing the hazard assessment.

c. **Defective and damaged equipment.** Defective or damaged PPE shall not be used.

d. **Reissued equipment.** The employer shall ensure that all unsanitary PPE, including that which has been used by employees, be cleaned and disinfected before it is reissued.

e. **Training**.
   1. The employer shall provide training to each employee regarding use of PPE Each employee shall be trained to understand at least the following:
      - **(i)** When PPE is necessary;
      - **(ii)** What PPE is necessary;
      - **(iii)** How to properly don, doff, adjust, and wear PPE;
      - **(iv)** The limitations of the PPE; and,
      - **(v)** The proper care, maintenance, useful life and disposal of the PPE.

   2. The employer shall ensure that each affected employee demonstrates the ability to use PPE properly before being allowed to perform work requiring the use of PPE.
   3. The employer shall retrain any employee who does not understand or display the skills required by paragraph (e)(2) above. Circumstances where retraining is required include, but are not limited to, situations where:
      - **(i)** Changes in occupation or work render previous training obsolete; or
      - **(ii)** Changes in the types of PPE to be used render previous training obsolete; or
      - **(iii)** Inadequacies in an affected employee's knowledge or use of assigned PPE indicate that the employee has not retained the requisite understanding or skill.

9.2 CLASSIFICATION OF PERSONAL PROTECTIVE EQUIPMENTS:

The personal protective equipment's which are commonly used can be classified into two categories as under:

a) **Non Respiratory Protective Equipment**

These types of personal protective equipment are meant for the protection of the various parts of body such as hands, face, eyes, ears, head, torso, etc. against physical injuries.

b) Respiratory Protective Equipment

These types of personal protective equipment provide protection to the breathing system of the individuals against toxic and poisonous substances while working in contaminated or oxygen deficient environment.

9.3 NON RESPIRATORY PROTECTIVE EQUIPMENTS:

a. Eye and face protection

1. The employer shall ensure that each affected employee uses appropriate eye or face protection where there are exposures to eye or face hazards caused by flying particles, molten metal, liquid chemicals, acid or caustic liquids, chemical gases or vapours, or potentially injurious light radiation.

2. The employer shall ensure that each affected employee uses eye or face protection that provides side protection when there is a hazard from flying objects. Detachable side protectors (e.g., a clip-on or slide-on side shield) meeting the pertinent requirements of this section are acceptable.

3. The employer shall ensure that each affected employee who wears prescription lenses while engaged in operations that involve eye hazards wears eye protection that incorporates the prescription in its design, unless the employee is protected by eye protection that can be worn over prescription lenses without disturbing the proper position of either the PPE or the prescription lenses.

4. The employer shall ensure that each affected employee uses equipment with filter lenses that have a shade number that provides appropriate protection from injurious light radiation.

b. **Head protection**

1. **Use.**

(i) The employer shall ensure that each affected employee wears a protective helmet when working in areas where there is a potential for injury to the head from falling objects.

(ii) The employer shall ensure that each affected employee wears a protective helmet designed to reduce electrical shock hazards where there is potential for electric shock or burns due to contact with exposed electrical conductors which could contact the head.

2. **Criteria for protective helmets.**

(i) Head protection must comply with the Indian Standard (IS) or any equivalent standard to the IS Standard.

(ii) Eye and face protection devices that the employer demonstrates are at least as effective as protective as eye and face protection devices that are constructed in accordance with one of the above consensus standards will be deemed to be in compliance with the requirements of this section.

c. **Foot protection**

Use : The employer shall ensure that each affected employee wears protective footwear when working in areas where there is a danger of foot injuries due to falling or rolling objects or objects piercing the sole.

d. **Hand and body protection**

1. The employer shall ensure that each affected employee uses appropriate hand protection and other protective clothing where there is exposure to hazards such as skin absorption of harmful substances, severe cuts or lacerations, severe abrasions, punctures, chemical burns, thermal burns, harmful temperature extremes, and sharp objects.

2. **Hot work operations.** The employer shall ensure that no employee wears clothing impregnated or covered in full or in part with flammable or combustible materials (such as grease or oil) while engaged in hot work operations or working near an ignition source.
3. **Electrical protective devices.** The employer shall ensure that each affected employee wears protective electrical insulating gloves and sleeves or other electrical protective equipment, if that employee is exposed to electrical shock hazards while working on electrical equipment.

e. **Lifesaving equipment**

1. **Personal flotation devices(PFDs).**

(i) PFDs (life preservers, life jackets, or work vests) worn by each affected employee must be as per Indian Standard.

(ii) Prior to each use, personal flotation devices shall be inspected for dry rot, chemical damage, or other defects which may affect their strength and buoyancy. Defective personal flotation devices shall not be used.

2. **Ring life buoys and ladders.**

(i) When work is being performed near water approved ring life buoys with lines attached shall be located in readily visible and accessible places.

(ii) When work is being performed near water there shall be at least one portable or permanent ladder in the vicinity. The ladder shall be of sufficient length to assist employees to reach safety in the event they fall into the water.

f. **Personal fall arrest systems (PFAS)**

1. Criteria for connectors and anchorages.

(i) Connectors shall be made of drop forged, pressed, or formed steel or shall be made of materials with equivalent strength.

(ii) Connectors shall have a corrosion-resistant finish, and all surfaces and edges shall be smooth to prevent damage to the interfacing parts of the system.

(iii) D-rings and snaphooks shall be capable of sustaining a minimum tensile load of 5,000 pounds (22.24 Kn).

(iv) D-rings and snaphooks shall be proof-tested to a minimum tensile load of 3,600 pounds (16 Kn) without cracking, breaking, or being permanently deformed.

(v) Snaphooks shall be sized to be compatible with the member to which they are connected to prevent unintentional disengagement of the snaphook caused by depression of the snaphook keeper by the connected member, or shall be of a locking type that is designed and used to prevent disengagement of the snap-hook by contact of the snaphook keeper by the connected member.

(vi) Snaphooks, unless of a locking type designed and used to prevent disengagement from the following connections, shall not be engaged:

- directly to webbing, rope or wire rope;
- to each other;
- to a D-ring to which another snaphook or other connector is attached;
- to a horizontal lifeline; or
- to any object that is incompatibly shaped or dimensioned in relation to the snaphook such that unintentional disengagement could occur by the connected object being able to depress the snaphook keeper and release itself.

(vii) On suspended scaffolds or similar work platforms with horizontal lifelines that may become vertical lifelines, the devices used for connection to the horizontal lifeline shall be capable of locking in any direction on the lifeline.

(viii) Anchorages used for attachment of personal fall arrest equipment shall be independent of any anchorage being used to support or suspend platforms.

(ix) Anchorages shall be capable of supporting at least 5,000 pounds (22.24 Kn) per employee attached, or shall be designed, installed, and used as follows:

- as part of a complete personal fall arrest system which maintains a safety factor of at least two; and
- under the direction and supervision of a qualified person.

2. Criteria for lifelines, lanyards, and personal fall arrest systems.

(i) When vertical lifelines are used, each employee shall be provided with a separate lifeline.

(ii) Vertical lifelines and lanyards shall have a minimum tensile strength of 5,000 pounds (22.24 Kn).

(iii) Self-retracting lifelines and lanyards that automatically limit free fall distances to 2 feet (0.61 m) or less shall be capable of sustaining a minimum tensile load of 3,000 pounds (13.34 Kn) applied to a self-retracting lifeline or lanyard with the lifeline or lanyard in the fully extended position.

(iv) Self-retracting lifelines and lanyards which do not limit free fall distance to 2 feet (0.61 m) or less, ripstitch lanyards and tearing and deforming lanyards shall be capable of sustaining a minimum static tensile load of 5,000 pounds (22.24 Kn) applied to the device when they are in the fully extended position.

(v) Horizontal lifelines shall be designed, installed, and used under the supervision of a qualified person, and shall only be used as part of a complete personal fall arrest system that maintains a safety factor of at least two.

(vi) Effective November 20, 1996, personal fall arrest systems shall:

- limit the maximum arresting force on a falling employee to 900 pounds (4 Kn) when used with a body belt;
- limit the maximum arresting force on a falling employee to 1,800 pounds (8 Kn) when used with a body harness;
- bring a falling employee to a complete stop and limit the maximum deceleration distance an employee travels to 3.5 feet (1.07 m), and
- Have sufficient strength to withstand twice the potential impact energy of an employee free falling a distance of 6 feet (1.83 m), or the free fall distance permitted by the system, whichever is less;
- Personal fall arrest systems shall be rigged such that an employee can neither free fall more than 6 feet (1.8 m) nor contact any lower level.

3. Criteria for selection, use and care of systems and system components.

(i) Lanyards shall be attached to employees using personal fall arrest systems, as follows:

- The attachment point of a body harness shall be located in the centre of the wearer's back near the shoulder level, or above the wearer's head. If the free fall distance is limited to less than 20 inches (50.8 cm), the attachment point may be located in the chest position; and
- The attachment point of a body belt shall be located in the centre of the wearer's back.

(ii) Ropes and straps (webbing) used in lanyards, lifelines and strength components of body belts and body harnesses shall be made from synthetic fibres or wire rope.

(iii) Ropes, belts, harnesses, and lanyards shall be compatible with their hardware.

(iv) Lifelines and lanyards shall be protected against cuts, abrasions, burns from hot work operations and deterioration by acids, solvents, and other chemicals.

(v) Personal fall arrest systems shall be inspected prior to each use for mildew, wear, damage, and other deterioration. Defective components shall be removed from service.

(vi) Personal fall arrest systems and components subjected to impact loading shall be immediately removed from service and shall not be used again for employee protection until inspected and determined by a qualified person to be undamaged and suitable for reuse.

(vii) The employer shall provide for prompt rescue of employees in the event of a fall or shall ensure that employees are able to rescue themselves.

(viii) Body belts shall be at least one and five-eighths inches (4.13 cm) wide.

(ix) Personal fall arrest systems and components shall be used only for employee fall protection and not to hoist materials.

4. **Training.** Before using personal fall arrest equipment, each affected employee shall be trained to understand the application limits of the equipment and proper hook-up, anchoring, and tie-off techniques. Affected employees shall also be trained so that they can demonstrate the proper use, inspection, and storage of their equipment.

9.4 RESPIRATORY PROTECTIVE EQUIPMENT:

a. It is of utmost importance that a proper type of respiratory equipment must be selected or else result may be suicidal. The following are main factors to be considered in the selection of the proper respiratory protective equipment for any given situation.

1. The nature of hazardous operation or process.
2. **The type of air contaminant including its physical properties, chemical properties, physiological effects on the body, and its concentration.**
3. The duration for which respiratory protection must be provided.
4. The state of health of the person involved.
5. The functional and physical characteristics of respiratory protective equipment.

b. The employees must be trained in proper selection and use of respiratory protective equipment. They must also develop a habit of upkeep, maintenance and proper storage of respiratory protective equipment's.

c. The following protective equipment's of various types and uses are available for respiratory protection against harmful and toxic environment.

9.5 GAS MASK CANISTER TYPE:

a) It consists of a face piece connected by a corrugated breathing tube to a canister. The face piece is provided with a visor, head harness and exhalation and inhalation valve. The canister is held in a harness for suspending in the neck and tieing in the waist.

b) The canister contains certain chemicals that purify, absorb or neutralize the contaminants and allow only fresh air to pass through to the face piece.

c) Because no single chemical has been found to remove all gaseous contaminants, the canister must be chosen to suit the specific need.
However, there are canisters available for protection against more than one contaminant.

d) Canister type gas masks are for emergency protection in contaminated environment. They do not provide protection in oxygen deficient atmosphere. Their effectiveness is limited to use in atmosphere containing at least 19.6% by volume of oxygen and not more than 2% by volume of those gases for which it is designed except for ammonia, for which the limit is 3%.

e) The period of protection that a canister gas mask will provide depends upon following factors:
   I. Type and size of the canister
   II. Concentration of the gas or vapour.
   III. Activity, health and breathing efforts of user.
   IV. Duration of use at each time.

f) By keeping proper records of time of canister's use and percentage of toxic concentration to which it was exposed, the approximate balance life of the canister can be ascertained. The life so determined, cannot be relied upon fully because of several factors controlling each as enumerated above, besides its manufacturing date and mode of storage.

g) When the face piece is properly adjusted air tight and all the parts of gasmasks are free from any cut, puncture, and mechanical defects, leakage of harmful and toxic gases indicated by odour, test and / or irritation of eyes, nose and throat is evidence that the canister is exhausted. However, in case of canister gas mask meant for odourless and tasteless gases such as carbon monoxide, a window indicator with reference & indicator sections is provided on the canister. In such a case when a colour of indicator section approaches to the colour of reference section, the canister is exhausted.

h) When it is detected that canister is exhausted, a canister must be changed with new one in fresh air.

i) The canister type gas mask must never be used in oxygen deficient atmosphere and inside confined spaces.

9.6 SELF CONTAINED COMPRESSED AIR-BREATHING APPARATUS (SCBA):

a) The apparatus consists of a high-pressure air cylinder, cylinder valve, demand regulator and a face piece with breathing tube and exhalation valve. The cylinder is mounted on back plate having harness for shoulder, chest and waist.

b) The apparatus can be used in atmosphere that is immediately hazardous to life. It affords completely respiratory protection in any toxic, harmful or oxygen deficient atmosphere, regardless of the concentration of the contaminants.

c) It allows complete freedom of movement with limiting factor of time, which is 35 minutes in respect of the apparatus available in our factory.

d) The air is drawn from the cylinder through a high-pressure hose to the demand regulator and passed over the face piece through corrugated breathing tube for inhalation. The exhaled air goes out through exhalation valve provided in face piece and thus is not rebreathed.

c) The demand regulator is provided with two knobs, one yellow and the other red. The yellow knob is the main valve control and used in normal working condition. The red knob is the bypass valve control and is used in case the yellow knob fails or demand regulator is damaged. The duration of air supply is using the red knob is greatly reduced and as such this operation more should be used to escape from the contaminated area not to continue work in case of failure of demand regulator and yellow knob.

e) The air cylinder, when fully charged, has a pressure of approximately 2000 p.s.i.g. and will last for 35 minutes. When the cylinder pressure, during the use of apparatus, drops to about 4000 p.s.i.g. a warning device

in the apparatus gives an alarm which continues till the cylinder becomes empty. The approximate time of alarm is 5 minutes.

g) During the use of apparatus when the alarm is sounded, a user must come out to the fresh air and change the cylinder with a full one.

- **How to use Breathing Apparatus:**

The putting on of self-contained compressed air breathing apparatus is one-man operation and needs regular practice and training for immediate use in emergency. The apparatus can be put on in the following manner:

a) Take out the apparatus from the case by holding the shoulder straps.
b) Swing the cylinder on the back and insert both hands under the shoulder belt.
c) Adjust the shoulder straps by pulling downwards backside with both hands. If necessary, give a jerk to the cylinder resting on back for better and quicker tightening of the shoulder strap. Adjust the waist belt:
d) Put on the face piece and adjust the head harness untill the face piece fits closely, comfortably and air tight.
e) Grasp the breathing tube tightly and close the air intake. Breathe; deeply until the face piece on face. If correctly adjusted, the face piece will remain collapsed until the air intake is opened.
f) Ensure that red knob on demand regulator is fully closed.
g) Release the cylinder valve safety lock and open the cylinder valve by turning the wheel two to three full turns. Check the pressure gauge for full indication.
h) Open fully the yellow knob on demand regulator.
i) Connect the breathing tube coupling to the outlet of the demand regulator before entering in the contaminated area.

- **Changing Air Cylinders:**

a) Uncouple the breathing tube from the demand regulator.
b) Release cylinder valve safety lock and close the cylinder valve fully.
c) Open the red knob on demand regular to depressurise the high-pressure hose.
d) Uncouple the high-pressure hose from the cylinder valve.
e) Pull the cylinder-clamping lever to release the cylinder.
f) Remove empty cylinder from the back plate and replace with full one.
g) Replacing the charged cylinder can be done in reverse order of the above steps.

- **Maintenance:**

a) All the respiratory protective equipment's must be maintained in good working condition. When any part shows signs of failure, it should be replaced with proper part.
b) The face piece and breathing tube which form the part of the respiratory protective equipment must be washed, cleaned and sterilized at regular intervals and after each use.
c) All the respiratory protective equipment's, when not in use, shall be kept in the carrying cases and stored in a cool, dry and ventilated place.

9.7 DUST RESPIRATOR:

a) Dust respirator is simple device for protecting the respiratory track and lungs from dust of material such as KCI. D.A.P., Rock phosphate, Sulphur and fertilizers. It consists of a mouthpiece, filter, exhalation valve and headband.
b) While breathing, the dust particles in the atmosphere are filtered, collect on the filter and only free air will allow to be inhaled. The exhaled air goes out through exhalation valve and thus is not rebreathed.

- **How to use Dust Respirator**
  a) Check the dust respirator for clear filter and correct working of exhalation valve.
  b) Put on the mouthpiece avoiding any gap between mouth piece and face and adjust the harness.
  c) Choked filters should be replaced with new ones as and when required.

9.8 LIST OF INDIAN STANDARDS ON PERSONAL PROTECTIVE EQUIPMENTS (PPE):

All the Personal Protective Equipment's (PPEs) used while working shall be as per the Indian Standard (IS) or any standard equivalent of Indian Standard. Supervisor / Engineer in-charge of the work shall ensure that PPEs provided to the employees shall conforming to Indian Standard or equitant standard. The list of Indian Standards for various category of works are as follows:

Standard	**Description**	**Reaffirm Year**
HEAD		
IS 5679 : 1986	Miners' cap lamp assemblies (incorporating lead acid type batteries)	2016
IS 9562 : 1980	Specification for non-metal helmet for police force	2017
IS 2745 : 1983	Specification for Non-Metal Helmet for Firemen and Civil Defence Personnel	2020
IS 2925 : 1984	Specification for Industrial Safety Helmets	2020
IS 4151 : 2015	Protective Helmet for Two Wheeler Riders - Specification Fourth Revision)	2020
IS 9695 : 1980	Methods of Sampling of Helmets	2020
IS 9973 : 1981	Specification for visor for scooter helmets	2018
IS 9995 : 1981	Specification for visor for non-metal police and firemen's helmets	2018
EYE, FACE & EAR		
IS 1179 : 1967	Equipment for Eye and Face Protection During Welding	2019
IS 8520 : 1977	Guide for selection of industrial safety equipment for eye, face and ear protection	2018
IS 8521 : Part 1 : 1977	Industrial safety face shields Part 1 With plastic Visor	2018
IS 8521 : Part 2 : 1994	Industrial safety face-shields: Part 2 With wire mesh visor	2019
IS 8940 : 1978	Code of practice for maintenance and care of industrial safety equipment for eyes and face protection	2018
IS 6229 : 1980	Method for Measurement of Real-ear Protection of Hearing Protectors and Physical Attenuation of Earmuffs	2019
IS 9167 : 1979	Specification for Ear Protectors	2021
IS 7524 : Part 1 : 1980	Methods of test for eye protectors: Part 1 Non-optical tests	2018
IS 7524 : Part 2 : 1979	Methods of Test For Eye-protectors -Part II: Optical Tests	2018
IS 5983 : 1980	Specification for Eye-protectors	2018
IS 14352 : 1996	Miners Safety Goggles	2017

Standard	Description	Reaffirm Year
ARM		
IS 4770 : 1991	Rubber Gloves - Electrical Purposes	2017
IS 8807 : 1978	Guide for selection of industrial safety equipment for protection of arms and hands	2018
IS 2573 : 1986	Leather Gauntlets and Mittens	2019
IS 4148 : 1989	Surgical rubber gloves Specification (First Revision)	2016
IS 13774 : 2021	Live Working Gloves of Insulating Materials (Second Revision)	2021
IS 6994 : Part 1 : 2021	Protection of Arms and Hands - Part 1 Protective Gloves against Dangerous Chemicals and Micro-organisms — Terminology and Performance Requirements for Chemical Risks	2021
IS 6994 : Part 2 : 2021	Protection of Arms and Hands Part 2 Protective Gloves against Dangerous Chemicals and Micro-organisms- Determination of resistance to penetration	2021
IS 6994 : Part 4 : 2021	Protection of Arms and Hands Part 4 Protective Gloves against Dangerous Chemicals and Micro-organisms- Determination of resistance to degradation by chemicals	2021
IS 6994 : Part 5 : 2021	Protection of Arms and Hands Part 5 Protective Gloves against Dangerous Chemicals and Micro-organisms - Terminology and performance requirements for micro-organisms risks	2021
IS 6994 : Part 6 : 2021	Protection of Arms and Hands Part 6 Protective gloves against mechanical risks	2021
IS 6994 : Part 7 : 2021	Protection of Arms and Hands Part 7 Protective Gloves General requirements and test methods	2021
IS 6994 : Part 8 : 2021	Protection of Arms and Hands Part 8 Protective Gloves for Pesticide Operators and Re-entry Workers â€" Performance Requirements	2021
IS 6994 : Part 9 : 2021	Protection of Arms and Hands Part 9 Protective clothing - Gloves and arm guards protecting against cuts and stabs by hand knives- Chain-mail gloves and arm guards	2021
IS 6994 : Part 10 : 2021	Protection of Arms and Hands Part 10 Protective clothing- Gloves and arm guards protecting against cuts and stabs by hand knives - Gloves and arm guards made of material other than chain mail	2021
IS 6994 : Part 11 : 2021	Protection of Arms and Hands Part 11 Protective clothing Gloves and arm guards protecting against cuts and stabs by hand knives - Impact cut test for fabric, leather and other materials	2021
IS 6994 : Part 12 : 2021	Protection of Arms and Hands Part 12 Protective clothing for users of handheld chainsaws Performance requirements and test methods for protective gloves	2021
BODY		
IS 8519 : 1977	Guide for selection of industrial safety equipment for body protection	2018

Standard	Description	Reaffirm Year
IS 8990 : 1978	Code of practice for maintenance and care of industrial safety clothing	2018
IS 6153 : 1971	Protective Leather Clothing	2019
IS 15071 : 2002	Chemical Protective Clothing Specification	2019
IS 4501 : 1981	Aprons, Rubberized, Acid and Alkali Resistant	2017
IS 3322 : Part 1 : 1987	Water-resistant Clothing Part1 PVC-coated Fabrics	2017
IS 16407 : 2015	Dried Rosemary (Rosemary officials) - Specification	2020
IS 15809 : 2017	High Visibility Warning Clothes – Specification (First Revision)	2017
FEET & LEGS		
IS 6519 : 2021	Code of practice for selection, care and repair of safety protective and occupational footwear	2021
IS 7329 : 1974	Metal last for safety rubber canvas ankle boots	2018
IS 5557 : 2004	Industrial and Protective Rubber Knee and Ankle Boots	2016
IS 3976 : 2018	Protective Rubber Canvas Boots for Miners	2018
IS 1989 : Part 1 : 1986	Leather Safety Boots and shoes Part 1: For Miners	2016
IS 1989 : Part 2 : 1986	Leather Safety Boots and shoes - Part 2: For Heavy Metal Industries	2016
IS 10667 : 1983	Guide for selection for industrial safety equipment for protection of foot and leg	2018
IS 11226 : 1993	Leather safety footwear having direct moulded rubber sole	2018
IS 14544 : 1998	Leather safety footwear with direct moulded PVC soles	2018
IS 11264 : 1985	Code of practice for manufacture of safety rubber footwear for miners	2016
IS 13295 : 1992	Code of Practice for Manufacture of Leather Safety Boots and Shoes for Workers in Mines and Heavy Metal Industry	2018
IS 5852 : 2004	Protective Steel Toe Caps for Footwear	2016
IS 15298 : Part 1 : 2015	Personal Protective Equipment Part 1 Test Methods for Footwear (Second Revision)	2020
IS 15298 : Part 2 : 2016	Personal Protective Equipment Part 2 Safety Footwear	2022
IS 15298 : Part 3 : 2019	Personal Protective Equipment Part 3 Protective Footwear	2018
IS 15298 : Part 4 : 2017	Personal Protective Equipment Part 4 Occupational Footwear (Second Revision)	2022
IS 15298 : Part 5 : 2004	Safety, Protective and Occupational Footwear for Professional Use Part 5 Additional Requirements and Test Methods	2021
IS 15298 : Part 6 : 2004	Safety, Protective and Occupational Footwear for Professional Use: Part 6 Additional Specifications for Safety Footwear	2021
IS 15298 : Part 7 : 2004	Safety, Protective and Occupational Footwear for Professional Use Part 7 Additional Specification	2021

Standard	Description	Reaffirm Year
	for Protective Footwear	
IS 15298 : Part 8 : 2004	Safety, Protective and Occupational Footwear for Professional Use Part 8 Additional Specification for Occupational Footwear	2021
OTHERS		
IS 10386 : Part 2 : 2013	Safety Code for Construction, Operation and Maintenance of River Valley Projects Part 2 Amenities, Protective Clothing and Equipment	2018
IS 8947 : 1978	Material (nylon webbing) for aircraft safety belts	2019
IS 11057 : 1984	Industrial Safety Nets	2019
IS 3521 : 1999	Industrial safety belts and harnesses Specification	2019
IS 6685 : 2009	Life Jackets	2019
IS 4355 : 1977	Fire-resistant Brattice Cloth	2017
RESPIRATORY		
IS 9623 : 2008	Selection, use and maintenance of respiratory protective devices - Code of practice	2018
IS 9473 : 2002	Respiratory Protective Devices - Filtering Half Masks to Protect Against Particles	2019
IS 9563 : 1980	Carbon monoxide filter self-rescuers	2017
IS 10245 : Part 1 : 1996	Breathing apparatus Part 1 Closed circuit breathing apparatus compressed oxygen cylinder)	2017
IS 10245 : Part 2 : 1994	Respiratory protective devices breathing apparatus Part 2 Open circuit breathing apparatus	2022
IS 10245 : Part 3 : 1999	Breathing Apparatus Part 3: Fresh Air Hose and Compressed Air Line	2017
IS 10245 : Part 4 : 1982	Breathing Apparatus Part 4 Escape breathing apparatus (short duration self-contained type)	2019
IS 14138 : Part 1 : 1994	Respiratory protective devices: threads for face pieces Part 1 Standard thread connection	2014
IS 14138 : Part 2 : 1994	Respiratory Protective Devices: Threads for face pieces Part 2 Centre thread connection	2014
IS 14166 : 1994	Respiratory Protective Devices: Full face masks	2019
IS 14170 : 1994	Respiratory Protective Devices: Mouthpiece Assemblies	2019
IS 14746 : 1999	Respiratory Protective Devices - Half Masks and Quarter Masks	2019
IS 15322 : 2003	Particle Filters Used in Respiratory Protective Equipment	2019
IS 15323 : 2003	Gas Filters and Combined Filters Used in Respiratory Protective Equipment	2019
IS 15803 : 2008	Respiratory Protective Devices Self Contained Closed Circuit Breathing Apparatus Chemical Oxygen (KO2) Type Self Generating, Self-Rescuers	2018
IS 8347 : 2008	Respiratory protective definitions, classification and nomenclature of components	2018
IS 6194 : 1971	Intermittent Positive Pressure Respirator, Bag Type, Manually Operated	2016

Standard	Description	Reaffirm Year
IS 12078 : 1987	Recommendations for Personal Protection of Workers Engaged in Handling Asbestos	2022

9.9 APPENDIX A: NON-MANDATORY GUIDELINES FOR HAZARD ASSESSMENT, PERSONAL PROTECTIVE EQUIPMENT (PPE) SELECTION, AND PPE TRAINING PROGRAM

This appendix is intended to provide compliance assistance for hazard assessment, selection of personal protective equipment (PPE) and PPE training. It neither adds to or detracts from the employer's responsibility to comply with the provisions of this Subpart.

1. **Controlling hazards.** Employers and employees should not rely exclusively on PPE for protection from hazards. PPE should be used, where appropriate, in conjunction with engineering controls, guards, and safe work practices and procedures.
2. **Assessment and selection**. Employers need to consider certain general guidelines for assessing the hazardous situations that are likely to arise under foreseeable work activity conditions and to match employee PPE to the identified hazards. The employer should designate a safety officer or some other qualified person to exercise common sense and appropriate expertise to assess work activity hazards and select PPE.
3. **Assessment guidelines**. In order to assess the need for PPE the following steps should be taken:
   - **a. Survey.** Conduct a walk-through survey of the area in question to identify sources of hazards.
     Categories for Consideration:
     (i) Impact
     (ii) Penetration
     (iii) Compression (roll-over)
     (iv) Chemical
     (v) Heat
     (vi) Harmful dust
     (vii) Light (optical) radiation
     (viii) Drowning
     (ix) Falling
   - **b. Sources.** During the walk-through survey the safety officer should observe:
     1. Sources of motion; for example, machinery or processes where any movement of tools, machine elements or particles could exist, or movement of personnel that could result in collision with stationary objects.
     2. Sources of high temperatures that could result in burns, eye injury or ignition of protective equipment.
     3. Types of chemical exposures.
     4. Sources of harmful dust.
     5. Sources of light radiation, for instance, welding, brazing, cutting, heat treating, furnaces, and high intensity lights.
     6. Sources of falling objects or potential for dropping objects.
     7. Sources of sharp objects which might pierce or cut the hands.
     8. Sources of rolling or pinching objects which could crush the feet.
     9. Layout of work place and location of co-workers.
     10. Any electrical hazards.
     11. Review injury/accident data to help identify problem areas.

c. Organize data. Following the walk-through survey, it is necessary to organize the data and other information obtained. That material provides the basis for hazard assessment that enables the employer to select the appropriate PPE.

d. Analyze data. Having gathered and organized data regarding a particular occupation, employers need to estimate the potential for injuries. Each of the identified hazards (see paragraph 3.a.) should be reviewed and classified as to its type, the level of risk, and the seriousness of any potential injury. Where it is foreseeable that an employee could be exposed to several hazards simultaneously, the consequences of such exposure should be considered.

4. **Selection guidelines.** After completion of the procedures in paragraph 3, the general procedure for selection of protective equipment is to:
   a. become familiar with the potential hazards and the types of protective equipment that are available, and what they can do; for example, splash protection, and impact protection;
   b. compare the hazards associated with the environment; for instance, impact velocities, masses, projectile shapes, radiation intensities, with the capabilities of the available protective equipment;
   c. select the protective equipment which ensures a level of protection greater than the minimum required to protect employees from the hazards; and
   d. fit the user with the protective device and give instructions on care and use of the PPE. It is very important that users be made aware of all warning labels and limitations of their PPE.
5. **Fitting the device.** Careful consideration must be given to comfort and fit. The employee will be most likely to wear the protective device if it fits comfortably. PPE that does not fit properly may not provide the necessary protection, and may create other problems for wearers. Generally, protective devices are available in a variety of sizes and choices. Therefore employers should be careful to select the appropriate sized PPE.
6. **Devices with adjustable features.**
   a. Adjustments should be made on an individual basis so the wearer will have a comfortable fit that maintains the protective device in the proper position. Particular care should be in fitting devices for eye protection against dust and chemical splash to ensure that the seal is appropriate for the face.
   b. In addition, proper fitting of hard hats is important to ensure that the hard hat will not fall off during work operations. In some cases a chin strap may be necessary to keep the hard hat on an employee's head. (Chin straps should break at a reasonably low force to prevent a strangulation hazard). Where manufacturer's instructions are available, they should be followed carefully.
7. **Reassessment of hazards.** Compliance with the hazard assessment requirements of §1915.152(b) will involve the reassessment of work activities where changing circumstances make it necessary.
   a. The employer should have a safety officer or other qualified person reassess the hazards of the work activity area as necessary. This reassessment should take into account changes in the workplace or work practices, such as those associated with the installation of new equipment, and the lessons learned from reviewing accident records, and a re-evaluation performed to determine the suitability of PPE selected for use.
8. **Selection chart guidelines for eye and face protection.** Examples of occupations for which eye protection should be routinely considered are carpenters, engineers, coppersmiths, instrument technicians, insulators, electricians, machinists, mobile equipment mechanics and repairers,

plumbers and ship fitters, sheet metal workers and tinsmiths, grinding equipment operators, machine operators, welders, boiler workers, painters, laborers, grit blasters, ship fitters and burners. This is not a complete list of occupations that require the use of eye protection. The following chart provides general guidance for the proper selection of eye and face protection to protect against hazards associated with the listed hazard "source" operations.

Eye and Face Protection Selection Chart

Source	Assessment of hazard	Protection
Impact:		
Chipping, grinding machining, masonry work, woodworking, sawing, drilling, chiseling, powered fastening, riveting, and sanding	Flying fragments, objects, large chips, particles, sand, dirt, etc.	Spectacles with side protection, goggles, face shields. For severe exposure, use face shield.
Heat		
Furnace operations, pouring, casting, hot dipping, and welding	Hot spark	Face shields, goggles, spectacles with side protection. For severe exposure use face shield.
	Splash from molten metals	Face shields worn over goggles.
	High temperature exposure	Screen face shields, reflective face shields.
Chemicals:		
Acid and chemicals handling, degreasing, plating	Splash	Goggles, eyecup and cover types. For severe exposure, use face shield. See notes (3), (11).
	Irritating mists	Special-purpose goggles.
Dust:		
Woodworking, buffing, general dusty conditions	Nuisance dust	Goggles, eyecup and cover types. See note (8).
Light and/or Radiation:		
Welding: Electric arc	Optical radiation	Welding helmets or welding shields.
Welding: Gas	Optical radiation	Welding goggles or welding face shield.
Cutting, Torch brazing, Torch soldering	Optical radiation	Spectacles or welding face shield.
Glare	Poor vision	Spectacles with shaded or special-purpose lenses, as suitable.

Notes to Eye and Face Protection Selection Chart

a. Care should be taken to recognize the possibility of multiple and simultaneous exposure to a variety of hazards. Adequate protection against the highest level of each of the hazards should be provided. Protective devices do not provide unlimited protection.
b. Operations involving heat may also involve light radiation. As required by the standard, protection from both hazards must be provided.
c. Face shields should only be worn over primary eye protection (spectacles or goggles).

d. As required by the standard, filter lenses must meet the requirements for shade designations in §1915.153(a)(4). Tinted and shaded lenses are not filter lenses unless they are marked or identified as such.
e. As required by the standard, persons whose vision requires the use of prescription (Rx) lenses must wear either protective devices fitted with prescription (Rx) lenses or protective devices designed to be worn over regular prescription (Rx) eye wear.
f. Wearers of contact lenses must also wear appropriate eye and face protection devices in a hazardous environment. It should be recognized that dusty and/or chemical environments may represent an additional hazard to contact lens wearers.
g. Caution should be exercised in the use of metal frame protective devices in electrical hazard areas.
h. Atmospheric conditions and the restricted ventilation of the protector can cause lenses to fog. Frequent cleansing may be necessary.
i. Welding helmets or face shields should be used only over primary eye protection (spectacles or goggles).
j. Non-side shield spectacles are available for frontal protection only, but are not acceptable eye protection for the sources and operations listed for "impact."
k. Ventilation should be adequate, but well protected from splash entry. Eye and face protection should be designed and used so that it provides both adequate ventilation and protects the wearer from splash entry.
l. Protection from light radiation is directly related to filter lens density. See note (d). Select the darkest shade that allows task performance.

9. **Selection guidelines for head protection.**
    a. Hard hats are designed to provide protection from impact and penetration hazards caused by falling objects. Head protection is also available which provides protection from electric shock and burn. When selecting head protection, knowledge of potential electrical hazards is important. Class A helmets, in addition to impact and penetration resistance, provide electrical protection from low voltage conductors. (They are proof tested to 2,200 volts.) Class B helmets, in addition to impact and penetration resistance, provide electrical protection from high-voltage conductors. (They are proof tested to 20,000 volts.) Class C helmets provide impact and penetration resistance. (They are usually made of aluminium, which conducts electricity and should not be used around electrical hazards.)
    b. Where falling object hazards are present, head protection must be worn. Some examples of exposure include: working below other workers who are using tools and materials which could fall; working around or under conveyor belts which are carrying parts or materials; working below machinery or processes which might cause material or objects to fall; and working on exposed energized conductors.
    c. Examples of occupations for which head protection should be considered are: carpenters, electricians, machinists, boilermakers, erectors, plumbers, coppersmiths, ship fitters, welders, labourers and material handlers.
10. **Selection guidelines for foot protection.**
    a. Safety shoes and boots must meet ANSI Z41-1991 and provide impact and compression protection to the foot. Where necessary, safety shoes can be obtained which provide puncture protection. In some work situations, metatarsal (top of foot) protection should be provided, and in some other special situations, electrical conductive or insulating safety shoes would be appropriate.

b. Safety shoes or boots with impact protection would be required for carrying or handling materials such as packages, objects, parts or heavy tools, which could be dropped, and for other activities where objects might fall onto the feet. Safety shoes or boots with compression protection would be required for work activities involving skid trucks (manual material handling carts) around bulk rolls (such as paper rolls) and around heavy pipes, all of which could potentially roll over an employees' feet. Safety shoes or boots with puncture protection would be required where sharp objects such as nails, wire, tacks, screws, large staples, scrap metal etc., could be stepped on by employees, causing an injury.
c. Some occupations (not a complete list) for which foot protection should be routinely considered are: shipping and receiving clerks, stock clerks, carpenters, electricians, machinists, boiler makers, plumbers, copper smiths, pipe fitters, ship fitters, burners, chippers and grinders, erectors, press operators, welders, laborers, and material handlers.

11. **Selection guidelines for hand protection.**
a. Gloves are often relied upon to prevent cuts, abrasions, burns, and skin contact with chemicals that are capable of causing local or systemic effects following dermal exposure. OSHA is unaware of any gloves that provide protection against all potential hand hazards, and commonly available glove materials provide only limited protection against many chemicals. Therefore, it is important to select the most appropriate glove for a particular application and to determine how long it can be worn, and whether it can be reused.
b. It is also important to know the performance characteristics of gloves relative to the specific hazard anticipated, e.g., chemical hazards, cut hazards, and flame hazards. These performance characteristics should be assessed by using standard test procedures. Before purchasing gloves, the employer should request documentation from the manufacturer that the gloves meet the appropriate test standard(s) for the hazard(s) anticipated.
c. Other general factors to be considered for glove selection are:
(A) As long as the performance characteristics are acceptable, in certain circumstances, it may be more cost effective to regularly change cheaper gloves than to reuse more expensive types; and,
(B) The work activities of the employee should be studied to determine the degree of dexterity required, the duration, frequency, and degree of exposure to the hazard, and the physical stresses that will be applied.
d. With respect to selection of gloves for protection against chemical hazards:
(A) The toxic properties of the chemical(s) must be determined; in particular, the ability of the chemical to cause local effects on the skin or to pass through the skin and cause systemic effects or both;
(B) Generally, any "chemical resistant" glove can be used for dry powders;
(C) For mixtures and formulated products (unless specific test data are available), a glove should be selected on the basis of the chemical component with the shortest breakthrough time, since it is possible for solvents to carry active ingredients through polymeric materials; and,
(D) Employees must be able to remove the gloves in such a manner as to prevent skin contamination.

12. **Cleaning and maintenance.**
a. It is important that all PPE be kept clean and be properly maintained. Cleaning is particularly important for eye and face protection where dirty or fogged lenses could impair vision.

b. For the purposes of compliance, PPE should be inspected, cleaned, and maintained at regular intervals so that the PPE provides the requisite protection.
c. It is important to ensure that contaminated PPE which cannot be decontaminated is disposed of in a manner that protects employees from exposure to hazards.

9.10 APPENDIX B: GENERAL TESTING CONDITIONS AND ADDITIONAL GUIDELINES FOR PERSONAL FALL PROTECTION SYSTEMS (NON-MANDATORY)

1. **Personal fall arrest systems—**
   a. **General test conditions.**
      1. Lifelines, lanyards, and deceleration devices should be attached to an anchorage and connected to the body-belt or body harness in the same manner as they would be when used to protect employees, except that lanyards should be tested only when connected directly to the anchorage, and not when connected to a lifeline.
      2. The anchorage should be rigid, and should not have a deflection greater than .04 inches (1 cm) when a force of 2,250 pounds (10.01 Kn) is applied.
      3. The frequency response of the load measuring instrumentation should be 100 Hz.
      4. The test weight used in the strength and force tests should be a rigid, metal cylindrical or torsoshaped object with a girth of 38 inches plus or minus 4 inches (96.5 cm plus or minus 10.16 cm).
      5. The lanyard or lifeline used to create the free fall distance should be the one supplied with the system, or in its absence, the least elastic lanyard or lifeline available to be used by the employee with the system.
      6. The test weight for each test should be hoisted to the required level and should be quickly released without having any appreciable motion imparted to it.
      7. The system's performance should be evaluated, taking into account the range of environmental conditions for which it is designed to be used.
      8. Following the test, the system need not be capable of further operation.
   b. **Strength test.**
      1. During the testing of all systems, a test weight of 300 pounds plus or minus 5 pounds (136.08 kg plus or minus 2.27 kg) should be used.
      2. The test consists of dropping the test weight once. A new unused system should be used for each test.
      3. For lanyard systems, the lanyard length should be 6 feet plus or minus 2 inches (1.83 m plus or minus 5.08 cm) as measured from the fixed anchorage to the attachment on the body belt or harness.
      4. For rope-grab-type deceleration systems, the length of the lifeline above the center line of the grabbing mechanism to the lifeline's anchorage point should not exceed 2 feet (0.61 m).
      5. For lanyard systems, for systems with deceleration devices which do not automatically limit free fall distance to 2 feet (0.61 m) or less, and for systems with deceleration devices which have a connection distance in excess of 1 foot (0.31 m) (measured between the centerline of the lifeline and the attachment point to the body belt or harness), the test weight should be rigged to free fall a distance of 7.5 feet (2.29 m) from a point that is 1.5 feet (45.72 cm) above the anchorage point, to its hanging location (6 feet (1.83 m) below the anchorage). The test weight should fall without interference, obstruction, or hitting the

floor or the ground during the test. In some cases, a non-elastic wire lanyard of sufficient length may need to be added to the system (for test purposes) to create the necessary free fall distance.

6. For deceleration device systems with integral lifelines or lanyards which automatically limit free fall distance to 2 feet (0.61 m) or less, the test weight should be rigged to free fall a distance of four feet (1.22 m).
7. Any weight which detaches from the belt or harness should constitute failure for the strength test.

c. **Force test general**. The test consists of dropping the respective test weight once. A new, unused system should be used for each test.

1. **For lanyard systems.**
   (i) A test weight of 220 pounds plus or minus three pounds (99.79 kg plus or minus 1.36 kg) should be used.
   (ii) Lanyard length should be 6 feet plus or minus 2 inches (1.83 m plus or minus 5.08 cm) as measured from the fixed anchorage to the attachment on the body belt or body harness.
   (iii) The test weight should fall free from the anchorage level to its handling location (a total of 6 feet (1.83 m) free fall distance) without interference, obstruction, or hitting the floor or ground during the test.
2. **For all other systems.**
   (i) A test weight of 220 pounds plus or minus 3 pounds (99.79 kg plus or minus 1.36 kg) should be.
   (ii) The free fall distance to be used in the test should be the maximum fall distance physically permitted by the system during normal use conditions, up to a maximum free fall distance for the test weight of 6 feet (1.83 m), except as follows:
   (A) For deceleration systems which have a connection link or lanyard, the test weight should free fall a distance equal to the connection distance (measured between the centre line of the lifeline and the attachment point to the body belt or harness).

   (B) For deceleration device systems with integral life lines or lanyards which automatically limit free fall distance to 2 feet (0.61 m) or less, the test weight should free fall a distance equal to that permitted by the system in normal use. (For example, to test a system with a self-retracting lifeline or lanyard, the test weight should be supported and the system allowed to retract the lifeline or lanyard as it would in normal use. The test weight would then be released and the force and deceleration distance measured.)
3. **Failure**. A system fails the force test if the recorded maximum arresting force exceeds 1,260 pounds (5.6 Kn) when using a body belt, or exceeds 2,520 pounds (11.21 Kn) when using a body harness
4. **Distances.** The maximum elongation and deceleration distance should be recorded during the force test.

d. **Deceleration device tests—general**. The device should be evaluated or tested under the environmental conditions (such as rain, ice, grease, dirt, type of lifeline, etc.) for which the device is designed.

1. Rope-grab-type deceleration devices.
   (i) Devices should be moved on a lifeline 1,000 times over the same length of line a distance of not less than 1 foot (30.48 cm), and the mechanism should lock each time.
   (ii) Unless the device is permanently marked to indicate the type of lifelines which must be used, several types (different diameters

and different materials) of lifelines should be used to test the device.

2. Other-self-activating-type deceleration devices. The locking mechanisms of other self-activating-type deceleration devices designed for more than one arrest should lock each of 1,000 times as they would in normal service.

2. **Positioning device systems—**

a. **Test Conditions.**

1. The fixed anchorage should be rigid and should not have a deflection greater than .04 inches (1.02 mm) when a force of 2,250 pounds (10.01 Kn) is applied.
2. For lineman's body belts and pole straps, the body belt should be secured to a 250 pound (113.4 kg) bag of sand at a point which simulates the waist of an employee. One end of the pole strap should be attached to the rigid anchorage and the other end to the body belt. The sand bag should be allowed to free fall a distance of 4 feet (1.22 m). Failure of the pole strap and body belt should be indicated by any breakage or slippage sufficient to permit the bag to fall free to the ground.
3. For window cleaner's belts, the complete belt should withstand a drop test consisting of a 250 pound (113.4 kg) weight falling free for a distance of 6 feet (1.83 m). The weight should be a rigid object with a girth of 38 inches plus or minus four inches (96.52 cm plus or minus 10.16 cm.) The weight should be placed in the waistband with the belt buckle drawn firmly against the weight, as when the belt is worn by a window cleaner. One belt terminal should be attached to a rigid anchor and the other terminal should hang free. The terminals should be adjusted to their maximum span. The weight fastened in the freely suspended belt should then be lifted exactly 6 feet (1.83 m) above its “at rest” position and released so as to permit a free fall of 6 feet (1.83 m) vertically below the point of attachment of the terminal anchor. The belt system should be equipped with devices and instrumentation capable of measuring the duration and magnitude of the arrest forces. Any breakage or slippage which permits the weight to fall free of the system constitutes failure of the test. In addition, the initial and subsequent arresting force peaks should be measured and should not exceed 2,000 pounds (8.9 Kn) for more than 2 milliseconds for the initial impact, nor exceed 1,000 pounds (4.45 Kn) for the remainder of the arrest time.
4. All other positioning device systems (except for restraint line systems) should withstand a drop test consisting of a 250-pound (113.4 kg) weight falling free for a distance of 4 feet (1.22 m). The weight should be a rigid object with a girth of 38 inches plus or minus 4 inches (96.52 cm plus or minus 10.16 cm). The body belt or harness should be affixed to the test weight as it would be to an employee. The system should be connected to the rigid anchor in the manner that the system would be connected in normal use. The weight should be lifted exactly 4 feet (1.22 m) above its “at rest” position and released so as to permit a vertical free fall of 4 feet (1.22 m). Any breakage or slippage which permits the weight to fall free to the ground should constitute failure of the system.

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CHAPTER 10: EMERGENCY RESPONSE

10.1 GUIDELINES FOR EMERGENCY RESPONSE:

1) FIRE INSTRUCTIONS - IF YOU DISCOVER A FIRE:

a) Break the glass in the nearest fire alarm, after which:
b) Attack the fire with the fire extinguishers provided, but take no risks.

Note: If in doubt, do not investigate for yourself, but call the fire Services immediately.

2) IF YOU HEAR THE EVACUATION SIGNALS:

a) Leave the building immediately by the nearest route.
b) Report to your assembly point and make sure that your name has been entered on the roll call/register.
c) Do not run in panic.
d) Do not go to toilets/cloakroom.
e) Do not stop to collect personal belonging.

Note: The evacuation signals will never be sounded for surprise tests

3) IF DANGER IS NOT IMMINENT:

a) Stop machines-air conditioners-computers-office equipment.
b) Shut off gas and electric power.
c) Close doors and windows

10.2 ASSEMBLY POINTS IN CASE OF EMERGENCY:

1) AT INDIRA DOCK:

a) If Evacuation Through internal Roads to Victoria Dock;
Assembly Point : Central Kitchen.

b) If Evacuation Through Blue Gate, Indira Dock;
Assembly Point : St. Georges's Hospital Ground.

c) If Evacuation Through Orange/Yellow Gate, Prince's Dock;
Assembly Point : Civil Defense Control Room, Mazgaon.

d) If Evacuation Through Green Gate.
Assembly Point: ST. George's Hospital Ground.

2) AT VICTORIA DOCK:

a) If Evacuation Through internal Roads to Indira Dock;
Assembly Point : Dr. B. R. Ambedkar Bhavan, Indira Dock Canteen

b) If Evacuation Through internal roads to Traffic Office Building, Prince's Dock.
Assembly Point : Central Kitchen.

3) AT PRINCE'S DOCK:

a) If Evacuation Through internal road to Victoria Dock Canteen, or, Ambedkar Bhavan, Indira Dock.
Assembly Point : Victoria Dock Canteen OR Ambedkar Bhavan Canteen.

b) If Evacuation Through Yellow Gate/Orange Gate
Assembly Point: Civil Defense Cotnrol Room, Mazgaon.

4) AT MOT PIR PAU:

a) If Evacuation Through Wadala Mahul Road
Assembly Point: Welfare Centre, Wadala.

5) AT MOT, JAWAHAR DWEEP:

a) Assembly Point: Gathering at Landing Jetty, MOT, JD for going by launch to No. 14 Victoria Dock OR MOT Pir Pau Jetty.

b) Assembly Point at Helipad, JD, air lifted by Indian Navy to Naval Base, Mumbai in extreme emergency when launch service not feasible.

6) AT HAJI BUNDER HAZARDOUS CARGO:

a) Assembly Point: Container Freight Station Office, Sewri.

10.3 EMERGENCY CONTACT NUMBER

Sr. No.	TYPE OF EMERGENCY	CONTACT PERSON / DEPARTMENT	TELEPHONE NO.
1.	FIRE	Fire Station	022 6656 6261 / 6274
2.	MEDICAL	MbPA Hospital	086579 33654 093213 31845 022 6656 7762
		Ambulance (Time Keeper)	022 6656 5471 / 5472
3.	SECURITY	Control Room (Security) CISF	022 6656 5090 / 5791
4.	ACCIDENT	Safety Management Cell	022 6656 5071 / 5078
5.	MARINE	Port Control	022 6656 5036 / 5034
6.	POLLUTION	Environment Cell	098200 30205

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D I S C L A I M E R

GUIDELINES ON SAFE WORKING IN THE PORT ENLISTED IN THIS COMPILATION ARE DRAWN BASED ON THE FIELD EXPERIENCES AND EMANATE FROM VARIOUS NATIONAL AND INTERNATIONAL SAFETY RULES. THEY ARE MERELY ILLUSTRATIVE IN NATURE. FOR ENHANCED UNDERSTANDING OF SAFETY REQUIREMENTS THE READERS MAY REFER TO THE RELEVANT NATIONAL / INTERNATIONAL RULES.