

MAHARASHTRA STATE ELECTRICITY TRANSMISSION COMPANY LIMITED



ENVIRONMENT, HEALTH & SAFETY MANUAL

Maharashtra State Electricity Transmission Company Limited

Environment, Health & Safety Guidelines

Knowledge and Resources

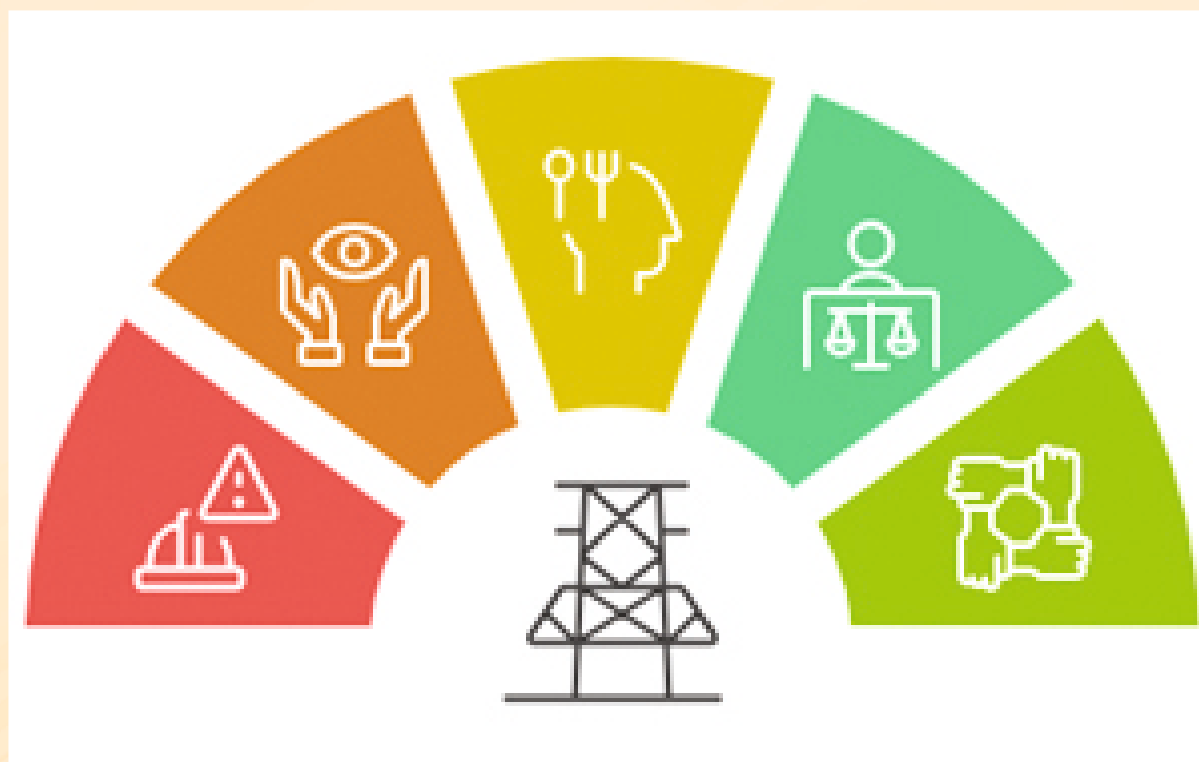
Provides essential information and tools for safe practices.

Safety Awareness

Promotes a culture of vigilance and mindfulness among workers.

Legal Compliance

Ensures adherence to legal and statutory safety requirements.



Safety Protocols

Establishes strict guidelines to ensuring safety & excellent health of all of our employees & stakeholders in all the operations of MSETCL

Shared Responsibility

Hazard Identification & Risk mitigation
Emphasizes collective accountability for Environment Health & safety.

ACKNOWLEDGEMENT

We express our profound gratitude to all distinguished individuals and organizations whose invaluable contributions made this comprehensive Environment, Health and Safety Manual possible.

We extend respectful acknowledgment to Dr. Sanjeev Kumar, I.A.S., Hon'ble Chairman and Managing Director, whose visionary leadership and commitment to excellence served as the cornerstone in shaping this authoritative resource. His guidance has been instrumental in elevating the quality and scope of this manual.

A special and profound appreciation is reserved for Shri Satish Chavan, CEO – EHS & Director Operations, whose relentless dedication to workplace safety, strategic foresight, and organizational leadership played a pivotal role in conceptualizing and steering the development of this manual. His initiative in integrating operational realities with safety best practices has significantly enriched the manual's practical utility and effectiveness across MSETCL's operations.

Our sincere appreciation extends to the distinguished senior leadership team: Shri Satish Chavan (CEO - EHS & Director Operations), Shri Avinash Nimbalkar (Director Projects), Smt. Trupti Mudholkar (Director Finance), and Smt. Suchita Bhikane (Executive Director Human Resources). Their initiative, support, and insights have significantly enhanced the authenticity and practical applicability of this document.

We extend heartfelt gratitude to all dedicated officers and professionals who contributed their specialized knowledge and expertise to the development of this manual. Their collective wisdom and commitment to safety excellence have been invaluable in creating this comprehensive resource.

We acknowledge that minor omissions or errors may have occurred. The compilation committee would appreciate if any discrepancies or suggestions for improvement are brought to the attention of the O & M Section, Corporate Office MSETCL Mumbai.

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Place : Mumbai

Date : 06th June, 2025

Preface

At **Maharashtra State Electricity Transmission Company Limited (MSETCL)**, safety is not just a priority - it is an integral part of our work culture and operational philosophy. As a leading power transmission company, we operate in an environment where hazards are inherent, and the consequences of any lapse in safety can be severe. Ensuring the well-being of our workforce, protecting assets, and maintaining uninterrupted power transmission are responsibilities we take with the utmost seriousness.

This **Environment, Health & Safety Manual** serves as a comprehensive guide to help employees, contractors, and all stakeholders adhere to the highest safety standards. It outlines essential safety protocols, best practices, risk management strategies, and emergency response measures designed to mitigate risks and prevent accidents. By fostering a proactive approach to safety, we can create a work environment where hazards are identified and controlled before they lead to incidents.

MSETCL remains committed to strengthening its safety culture through continuous training, investment in safety infrastructure, and strict enforcement of safety regulations. However, achieving a truly safe workplace requires the collective effort of every individual. Each of us has a duty to remain vigilant, follow prescribed safety guidelines, and actively contribute to a safer working environment.

I urge all employees and contractors to use this manual as a key reference and integrate its principles into their daily work practices. Let us work together to ensure that safety remains the foundation of our operations, allowing MSETCL to continue its mission of delivering reliable power transmission while safeguarding lives and infrastructure.



(Satish Chavan)
Director (Operations) &
Chief Executive Officer (EHS)
MSETCL

Environment, Health & Safety Policy

Maharashtra State Electricity Transmission Company Limited (MSETCL), a wholly owned corporate entity under the Maharashtra Government, was incorporated under the Companies Act in June 2005 after restructuring the erstwhile Maharashtra State Electricity Board to transmit electricity from its point of generation to its point of distribution. It owns and operates most of Maharashtra's electric power transmission system. MSETCL operates a transmission network of 51,518 circuit kilometres of transmission lines and 742 EHV substations with 138,598 MVA transformation capacity.

The safety of employees, contractors, and the public is paramount in the operations & project executions of Extra High Voltage (EHV) power transmission systems. MSETCL's safety policy outlines the commitment to create and maintain a safe working environment, ensuring compliance with relevant regulations and industry best practices.

Environment, Occupational Health and Safety is a fundamental part of MSETCL's commitment to protecting its workforce, stakeholders, assets, and the environment. Leadership commitment, employee participation, and continuous improvement shall drive proactive risk management, enhancing the long-term health and safety performance of employees and stakeholders. MSETCL is devoted to preventing work-related injuries and ill health, meeting or exceeding legal and other obligations, and constantly enhancing the EHS management system.

3.1 Scope

3.1.1. Operations

The policy applies to all operations and activities carried out by MSETCL, including those carried out by contractors or other third parties on its behalf.

3.1.2. Locations

The policy covers all locations where MSETCL operates, including but not limited to substations, transmission line infrastructure, EHV cable infrastructure, buildings, project sites, and facilities owned, rented, or otherwise used by MSETCL.

3.1.3. Employees

All employees of MSETCL, including full-time, part-time, and temporary employees, are covered by this policy and are required to comply with all provisions in their work activities.

3.1.4. Contractors and Third Parties

All contractors, suppliers, and third parties engaged by MSETCL or acting on its behalf are required to comply with relevant aspects of this policy while working at MSETCL locations or carrying out activities related to its operations.

3.1.5. Visitors

Visitors to MSETCL locations, including clients, customers, and members of the public, are also covered by this policy. They are expected to comply with health and safety rules and instructions during their visit.

3.2 Responsibility

3.2.1. Top Management

Top management of MSETCL has the ultimate responsibility for the health and safety of all employees, contractors, and visitors. They are committed to the implementation and adherence to this OHS policy, including the provision of necessary/adequate resources and support. They recognize and uphold MSETCL's statutory and moral responsibility for ensuring the safe design, construction, operation, and maintenance of transmission lines and substations. Management will conduct periodic safety performance reviews and take corrective actions where necessary.

3.2.2 Environment, Health & Safety Officer

The EHS Officer is responsible for management/monitor of health and safety at the MSETCL location assigned to him/her. He/she shall ensure compliance with this policy and provide advice and guidance on health and safety matters.

3.2.3. Chief Engineers / Chief General Managers

They are responsible to monitor safety policy across his jurisdiction implementing this policy and advancing management perspectives in their respective areas of operations or departments. They must ensure that health and safety procedures are followed, risks are properly managed, legal and other requirements are complied with, and employees receive necessary training and safety awareness.

3.2.4. Employees

All employees are responsible for following this policy and maintaining a safe and healthy work environment. They must report any health and safety concerns or incidents to their immediate supervisors or the Health and Safety Officer promptly. They shall provide feedback on safety practices & suggest improvement based on their experience.

3.2.5. Contractors and Third Parties

Contractors and third parties must comply with this policy while carrying out work for or on behalf of MSETCL. They must follow all health and safety rules and instructions provided by MSETCL. Ensure that their employees receive adequate safety training relevant to their roles. Report any safety incident to MSETCL promptly.

3.3 Procedures

3.3.1. Risk Management/Assessment

MSETCL will identify and evaluate health and safety risks associated with its operations and take appropriate measures to eliminate or control these hazards. A risk management protocol will be established, including risk identification, risk assessment, risk control, and risk monitoring.

3.3.2. Legal and Other Statutory Requirements

MSETCL will comply with all relevant legal and other statutory requirements related to Environment, Occupational health and Safety and will stay updated on legislative changes to ensure compliance.

3.3.3. Training and Competence

MSETCL will provide necessary training to employees to ensure they are competent to perform their tasks safely and will regularly assess their competence, arranging additional training as needed. Conduct regular safety drills to prepare staff for emergency situation.

3.3.4. Consultation and Participation

MSETCL will actively engage employees in decision-making processes related to health and safety, establishing mechanisms for their involvement in hazard identification, risk assessment, risk control measures, and incident investigation.

3.3.5. Health Surveillance

Where necessary, MSETCL will conduct health surveillance to detect ill-health effects at an early stage and validate control measures.

3.3.6. Near-Miss / Incident Reporting and Investigation

MSETCL will maintain an incident reporting and investigation system, ensuring all incidents are promptly reported and investigated to determine causes and take corrective actions.

3.3.7. Performance Measurement and Monitoring

MSETCL will establish key performance indicators (KPIs) to measure health and safety performance and regularly monitor and evaluate performance against these KPIs, taking necessary actions for improvement.

3.3.8. OHS Objectives and Programme

MSETCL will set and review OHS objectives annually and develop an OHS programme to achieve these objectives.

3.3.9. Contractor / Vendor Management

MSETCL will ensure contractors effectively manage their health and safety risks, set health and safety criteria for their selection, and monitor their performance to ensure adherence to OHS standards.

3.3.10. Procurement

MSETCL will integrate health, environmental, and safety considerations into procurement processes, ensuring purchased goods, machinery, equipment, and services meet safety standards and pose no unacceptable risks.

3.3.11. Design and Planning

Health, environmental, and safety considerations will be incorporated into the design and planning of facilities, equipment, processes, and products to manage risks at an early stage.

3.3.12. Personal Protective Equipment (PPE)

MSETCL will provide PPE to employees as needed and ensure they are trained in its proper use. PPE will be considered a last resort when risks cannot be adequately controlled by other means.

3.3.13. Fire Safety and Firefighting

MSETCL will implement precautions, procedures, and measures to prevent fires, minimize fire-related risks, and ensure fire safety rules and regulations are strictly adhered to.

3.3.14. First Aid

MSETCL will provide first aid facilities and train employees at all locations, ensuring awareness of procedures for obtaining first aid assistance.

3.3.15. Health and Wellbeing

MSETCL will promote employee health and wellbeing by providing information on healthy lifestyles and facilitating access to health resources.

3.3.16. Communication

MSETCL will maintain effective communication channels to ensure all employees and relevant parties are informed about the OHS policy, objectives, procedures, and performance.

3.4 Policy Review

3.4.1. Annual Review

This policy will be reviewed at least once a year to ensure effectiveness, relevance, and appropriateness to health and safety risks.

3.4.2. Triggered Review

Reviews may be triggered by significant changes in operations, incidents, non-compliance issues, legislative/regulatory, environmental changes technological advances, or employee feedback.

3.4.3. Participation

The review will be conducted by top management in consultation with employees and relevant representatives, with input from external experts as necessary.

3.4.4. Analysis of Data

The review will include an analysis of incident reports, audit results, inspection findings, employee feedback, and performance data.

3.4.5. Outcomes of the Review

Review outcomes will be promptly communicated and may include policy amendments, changes in objectives or procedures, resource allocation, or other actions to enhance OHS performance, ensuring resilient infrastructure.



(Satish Chavan)
Director – (Operations) &
Chief Executive Officer (EHS)
MSETCL

“Environment, Health and Safety Objectives”

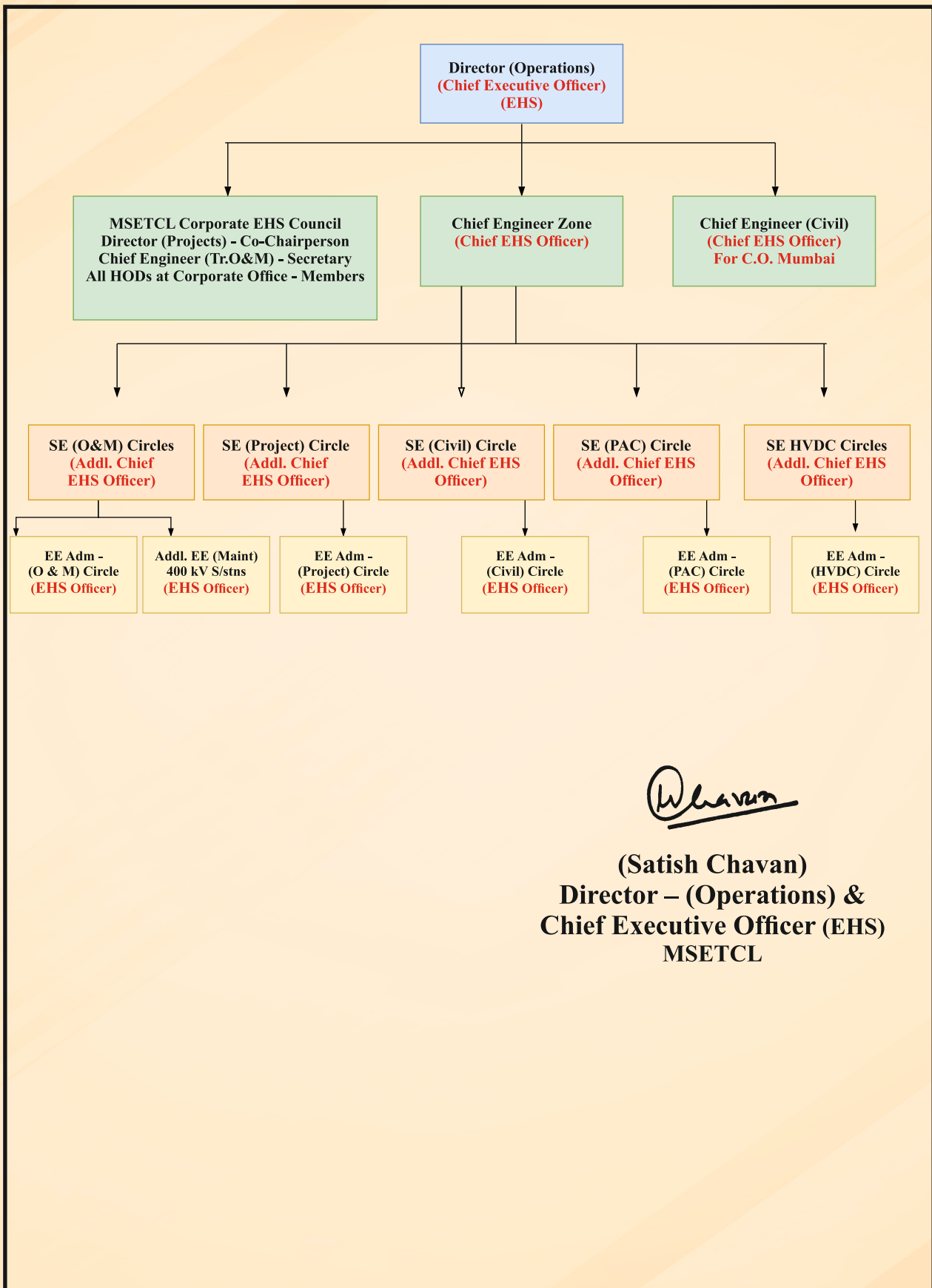
MSETCL is committed to:

- i. Maintaining a **zero-accident, zero leaks, zero harm** workplace by implementing best safety environment for the employees, contractors & subcontractors.
- ii. To ensure/ verify use / availability of proper personal protective equipment's and required adequate tools / equipment.
- iii. Conducting **Hazard Identification & Risk Assessment (HIRA)** to identify and eliminate workplace hazards.
- iv. Complying with all the applicable **Legal & other requirements and safety regulations** pertaining to Transmission business.
- v. **Continuous safety training** and awareness programs for all personnel ensuring at all times that they are kept familiar with the general and special practices for the safe conduct of their work.
- vi. To create awareness on electrical and fire safety to avoid near misses / incidents / accidents and thereby save the lives and property.
- vii. Conducting **regular safety audits and inspections** to identify and mitigate potential hazards.
- viii. Encouraging employee participation and reporting of unsafe conditions without fear of reprisal.
- ix. Establishing a **culture of safety** through leadership commitment and worker engagement.



Satish Chavan
(Director – Operation & CEO (EHS))
Maharashtra State Electricity Transmission
Company Limited

Environment, Health & Safety Organisation Chart



(Signature)

(Satish Chavan)
Director – (Operations) &
Chief Executive Officer (EHS)
MSETCL

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Chapter 1

MSETCL - EHS GOVERNANCE, ROLES AND RESPONSIBILITIES -

1.1. Introduction

Maharashtra State Electricity Transmission Company Limited (MSETCL), being one of the largest state transmission utilities in India, operates a vast and complex network of Extra High Voltage (EHV) substations, transmission lines, and associated infrastructure across Maharashtra. Given the nature of its operations, safety is not just a compliance requirement - but a fundamental value.

1.2 Safety at MSETCL primarily matters for the following:

- (a) High-Risk Environment: Transmission systems involve high voltages (from 132 kV to 765 kV), heavy equipment, and challenging work conditions such as heights, confined spaces, and remote locations.
- (b) Human Capital: MSETCL values the lives and well-being of every employee, contractor, and stakeholder. A safe workplace ensures that people return home unharmed every day.
- (c) Asset Protection: Preventing accidents and unsafe conditions safeguards critical infrastructure and reduces operational losses and downtime.

1.3 As MSETCL continues to expand its operations across EHV transmission infrastructure - including substations, transmission lines, HVDC systems, and cable networks - it is imperative to align with globally recognized safety management standards to ensure robust, proactive, and sustainable safety practices.

1.4 Safety Manual of MSETCL has been developed in alignment with Electricity Act 2003, CEA Guidelines and other statutory requirements applicable to its operations. By adopting ISO 45001, MSETCL is not just fulfilling a standard—it is making a long-term commitment to the health, safety, and well-being of its workforce, contractors, and stakeholders simultaneously empowering top management to lead by example and integrate safety into business decisions and move from reactive hazard control to proactive risk identification, assessment, and mitigation across all functions—from site to corporate offices

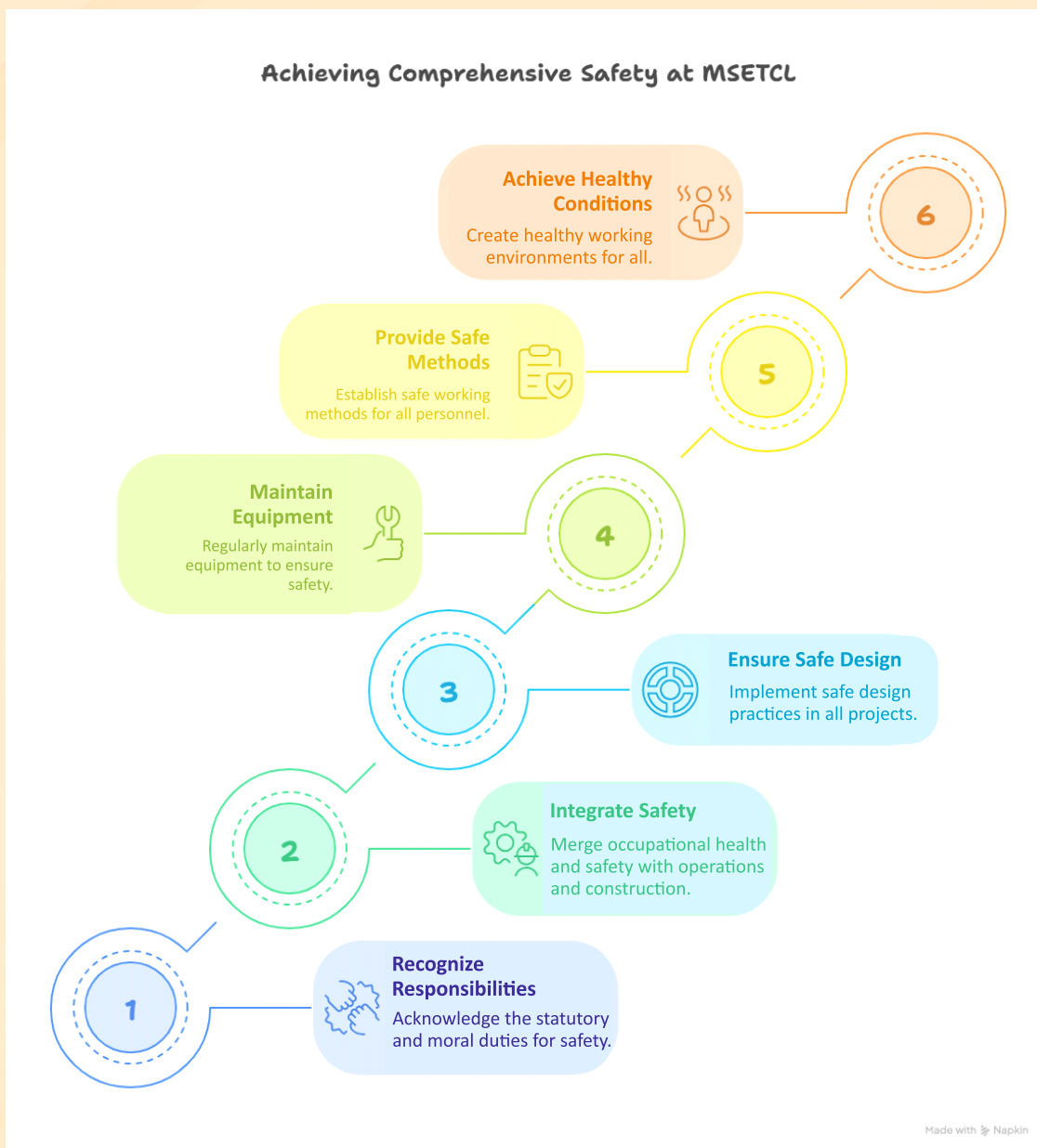
This manual will serve as a vital resource in our collective effort to uphold a strong safety culture and drive continual improvement in OH&S performance. By following its guidelines and embracing safety as a shared responsibility, we can ensure that our operations and projects are executed efficiently, reliably, and without harm.

Let's work together to make safety an uncompromising commitment in every task we undertake.

1.5. Scope

This manual ensures a consistent approach to execute the safety & health strategies/processes are being observed throughout MSETCL. MSETCL recognizes and accepts its statutory and moral responsibilities for ensuring safe design, construction, operation and maintenance of equipment and for the provision of safe methods of work and healthy working conditions. These requirements rank equally with other objectives of the Company.

It mandates to completely integrate occupational health & safety with O&M and construction of Sub-stations / Transmission feeders (Lines and Cable Infrastructure) including buildings, Project sites, and facilities owned, rented, or otherwise used by MSETCL as well as while carrying out the Constructional, operational and maintenance aspects of the equipment's and also that of all the personnel (MSETCL, Contractor, Visitors).



1.6 AUTHORISATION (WORK ALLOCATION) OF PERSONS

Purpose

To outline the process and guidelines for authorizing personnel to perform operation and maintenance (O&M) works in Extra High Voltage (EHV) Substations and on Transmission Lines within MSETCL.

Procedures

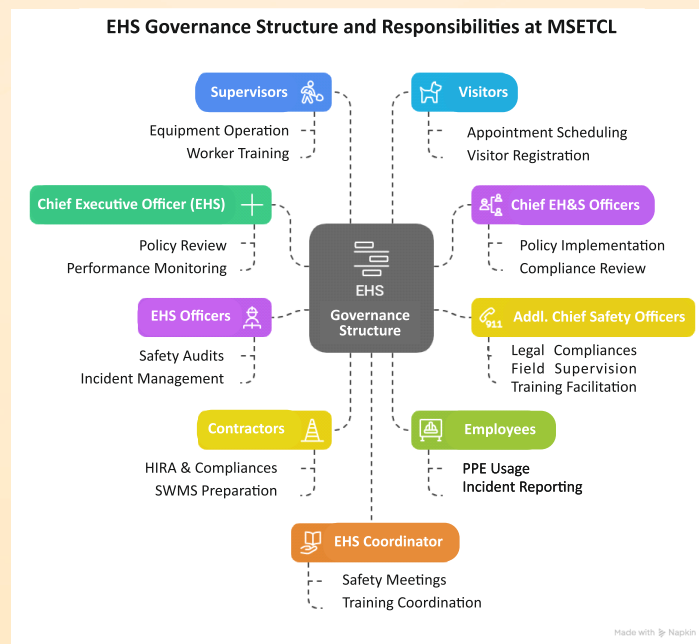
1. Only authorized personnel shall carry out O&M activities in EHV Substations or on Transmission Lines.

2. Substation In-Charge shall issue and enforce O&M safety guidelines.
3. Safety documentation (PTW/PTT) for maintenance must be approved by the Substation In-Charge.
4. Substation In-Charge shall authorize Designated Officers and Maintenance Engineers (including Testing Engineers) for activities.
5. Testing assignments for Engineers from the Protection Wing or others will also include PTW/PTT responsibility under Substation In-Charge approval.
6. All switching operations including isolation and earthing shall be carried out by the Operator under Designated Officer's supervision.
7. Only after confirming complete isolation and earthing at site, Designated Officer shall issue PTW/PTT to the Maintenance/Testing Engineer.
8. Maintenance/Testing Engineers shall direct Authorized Persons and ensure usage of PPEs and adherence to safety practices.

1.7. CHIEF EXECUTIVE OFFICER (EHS) – DIRECTOR (OPERATIONS)

The Director (Operations) shall function as the **Chief Executive Officer (EHS)** and will report directly to the **Chairman & Managing Director (CMD)**. Responsibilities include:

1. Strategic oversight of EHS performance across MSETCL.
2. Reviewing and approving policies, procedures, and annual EHS plans.
3. Ensuring interdepartmental coordination for implementation of safety management systems.
4. Driving integration of safety culture into corporate and operational strategy.
5. Monitoring EHS performance KPIs and initiating major safety improvement programs.
6. Providing leadership during major incident investigations or audits.
7. Reporting consolidated EHS performance to CMD and the Board, when required.



1.8. CHIEF ENVIRONMENT, HEALTH & SAFETY OFFICERS – CHIEF ENGINEERS

Chief Engineers at the seven MSETCL zones and Chief Engineer (Civil) are designated as **Chief EH & Safety Officers** with zonal oversight for all EHS matters. Their responsibilities include:

1. Implementing corporate EHS policies and directives within their respective zones.
2. Ensuring periodic reviews of Legal & other Statutory and safety compliances at all sites under their jurisdiction.
3. Supporting investigation and resolution of critical incidents and near misses.
4. Leading zonal safety meetings and reporting outcomes to the CEO (EHS).
5. Coordinating with Circle Superintending Engineers (Addl. Chief Safety Officers), EHS Officers, and EHS Coordinators to ensure uniform implementation.
6. Promoting safety awareness and behavioural safety initiatives.
7. Reviewing audit findings and ensuring timely closure of safety observations.

1.9. ADDL. CHIEF EHS OFFICERS – CIRCLE SUPERINTENDING ENGINEERS

1. **Legal & other statutory requirements - maintaining Compliance management register**
2. Act as nodal safety officers at the Circle level.
3. Supervise field implementation of safety practices, PPE compliance, and emergency preparedness.
4. Ensure that Safety Officers and EHS Coordinators are adequately supported.
5. Facilitate Circle-level training sessions and mock drills in coordination with EHS Officers.
6. Report major EHS concerns to Chief EH & Safety Officers.

1.10. EHS OFFICER

1. **Hazard Identification & Risk assessment and Implementation**
2. Ensures safety compliance among staff and contractors.
3. Maintains safe working conditions, PPE usage, and documentation.
4. Plans site visits, mock drills, and safety audits.
5. Facilitates monthly safety meetings at stations/sites.
6. Manages accident/incident investigations and hazardous waste practices.
7. Coordinates Apex Safety Meetings and safety training programs.
8. Oversees emergency preparedness, including evacuation drills and siren protocols.
9. Monitors toolbox talks and safety violations, issuing violation slips when necessary.

10. Ensures proper use and record-keeping of Safety Tags.
11. Conducts compliance testing per CEA safety regulations.
12. **Maintains safety compliance records and safety communication.**
13. **Ensures safety norms, PPE use, and readiness for drills.**
14. Oversees documentation, hazardous waste management, and reporting.
15. Issues and tracks safety violations, coordinates training, and validates tool box meetings.

1.11. CONTRACTORS

1. Accountable for safety and environmental **compliance for their workers.**
2. Must conduct hazard identification & Risk assessment of their jurisdiction, prepare **Safe Work Method Statements (SWMS), and conduct toolbox meetings.**
3. Must ensure machinery is inspected and tagged by MSETCL authority before use.
4. Must not repeat safety violations once issued with a safety violation slip.
5. Are responsible for reporting incidents and complying with MSETCL's EHS policies.

1.12. EMPLOYEES

1. Must adhere to IMS policies and risk management procedures.
2. Required to wear appropriate PPE and be familiar with emergency procedures.
3. Must report unsafe practices, incidents, and violations.
4. Empowered to refuse work posing imminent danger.
5. Expected to promote and maintain a safe work environment.
6. Responsible for suggesting improvements and complying with all EHS standards.

1.13. SUPERVISORS

1. Ensure a safe work environment by enforcing compliance to regulatory and internal EHS standards.
2. Provide guidance and correct non-conformance through proactive safety leadership.
3. Ensure safe equipment operation and worker training.
4. Communicate EHS-related updates and ensure availability of PPE.

1.14. VISITORS

1. Must schedule appointments and comply with visitor registration procedures.
2. Must wear and display Visitor Cards, cooperate with security, and follow directions.
3. Not allowed in operational areas without authorization and escort.
4. Must use PPE in applicable areas and follow all instructions during site visits.

1.15. EHS COORDINATOR (Project Sites, UG EHV Cable Works)

1. Reports to EHS Officer and site/zonal in-charge.
2. Displays safety policies, posters, and ensures awareness sessions.
3. Ensures PPE usage, tool box meetings, and proper tagging of tools/tackles.
4. Coordinates and documents safety meetings, drills, and audits.
5. Maintains Safety Violation and Tag Registers.
6. Participates in Apex Safety Meetings and mock drills.
7. Facilitates training and awareness with the EHS Officer.

1.16. SECURITY SUPERVISOR/GUARD

1. Involves in all safety related activities such as tool box meeting, safety promotions and drills
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Chapter 2

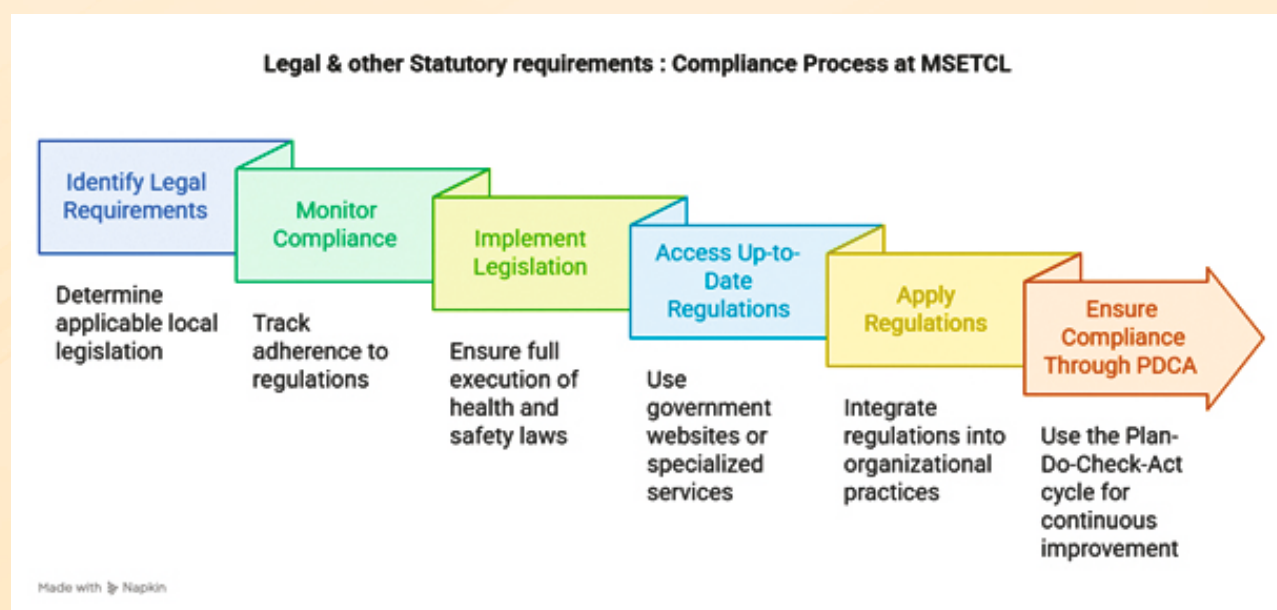
Legal and other requirements – Compliance Management

Compliance with legal and other statutory requirements is one of the most important requirements in ISO 45001, because the lives and health of people are at stake. The ISO 45001 standard provides a good framework for identifying and monitoring compliance with all local legislation applicable to the safe and healthy operations of its Organization. Compliance with legal requirements means full implementation of applicable occupational health, Environment and safety legislation, and it occurs when requirements are met and desired changes are achieved.

MSETCL shall determine and have access to up-to-date occupational health and safety regulations on the website of government agencies in charge, or via other specialized services that are applicable to its occupational health and safety hazards, and how they apply to the organization.

MSETCL will ensure Compliance considered through the whole Plan-Do-Check-Act (PDCA) cycle by following actions:

Action Item	ISO 45001 Clause	MSETCL Implementation Suggestion
Maintain a register of applicable laws and requirements	6.1.3	Maintain in SAP / ERP/ Safety Portal (Legatrix)
Assign responsibility to track updates in laws	5.3 & 6.1.3	Corporate Legal Cell / Safety circles (Zone-wise)
Train employees and contractors on legal obligations	7.2 & 7.3	Through mandatory induction & monthly toolbox talks
Periodically evaluate compliance	9.1.2	Internal and external safety audits
Document evidence of compliance	7.5	PTW system, audit reports, SOP adherence logs



Although the standard does not explicitly require you to document a procedure, its purpose is to ensure that applicable legal and other requirements are taken into account during establishing, implementing,

and maintaining the OH&S management system. MSETCL understands that a periodic evaluation of compliance with legal and other requirements is necessary because even if it is in compliance today, one cannot be sure that it will be in compliance in six months or a year. This is a mandatory activity and there must be a record kept as evidence. Sample Legal Register by MSETCL is produced below with an example: Refer Annexure (A)

Sr. No.	Task ID	Legislation	Clause Number	Title Task	Risk	Frequency	Compliance	Compliance Document	Remarks/ Review
1	MSETCL - CEA - 1	Central Electricity Authority (Measures Relating to Safety and Electric Supply) Regulations, 2023	Clause 5	Appointment of Electrical Safety Officer (designate an Electrical Safety Officer)	Non-compliance of the safety provisions	Annual	Designate a qualified Electrical Safety Officer	Circular no. MSETCL / CO / CE / TR. (O&M) / SE-II / EE_VII / 1310 dated 17/02/25	Continue

In a wide list of regulations, Legal Acts to be but not limited to be considered and chosen only those that are applicable to MSETCL business

Sr. No.	Legislation
1	Electricity Act 2003 And Merc Regulations, Maharashtra Electricity Regulatory Commission (state Grid Code) Regulations 2006
2	Central Electricity Authority (measures Relating To Safety And Electricity Supply) Regulations 2010. Amendment 2023
3	Forest Laws, The Environment (protection) Act, 1986 (amendment 1991) & Rules 1986 (amendment 2010)
4	The Employee Compensation Act, 1923 , The Maharashtra Shops & Establishment Act, 1948 The Public Liability Insurance Act, 1991 Amended 1992 & Rules 1991 Amended 1993, The Maharashtra Labour Welfare Fund Act 1953
5	The Motors Vehicles Act, 1988 (amendment Act 2012), The Central Motor Vehicle Rules, 1989 (amendment 2013)
6	Maharashtra Electricity Regulatory Commission (state Grid Code) Regulations 2006, The Maharashtra Lift Act, 1939
7	Central Electricity Authority (installation And Operation Of Meters) Regulations 2006. Indian Electricity Rules ,1956 Amendment 2005 – EHV Station O & M
8	Building And Other Construction Worker's (regulation Of Employment And Condition Of Services, 1998) Maharashtra Value Added Tax Act, 2002
9	Corporate Regulations, Gas Cylinders Rules, 2004 (amended 2010)
10	The Mumbai Municipal Corporation Act, 1888 (amendment 2012), The Water (prevention And Control Of Pollution) Cess (amendment) Act, 2003
11	ICNIRP (International Commission On Non-ionizing Radiation Protection) Guidelines For Electromagnetic Exposure Limits.

Chapter 3

Life Saving Safety Rules (LSSR)

- 3.1 All MSETCL employees and their stakeholders shall be responsible for adherence to the following mandatory Life Saving rules, facilitate the creation of a positive safety culture and achieving our goal of "Zero Harm & Zero Leak" by adhering to the applicable Legal & other Statutory requirements.

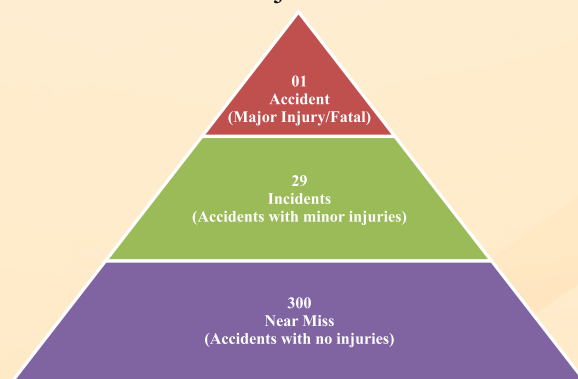


- i. Work with a valid work permit when required. Prior Hazard identification and risk assessment shall be necessary in the form of JSA for all activities covered under site's Permit to Work (PTW) system

- ii. Use vehicle fit for the purpose and follow traffic safety mandates –Use of seat belt (4 wheelers) & crash helmet (2 wheelers) is compulsory at any time a vehicle engine is running; do not use mobile phone and exceed speed limits.
- iii. Working / driving under influence of alcohol and drugs is banned. Don't smoke, sleep at workplace.
- iv. No physical contact with moving machinery, ensure machine guarding as per design, to prevent human contact with energized equipment.
- v. Verify energy isolation process (LOTO) prior to commencing any maintenance or Servicing work in which the unexpected energization or startup of the machines or equipment, or release of stored energy may occur
- vi. Obtain authorization on written lift plan before lifting material including prevention of people movement under suspended loads
- vii. Protect yourself against fall while ascending, descending, or working at height (≥ 1.8 meter).
- viii. Obtain written authorization and ensure safe atmosphere before entering a confined space
- ix. Obtain written authorization before disabling safety critical equipment; or bypassing any established safety practices / procedure or safe operating limits.
- x. All incidents must be recorded, reported, investigated and recommendations acted upon in a time bound manner.

The above rules are mandatory. Additional rules may be framed by MSETCL based on the nature and scale of the risks of activities and services.

- 3.2 The accident triangle, also known as **Heinrich's triangle or Bird's triangle**, is a theory of industrial accident prevention. It shows a relationship between serious accidents, minor accidents and near misses. This idea proposes that if the number of minor accidents is reduced then there will be a corresponding fall in the number of serious accidents. The triangle was first proposed by Herbert William Heinrich in 1931 and has since been updated and expanded upon by other writers, notably Frank E Bird. It is often shown pictorially as a triangle or pyramid and has been described as a cornerstone of 20th century workplace health and safety philosophy. In recent times it has come under over the values allocated to each category of accident and for focusing only on the reduction in minor injuries.



For every 1 major injury, there are:

- 29 minor injuries, and
- 300 near misses or unsafe acts

Implication:

By focusing on reducing minor incidents and unsafe behaviours (the base of the triangle), you can proportionally reduce the occurrence of major injuries or fatalities.

In the context of MSETCL's high-risk activities (EHV systems, cable laying, live substation maintenance), applying **Heinrich's/Bird's Triangle** helps:

1. Justify **proactive safety programs** (training, toolbox talks, hazard reporting).
2. Encourage **reporting of near-misses**, which often go unreported.
3. Emphasize **safety culture at all levels**, not just reactive post-incident management.
4. Structure **leading indicators** in EHS dashboards (e.g., count of near misses, unsafe acts corrected, PPE compliance).



Chapter 4

Permit To work

(Ref :- Document Prepared by STU-Maharashtra regarding
"Procedure for work to be carried out across an Inter - User Boundary")

4.1 Objective

The objective is to achieve agreement and consistency on the principles of safety as prescribed in the Indian Electricity Rules when working across a inter user boundary between one User and another User.

4.2 Framework

4.2.1 Transmission Licensees and all Users shall nominate suitable authorized persons to be responsible for the co-ordination of safety across that company boundary. These persons shall be referred to as Designated Officer.

4.2.2 Transmission Licensees and all Users shall issue a list of Designated Officers (names, designations and telephone numbers) to all Users who have a direct inter user boundary with their network. This list shall be updated promptly whenever there is change of name, designation or telephone number and shall be uploaded on their website.

4.2.3 Whenever work across an inter-user boundary between Transmission Licensees and any other User or between two Users is to be carried out, the Designated Officer, of the User, wishing to carry out work shall personally contact the other relevant Designated Officer. If the Permit to Work (PTW) cannot be obtained personally, the designated officers shall contact through telephone and exchange Code words to ensure correct identification of both parties. Detailed procedure to obtain PTW over telephone is described in Section 2 of section to above referred STU Document.

4.2.4 If the work extends over more than one shift the Designated Officer shall ensure that the taking over Designated Officer is fully briefed on the nature of the work and the code words in operation.

4.2.5 The Designated Officers shall co-operate to establish and maintain the precautions necessary for the required work to be carried out in a safe manner. Both the established isolation and the established earth shall be locked in position, where such facilities exist, and shall be clearly identified.

4.2.6 Work shall not commence until the Designated Officer, of the User (who may be State Transmission Licensee), wishing to carry out the work, is satisfied that all the safety precautions have been established. This Designated Officer shall issue agreed safety documentation (PTW) to the working party to allow work to commence. The PTW in respect of specified EHV lines and other interconnections shall be issued with the consent of SLDC. (SLDC consent format for operation or work or testing on transmission line element shall be refer from Annexure - A of above referred STU Document.

4.2.7 When work is completed and safety precautions are no longer required, the Designated Officer who has been responsible for the work being carried out shall make direct contact with the other Designated Officer to return the PTW and removal of those safety precautions. Return of PTW in respect of specified EHV lines and interconnections shall be informed to SLDC.

4.2.8 The equipment shall only be considered as suitable for return to service when all safety precautions are confirmed as removed, by direct communication using code word contact between the two Designated Officers, and return of agreed safety documentation from the working party has taken place.

4.2.9 Any dispute concerning Inter user Boundary Safety shall be resolved at an appropriate higher level of authority.

4.3 THE SAFETY RULES

4.3.1. Application of Rules

- i. The Transmission License Safety Rules and Safety Instructions shall be applied when working on or near to items of Equipment, which are part of a System.
- ii. The System to which these Safety Rules and Safety Instructions apply for all those items of Equipment owned by Transmission Licensee or on its transmission lines or assets.
- iii. Equipment shall be added to and removed from a system only in accordance with an Approved Handing over / Taking over Procedure. The same procedure will determine when the Safety Rules and Safety Instructions shall apply or cease to apply.
- iv. Equipment located on another company's premises may be subject to its Safety Rules and Safety Instructions, or to the owning Authority Safety Rules and Safety Instructions.

4.3.2. Approach to expose extra high voltage and high voltage conductor and insulators.

- i. Persons shall not allow any part of their body or objects / tools & plant to approach within the specified Safety Clearance to exposed EHV / HV conductors, which are Live. The only exception to this is during Live / Hot line work carried out on EHV / HV equipment in accordance with Approved specialized procedure.
- ii. Safety working clearance.

Highest system Voltage (kV)	Safety working Clearance (in meters)
12	2.6
36	2.8
72.5	3.1
145	3.7
245	4.3
420	6.4
800	10.3

- * Safety working clearance considered from Central Electricity Authority (Measures relating to Safety and Electric Supply) Regulations, 2010.

- iii. When Points of Isolation have been established but exposed conductors could be subject to Extra High Voltage or High Voltage, the only object permitted to approach within Safety Working Clearance shall be Approved voltage measuring devices or Earthing Devices.
- iv. When Points of Isolation have been established by the application of Earthing Devices, approach is allowed under an appropriate Safety Document within the specified Safety Clearance.

4.3.3. Safety precautions for work or testing on or near to extra high voltage or high voltage equipment.

- i. When work or testing is to be carried out on or near to EHV / HV equipment, the means of achieving safety must be assessed according to Transmission Licensees Safety Document Procedure. The EHV / HV equipment must be identified.
- ii. Safety Documents.
 - a) When work or testing is to be done on the normally energized part / primary side of the EHV / HV equipment and it is necessary to provide Primary Earths, a Permit to Work (PTW) shall be issued. In case it is required to remove the Primary Earth for the purpose of testing, this shall be done after taking due precautions as required.
 - b) When work or testing is to be done on the normally not energized part / secondary side of the EHV / HV equipment, such as for relay testing or CB operation testing or work on secondary side of CT's / PT's and does not require the de-energization of the equipment or the providing of Primary Earths, Permit To Test (PTT) shall be issued.
 - c) The Safety Document must show the Safety Precautions taken to achieve safety from the EHV / HV system and further precautions required to protect persons from inherent dangers in other systems.
 - d) Within any Isolated Zone, any number of PTWs may be issued.
 - e) Only one PTT shall be in force at any time within any isolated zone, No PTWs are permitted at the same time as the PTT is in force in the same isolated zone.
 - f) When the restoration of motive power is required for work or testing, the supplies required must be stated on the Safety Document in accordance with Safety Instruction.
 - g) If motive power supplies have been made available, no other PTWs shall be issued on the same equipment.
- iii. When danger from induced voltages could arise during the course of work or testing, additional earths shall be applied.

4.3.4 Safety precautions for work on or near to medium and low voltage equipment

- i. Where reasonably practical, work on or near to Medium and Low voltage equipment should be carried out with that equipment in Dead condition.
- ii. When work or testing is to be carried out on or near to MV / LV Equipment, then the means of achieving safety must be assessed and shall also comply with the following rules.

- a. The MV / LV Equipment shall be identified.
 - b. The MV/LV Equipment shall be isolated and those points of isolation secured.
 - c. The Supervisor or Shift In charge under which work or testing work is carried, shall have to brief the detail procedure to the technician before taking the Permit to Work.
 - d. The method of instructing how the work or testing is to take place can be either a safety Document or Personal supervision.
- iii. When it is unavoidable to carry out work or testing on MV / LV equipment which is not dead, then suitable precautions to avoid Danger must be followed.

4.3.5 Safety precautions for work or testing or testing in or near to mechanical equipment.

- i. When work or testing is to be carried out on or near to mechanical equipment, the means of achieving safety must be assessed according to Safety Instructions.
- ii. Safety Documents
 - a. For work or testing with the Equipment Isolated and either non - operational or with limited restoration of motive power supplies, the Safety Document issued will be a Permit to Work.
 - b. When testing of mechanical Equipment involves the application of test pressures, the Safety Document issued will be a Permit to Test.
- iii. When the work or testing requires the issue of a Permit To Work, according to the safety rule (4.3.5 (ii)(a)), the precautions will be specified in the Permit To Work and must include the following:
 - a. The Mechanical equipment must be Isolated and Points of Isolation established for the work.
 - b. Further precautions taken to protect persons from inherent dangers in mechanical systems. This must include draining, venting, purging and removal of stored energy.
 - c. Venting emissions shall be dissipated so as to avoid Danger. Where reasonably practicable, vents shall be locked open and Caution Notices fixed.
 - d. The removal of the stored energy must be carried out in a manner to contain or dissipate that stored energy safely.
 - e. Where internal access is required and the residue of the contents could cause Danger, the mechanical equipment must be purged and that residue disposed of safely according to an Approved Procedure.
- iv. Where work or testing is to be carried out on mechanical Equipment and it is essential to restore motive power for that work or testing while the Permit to Work is in force, then the following additional precautions shall be applied.
 - a. All supplies required must be stated on the Permit to Work in accordance with the Safety Instructions.

- b. If motive power supplies have been made available, no other PTWs shall be issued on the same Equipment.
- v. When the testing requires the issue of a Permit to Test according to Safety Rule (4.3.5 (ii)(b)) then the procedures will be as described in Safety Instructions.

It is essential that the risks of testing are properly assessed by the Maintenance / Testing Engineer. This procedure should only be used when such testing is an operational necessity.

A. Transfer of permit

- i. Transfer of permit to work from one Supervisor to another is strictly prohibited. If there are more than one working parties, separate permits should be issued to the Supervisor in charge of each working party and a written record should be kept of the number of such permits issued for each work.
- ii. If work is of such a nature and duration that it has to be carried out continuously but under the supervision of more than one Supervisor in shift duty, the “Permit to work” form shall be endorsed by the Permit Issuing Officer cancelling the name of the supervisor to whom it was originally issued and substituting the name of the second or subsequent Supervisor to whom the permit will now become valid. The time of each endorsement should be noted on the “Permit to work” form and it’s duplicate.

B. Operating of equipment

- i. The system shall never involve pre - arranged signals or the use of time intervals to achieve safety while operation on any Equipment.
- ii. The operation of the equipment and / or its isolation and / or earthing shall be confirmed before the issue of Permit to Work or Permit to Test.

C. Demarcation of work and testing areas

- i. The work and testing area shall be clearly demarcated.
- ii. Where necessary, physical protection must be provided to prevent danger to persons in a demarcated area from adjacent system hazards.

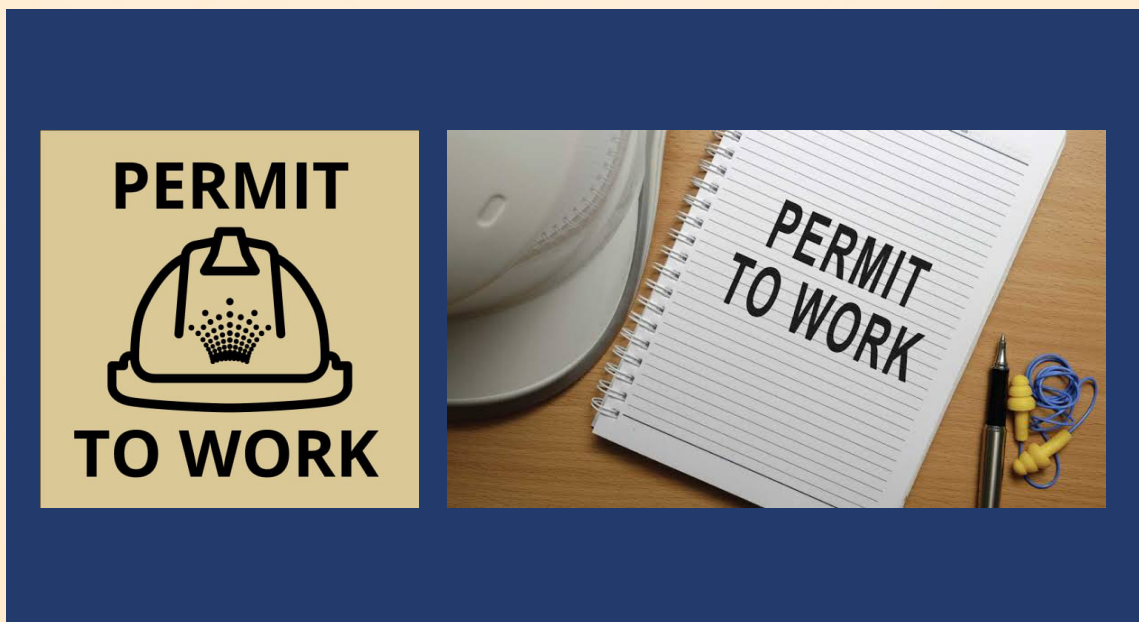
D. Identification of equipment and special consideration

- i. All equipment on inter user boundary between Transmission Licensee and other Users circuits which may be used for the purpose of safety co-ordination and establishment of isolation and earthing, shall be permanently and clearly marked with an identification number or name, that number or name being unique in that sub-station. This equipment shall be regularly inspected and maintained in accordance with manufacturer's specification.
- ii. Each Designated Officer shall maintain a legibly written safety log, in chronological order, of all operations and messages. Relating to safety co-ordination sent and received by them.

- iii. For inter user boundary between STU and other Users circuits, all Users shall comply with the agreed safety rules, which must be in accordance with IE Rules.

4.4 EHV AND HV SWITCHING, EARTHING AND SAFETY DOCUMENT PROCEDURE

- i. **Purpose:** To specify procedure to achieve safety from system when maintenance or testing is to be carried out on EHV / HV System.
- ii. **Scope:** This MSETCL Safety Instructions set down the procedure to be adopted when carrying out EHV / HV switching, isolation from other supplies, earthing, issue of Safety Document and control on EHV / HV Transmission System.
- iii. **Procedure:** Before commencing any work on EHV/HV equipment, a detailed permit procedure must be followed. The system shall be de-energized through approved switching operations, ensuring complete isolation from all sources, including back feeds. Physical disconnection must be verified through mimic diagrams and on-site indicators. Once isolation is confirmed, portable or fixed earths shall be applied at all accessible points, including both sides of the equipment under work. A Safety Document (Permit-to-Work) shall then be issued by the authorized person (Switching Officer/Control Engineer) only after cross-verification. No work shall begin without the authorized signature of the permit holder. The Safety Document must remain with the person in charge of the work and be surrendered only upon completion, after which earthing shall be removed and normal service restored. All operations must be logged and supervised per standard operating procedures and CEA safety Regulations



4.5 Planning/Assessment

- i. PTW (Permit to Work) will be issued when work requires the providing of primary earths. (Refer Safety Rule (4.3.3 (ii)(a)).

- ii. PTT (Permit to Test) will be issued when work / testing on the substation equipment/ transmission line do not require the providing of primary earths. (Refer Safety Rule 4.3.3 (ii) b).
- iii. Any number of PTWs may be issued within any isolated zone, at the discretion of the Designated Officer (Designated Officer shall keep track of the PTWs issued). (Refer Safety Rule 4.3.3 (ii) d).
- iv. Only one PTT shall be in force at any time within any isolated zone, No PTWs are permitted at the same time as the PTT is in force in the same isolated zone. (Refer Safety Rule 4.3.3 (ii) e).

4.6 Shutdown approval from SLDC/WRLDC

- i. The approval of planned as well as emergency outages in the transmission Network level in real time is coordinated by SLDC/ RLDCs based on system conditions.

(Detailed procedure for the shutdown shall be as per Standard Operating Procedure for Outage Planning in State of Maharashtra)

4.7 Request of PTW

- i. Maintenance engineer shall request PTW by completing the Part-A of Permit to Work format.

4.8 Availing outage code from SLDC/WRLDC

- i. The Designated Officer shall check whether this is a planned outage or emergency and seek the code for availing outage from SLDC.

(In case of WRLDC oversight asset, SLDC shall request WRLDC for shutdown code. WRLDC will provide the code to SLDC in case of interstate line/asset)
- ii. SLDC will confirm to the Designated Officer that the shutdown can be availed/or cannot be availed and both will record the instructions in their log sheet(s) and message register together with the message number, date and time that the instruction was given. Mode of communication; Email/ land Line Phone/ Mobile/ PLCC shall also be recorded. Detail of the message recorded in the voice Recording system of the substation, if available, shall also be recorded in the Log sheet and message Register.

4.9 Switching operations (for shutdown)

- i. The Designated Officer will carry out switching (shutdown) operations as per the instructions of SLDC.
 - a. If SLDC is not coordinating the switching procedure, an authorization for carrying out necessary coordination and switching operations shall be availed from SLDC.
 - b. The Designated Officer of the Sub Station where the PTW / PTT has been applied for, on getting the authorization for operations shall coordinate for carrying out such switching operations as necessary for isolation of the work/ test area.

- c. All isolations shall be carried out and points of isolations will be Locked Open.
- d. In case of Line, the Designated Officer shall give a message to the Designated Officer of the Sub Station at the other end(s) for carrying out isolation and locking open the points of isolation.
- e. The Designated Officer of the Sub Station at the remote end only after confirming and matching the shutdown code given by SLDC/WRLDC will isolate and Lock Open all points of isolation and confirm back to the Designated Officer of the Sub Station where the PTW / PTT has been applied for.
- f. Isolation of the secondary side of voltage transformers and auxiliary transformers (tertiary winding where applicable) will also be carried out including locking.
- g. These switching operations, along with time stampings of each operation, will be recorded as per Operations Register Format in the substation log sheet(s) and message register together with message number, the date and time.

4.10 Locking of isolation points and no feedback/ earthing certificate

- i. Earth switches shall be closed and locked once all isolation including voltage transformers and auxiliary transformers (tertiary winding where applicable) has been completed, including remote ends where necessary, and confirmation has been received that the isolation has been completed at the remote end
- ii. Designated Officer shall ensure that Caution Notices shall be fixed on all control handles on the control panel and also attached to the locks used to Lock Open all points of Isolation and Lock Closed all earth switches.

These switching operations will be recorded in the Sub-station log sheet(s) and message Register together with message number, date and time.

- iii. 'No Back Feed Certificate' / 'Earthing Certificate' must be obtained from all concerned Sub Stations. All details of the 'No Back-Feed Certificate' / 'Earthing Certificate' must be entered in the Sub Station log sheet(s) and message register along with message number, date and time. The message number, date and time must also be recorded on the PTW / PTT.
- iv. The Designated Officer shall record the isolation and earthing as per Operations Register Format.

A copy of operations register format is to be attached with Permit to Work or Permit to Test and document no. is to be referred in part B.1 (Sequence of Isolation) of PTW/PTT.

- v. All Safety Keys, fuses and links, etc., which have been used to Lock all points of isolation and earth switches, etc. will be Locked in a Key Safe under the safe custody of the Designated Officer.
- vi. The Designated Officer will specify the following in Part B of the Permit To Work or Permit To Test before issue:

- a. Any further precautions which are required to be taken later by the in charge holding the Permit to Work or Permit to Test to achieve Safety. (Refer Safety Rule 4.3.3 (ii) b).
- b. The power supplies that can be resorted for the particular work being carried out (Refer Safety Rule 4.3.3 (ii) e) and issue the Approved written procedure.
- c. The number of Additional Earths required. The use of these Additional Earths will be specified on an Earthing Schedule drawn up by the Maintenance Engineer

4.11 Issue of PTW/PTT

- i. The Designated Officer will issue the Permit to Work or Permit to Test to the Person requesting for PTW / PTT who will retain the Safety Document in his possession until all work has been completed.
- ii. The Designated Officer will record all the details in the substation log book and Permit to Work or Permit to Test register.
- iii. In cases where PTW / PTT has been requested over telephone or mail, the confirmation of conveying the approval of the PTW / PTT shall be recorded by the Designated Officer.

4.12 Receipt of PTW/PTT and Code

- i. The Person requesting for PTW / PTT will sign Part C (Receipt) to accept the responsibility for carrying out the work / testing on the Sub Station equipment / transmission line.
- ii. The Person responsible for the work / testing will draw up the Earthing Schedule, if required, to show the position and use of Additional Earths.
- iii. IMPORTANT: - When PTW / PTT has been requested over telephone: The person responsible for the work / testing will give confirmation of receipt of the approval of the PTW / PTT by giving a “code name” which shall be not be recorded by the Designated Officer. The Designated Officer shall verbally convey the “code name” to the next Designated Officer
- iv. In substations, Additional Earths must be applied in a manner similar to primary portable earths using the same earthing equipment.
- v. On overhead transmission lines, Additional Earths can be applied within Safety Clearance but at not less than Safe Electrical Clearances.

4.13 Return of PTW, code verification and cancellation of PTW/PTT

- i. The person who has obtained the PTW / PTT will sign the Return of Permit to Work or Permit to Test (Part D) to declare that all work / testing is completed.
- ii. The person who has obtained the PTW / PTT over telephone shall convey the above along with the “code name” given by him at the time of obtaining the PTW / PTT.
- iii. While returning the PTW / PTT, any restrictions applicable / changes made shall be described in part D.

- iv. It shall also be confirmed that all men, tools, plant and Additional Earths have been removed.
- v. The Designated Officer will receive / accept the cleared Permit to Work or Permit to Test and record receipt in the substation log sheet. He will also record the receipt / acceptance in the Permit to Work or Permit to Test register together with date and time, and mention this in Part E.1 of the PTW / PTT.
- vi. The Designated Officer shall cancel the PTW / PTT by signing in Part E. The PTW / PTT shall then be kept for record.

4.14 Confirmation of No PTW outstanding

- i. The Designated Officer will verify the local status and confirm that no PTW/PTT is outstanding and it is clear for restoration.
- ii. The Designated Officer where PTW/PTT was issued shall seek from the Designated Officer of the Sub Station at the other end(s) the confirmation in the form of a certified document that no PTW/PTT is pending at his end and line is clear to be charged.
- iii. This shall be recorded in the substation log sheet(s) and message register together with message number, the date and time.

4.15 Availing restoration code from SLDC/WRLDC

- i. Designated Officer shall seek restoration code from SLDC that the PTW on the asset has been cancelled and can be energized.

(In case of WRLDC oversight asset (refer Operating Procedures of Western Region), SLDC shall forward the request with their consent to WRLDC. WRLDC will then approve the restoration and provide the code to SLDC)

SLDC shall confirm the Designated Officer with code that restoration of the asset can be availed.

4.16 Switching operation (for restoration)

- i. The Designated Officer will carry out switching (restoration) operations as per the instructions of SLDC.
 - a. If SLDC is not coordinating the switching procedure, an authorization for carrying out necessary coordination and switching operations shall be availed from SLDC.
 - b. The Designated Officer of the Sub Station where the PTW / PTT has been applied for shall coordinate for carrying out such switching operations as are necessary for restoration of the work / test area.
 - c. The Designated Officer of the Sub Station where the PTW / PTT has been applied for shall then carry out the removal of all the Primary Earthing and switching operations after consultation with remote end(s), recording these in the operations register format, substation log sheet together with date and time

- d. These switching operations, along with time stampings of each operation, will be recorded as per Operations Register Format in the substation log sheet(s) and message register together with message number, the date and time.
 - e. Designated Officer will complete Part E.2 of the Permit to Work / Permit to Test to describe the sequence of normalization and refer the Operations register document no. A copy of operations register shall be attached to the cancelled PTW.
- ii. All documents shall be filed and maintained.



4.17 AUTHORISATION (WORK ALLOCATION) OF PERSONS

4.17.1 Purpose

To define guidelines for authorizing persons for carrying out maintenance works in EI IV Sub Stations or on transmission lines.

4.17.2 Scope

These MSETCL Safety Instructions set down procedures for authorization of personnel such as Maintenance Engineer, Testing Engineer, Designated Officer, Sub Station In-Charge, Line In-Charge, Operator and Authorized Person.

4.17.3 Procedures

1. Only authorized persons shall be allowed to carry out operation and maintenance activities in Sub Stations / on transmission lines.
2. Safety guidelines during O&M of Sub Stations shall be issued by Sub Station In-Charge. All operation and maintenance activities shall be carried out under the control of Sub Station In-Charge.
3. For carrying out maintenance work, issue of safety document (PTW / PTT) shall be approved by Sub Station In-Charge.
4. Sub Station In-Charge shall authorize Designated Officer & Maintenance Engineer for carrying out O&M activities. Maintenance Engineer shall also be Testing Engineer for local testing. Engineers of the Protection Wing & other fields who have been assigned specific testing tasks shall also be designated as Testing Engineers. Sub Station safety documents, i.e., PTW / PIT shall be filled by Maintenance Engineer / Testing Engineer for carrying out maintenance / testing activities in Sub Stations. PTW / PTT are to be approved by Sub Station In-Charge before being issued by Designated Officer.
5. All operations including isolation and earthing of equipment shall be carried out by the Operator in the presence of Designated Officer.
6. Only after personally confirming isolation and earthing in the work area, the Designated Officer shall issue the PTW / PTT. After receipt of PTW / PIT, the Maintenance Engineer / Testing Engineer shall advise the Authorized Persons for carrying out maintenance / testing activities. All Authorized Persons shall be selected by Maintenance Engineer / Testing Engineer.
7. Maintenance Engineer / Testing Engineer shall be responsible for taking all safety precautions during maintenance testing works including use of Personnel Protective Equipment (PPEs).

ANNEXURE - A Sample authorization letter from SLDC for Switching Operations or work or testing on Transmission Line Element.

From : MSLDC

Date -

To,

Subject: Shutdown on / for _____

You are hereby allowed to carry out necessary operations and issue PTW to an authorized person after observing all safety precautions to avail shutdown on w.e.f. _____ hrs. to _____ hrs. of dt. _____, to _____ hrs. of dt. _____. Shutdown timings should be strictly adhered to.

Name -

Employee Code -

Designation -

Signature or Authorized Person:

PERMIT TO WORK

A : REQUEST			
1	Work Area		
2	Work to be done		
3	Period of PTW	From Date : Time : To Date Time :	
4	Details of Isolation Required	1. 2. 3. 4. 5.	
5	PTW Requested by	Date :	
	Name & Designation	Time :	
	Signature		
B : ISSUE OF PTW			
		Isolating Time :	
		Earthing Time :	
		Certificate No.:	
		Dt. :	
		Issued by:	
3	Further precautions to be taken to achieve safety	i) ii)	
4	PTW ALLOWED	From Date : Time : To Date Time :	
5	Entry made in PTW register on page		
6	PTW Approved by : Name and Designation : Signature :		

C. RECEIPT

I Hereby Declare that I have inspected and have satisfied my self that such equipment where the work is to be carried out has been switched off and isolated/earthed. I also accept responsibility for carrying out work only on equipment detailed on this permit and that no attempt will be made by me or by any man under my control, to carry out work on any other equipment.

Name and Designation :

Signature or Code (In case receipt over Phone) :

D. RETURN OF PERMIT TO WORK

1 Details of Work done

2 Restriction / changes if
any on the equipment being
returned to service

3 Clearance Certificate

I hereby declare that all men, material & earthing have been withdrawn and all personnel warned that is no longer safe to work on the equipment specified in this permit and all tools and additional earths are clear and equipment is ready for charging.

Name :

Date :

Signature :

Time :

E. CANCELLATION OF PERMIT TO WORK (PTW)

1. PTW Cancelled and entry made
on PTW register page No.

2. Sequence of Normalization : &
Operations Register Document No. :

i. OPERATIONS REGISTER DOCUMENT NO. :

ii. REMOVAL OF EARTHING TIME :

iii. CLOSING OF ISOLATORS TIME :

iv. ENERGIZATION TIME :

Name & Designation :

Date :

Signature :

Time :

ADDITIONAL COMMENTS

NOTES FOR RECIPIENT

THIS CERTIFICATE IS A VALUABLE DOCUMENT AND SHOULD BE RETAINED
FOR FUTURE REFERENCE

PERMIT TO TEST

A : REQUEST			
1	Work Area		
2	Work to be done		
3	Period of PTW	From Date : Time :	To Date Time :
4	Details of Isolation Required	1. 2. 3. 4. 5.	
5	PTW Requested by	Date :	
	Name & Designation	Time :	
	Signature		
B : ISSUE OF PTT			
		Isolating Time :	
		Earthing Time :	
		Certificate No.:	
		Dt. :	
		Issued by:	
3	Further precautions to be taken to achieve safety	i) ii)	
4	PTT ALLOWED	From Date : Time :	To Date Time :
5	Entry made in PTW register on page		
6	PTW Approved by : Name and Designation : Signature :		

C. RECEIPT

I Hereby Declare that I have inspected and have satisfied my self that such equipment where the work is to be carried out has been switched off and isolated/earthed. I also accept responsibility for carrying out work only on equipment detailed on this permit and that no attempt will be made by me or by any man under my control, to carry out work on any other equipment.

Name and Designation :

Signature or Code (In case receipt over Phone) :

D. RETURN OF PERMIT TO TEST

1 Details of Work done

2 Restriction / changes if
any on the equipment being
returned to service

3 Clearance Certificate

I hereby declare that all men, material & earthing have been withdrawn and all personnel warned that is no longer safe to work on the equipment specified in this permit and all tools and additional earths are clear and equipment is ready for charging.

Name :

Date :

Signature :

Time :

E. CANCELLATION OF PERMIT TO WORK (PTT)

1. PTT Cancelled and entry made
on PTT register page No.

2. Sequence of Normalization : &
Operations Register Document No. :

i. OPERATIONS REGISTER DOCUMENT NO. :

ii. REMOVAL OF EARTHING TIME :

iii. CLOSING OF ISOLATORS TIME :

iv. ENERGIZATION TIME :

Name & Designation :

Date :

Signature :

Time :

ADDITIONAL COMMENTS

NOTES FOR RECIPIENT

THIS CERTIFICATE IS A VALUABLE DOCUMENT AND SHOULD BE RETAINED
FOR FUTURE REFERENCE

Chapter 5

Hazard Identification and Risk Assessment

5.1 ISO 45001 focuses on proactive risk-based thinking and the continual improvement of health and safety performance in the workplace. Hazard Identification and Risk Assessment (HIRA) is conducted to ensure a safe working environment by identifying potential hazards, evaluating their associated risks, and implementing necessary control measures in power transmission operations.

Hazard Identification: The process of recognizing sources, situations, or acts with a potential to cause harm (injury, ill health, damage).

Risk Assessment: It is the process to evaluate the risk level arising from the identified hazards, considering existing controls, likelihood, and severity.

Risk Assessment Matrix

The risk level is determined using the formula:

$$\text{Risk Level (R)} = \text{Likelihood (L)} \times \text{Severity (S)}$$

Where:

- **Likelihood (L):** Probability of hazard occurrence (Scale: 1 to 5)
- **Severity (S):** Impact of hazard (Scale: 1 to 5)

Likelihood	Description	Score
Rare	Highly unlikely	1
Unlikely	May occur occasionally	2
Possible	Can occur under certain conditions	3
Likely	Occurs frequently	4
Almost Certain	Highly probable	5
Severity	Description	Score
Minor	No or minor injury	1
Moderate	Injury requiring medical attention	2
Major	Permanent disability	3
Critical	Fatality or multiple severe injuries	4
Catastrophic	Multiple fatalities or severe loss	5

5.2 Control Measures – A Strategic Safety Commitment at MSETCL

At MSETCL, control measures are a core part of our operational safety strategy. These are systematically implemented actions aimed at **eliminating or reducing the risks** arising from identified workplace hazards.

Control measures at MSETCL include and not limited to:



- **Engineering Controls:**

Safeguards such as machine guarding, interlocking systems, proper earthing, SF₆ gas leak detection, and forced ventilation in basements.

- **Administrative Controls:**

Development and enforcement of safe operating procedures (SOPs), Permit-to-Work (PTW) systems, training schedules, inspection routines, and job rotations.

- **Personal Protective Equipment (PPE):**

Provision and mandatory use of helmets, arc-flash suits, gloves, harnesses, goggles, respirators, and other task-specific gear.

Through structured hazard identification, comprehensive risk assessment, and implementation of tiered controls, MSETCL not only aligns with ISO 45001 standards but also safeguards its workforce, contractors, and infrastructure across its diverse transmission operations.

5.3 Organizational Benefits of Implementing HIRA at MSETCL

- i. **Increased Safety**

HIRA enables early identification of potential hazards across substations, transmission lines, HVDC terminals, and cable galleries. Proactive control prevents incidents, ensuring a safer work environment for employees and contractors.

- ii. **Regulatory Compliance**

Adhering to statutory requirements such as the Electricity Act, CEA Regulations, Factories Act, and environmental guidelines, etc. MSETCL ensures legal conformity and avoids operational or financial penalties.

- iii. **Informed Decision-Making**

Systematic risk evaluation improves planning for high-risk tasks (e.g., live-line maintenance or confined space entries) and enables prioritization of risk control efforts.

iv. Cost Efficiency

preventing incidents reduces unplanned outages, medical expenses, insurance claims, and rework—resulting in significant cost savings and productivity retention.

v. Enhanced Public and Industry Reputation

a strong safety record enhances MSETCL's brand as a reliable, responsible transmission utility committed to the well-being of its workforce and the wider community.

vi. Continuous Improvement

The HIRA process is iterative and supports MSETCL's safety culture. Through incident feedback, audits, and safety committee inputs, it evolves to address emerging risks.

5.4 Key Steps in MSETCL's HIRA Process

i. Hazard Identification

The first step is to believe right or wrong is a possibility. However outcome is meaningless unless all users can safely identify and address the following:

- What can go wrong?
- What are the consequences?
- How could it arise?
- What are other contributing factors?
- How likely is it that the hazard will occur?
- Where it is happening (environment)?
- Who or what it is happening to (exposure)?

What precipitates the hazard (trigger) and the outcome that would occur should it happen (consequence?)

The next step in the HIRA cycle is to systematically identify hazards—both routine and non-routine—across all activities. This includes:

ii. Electrical Hazards:

- Direct or indirect contact with live conductors during maintenance, testing, or construction.
- Arc flash/blast during switching or fault isolation.

iii. Physical Hazards:

- Falls from towers, gantries, or scaffolding.
- Slips/trips in cable trenches or at substations during rains.

iv. Fire and Explosion Hazards:

- SF₆ or transformer oil leaks.

- Faults in cable basements or indoor switchgear bays.

v. Environmental Hazards:





- Snake or insect encounters during field patrols.
- Fog or lightning during restoration.
- Work near rivers, highways, or rail tracks.

vi. Psychosocial Hazards:

- Stress due to long shift hours or emergency response duties.
- Fatigue and mental workload during peak operational demand.

vii. Hazard Sources:

- Site safety inspections and condition assessments
- Historical breakdown and failure analysis
- Incident and near-miss reports
- Feedback from line patrols and maintenance crews
- Safety committee observations

Risk Assessment Matrix					
Severity ↓ / Likelihood →	Rare	Unlikely	Possible	Likely	Certain
Fatality (Catastrophic)	5	10	15	20	25
Major Injury (Hospitalization)	4	8	12	16	20
Major (Medical Case)	3	6	9	12	15
Moderate (First Aid)	2	4	6	8	10
Negligible (Minor)	1	2	3	4	5
Risk Level / Rating					
	The risk is acceptable and the task can proceed. However efforts should still be made to reduce the risk to as low as reasonably practicable (Monitor & Control)				
	The risk is significant. Take mitigation measures to further reduce Risk level.				
	Moderate harm probable, major harm unlikely. The risk is significant The activity requires a review of possible alternatives and additional control measures. If the rating cannot be reduced, management /customer authorization is required before the task can proceed				
	Serious or major harm will probably occur. The risk is unacceptable and the task cannot be carried out				

5.5 Risk Control – As per Hierarchy

If the risk is in the Green region on the Risk Assessment Matrix, this is broadly acceptable and no further action is required. If the risk is in the Yellow region on the RAM, this is in the tolerable regions and needs to be demonstrated to be As Low as Reasonably Achievable, Practicable (ALARP) by recommending further action. If the Risk is still in the Red region, this

is not acceptable and action definitely needs to be taken. HIRA Review team shall discuss the proposed actions, where applicable, to address the hazard that is ascribed with a medium to high-risk rating.

Based on the risk assessment results, a control plan is developed to eliminate or reduce the identified risks. This can include implementing engineering controls such as guarding or ventilation systems, administrative controls such as training or written procedures, or personal protective equipment (PPE). The control plan should also include monitoring and review mechanisms to ensure that control measures are effective and continue to be implemented.

MSETCL should follow the Hierarchy of Controls to mitigate hazards:

- i. Eliminate: e.g. avoid live work if a shutdown is feasible.
- ii. Substitute: e.g. Use insulated tools and hot sticks instead of bare hands.
- iii. Engineering Controls: e.g., Barricades, grounding chains, relay interlocks, auto-reclosing schemes.
- iv. Administrative Controls: e.g. SOPs, permit-to-work, safety training, tagging and isolation protocols.
- v. PPE: e.g. Insulating gloves, helmets with arc visors, flame-resistant clothing, fall arresters.

5.6 Review & Monitoring

MSETCL will periodically review HIRA when:

- i. New substations, bays, or transmission lines are added
- ii. After grid disturbances or L1-level safety incidents
- iii. Regulatory updates from MERC/CERC or CEIG
- iv. Input from safety audits or internal committees

5.7 HIRA Register

Annexure (B)

The Procedure for developing the HIRA register is defined below. Further, it has to be maintained, updated and followed

STEPS OF PREPARATION OF HIRA

Step-1:

Collection of information: Team shall collect the following information wherever possible, for each work activity.

- i. Activity / Activities that will be carried out.
- ii. Duration and frequency of the said activity.
- iii. Location/s where the activities will be carried out.
- iv. Persons involved in the activities?

- v. Other persons who may be affected by the work (e.g. visitors, contractors, the public)
- vi. Training of persons involved in the activities.
- vii. Type of activities — Routine/non-routine activities
- viii. Availability of Standard Operating Procedure (SOP)/Standard Maintenance
- ix. Procedure (SMP) for Routine Activities.
- x. Physical form of materials to be used and its recommendations as per Material Safety Data Sheet (MSDS).
- xi. Legal and other requirements applicable for the activities.
- xii. Records of past incident/s and analysis pertaining to activities.
- xiii. Communications from employees and other interested parties (if any).
- xiv. Existing Control measures to be in place.

Step — 2:

Hazard Identification: Identify hazards and determine risks.

Hazard identification and risk assessment to be pro-active rather than reactive. The broad categories of hazards are:

- i. Mechanical (Example: Fall / slip due to slippery floor, Exposure to moving / rotating parts of machine etc.)
- ii. Electrical (Example: Electric shocks / electrocution)
- iii. Chemicals (Example: acids / alkali / salts etc.).
- iv. Fire and Explosion.
- v. Toxic release (Example: Leakage of SF₆ etc.)
- vi. Natural calamities. (Earth quake, Floods, Severe wind storm etc.)
- vii. Biological hazards (Example: Sources of biological hazards include bacteria,
- viii. viruses, insects)

Following three questions to be explored and recorded during hazard identification

- i. Is there a source of harm?
- ii. Who (or what) could be harmed?
- iii. How could harm occur?

Following factors shall be considered while identifying the hazards and determining the risks-

- i. Human behaviour, capabilities and other human factors.

- ii. Hazards originating “outside the workplace” capable of adversely affecting the health and safety of personnel under the control of the organization within the workplace.
- iii. Hazards created in the vicinity “inside the workplace” by work related activities under the control of the organization.
- iv. Infrastructure, equipment and materials at the workplace, whether provided by the organization or others.
- v. Changes or proposed changes in the organization, its activities and materials.
- vi. Applicable legal obligations relating to risk assessment and implementation of necessary controls.
- vii. Design of workplace, processes installations, machinery / equipment, operating procedures and work organization, including their adaptation to human capabilities.

Step — 3:

Review of Existing Control Measures: Team shall carry out review of adequacy of existing control measures.

Step — 4:

Assessment of Risks: After identifying the hazards and determination of risks, carrying out risk assessment and classify the risks based on the risk level

(Matrix) refer Risk Matrix.

RISK Level is obtained by multiplying the following factors: $R = L \times S$. Where:

L - Likelihood: Frequency of the occurrence on Incident

S - Severity of harm: The risk from the hazard is determined by estimating the potential severity of the harm.

Refer to Likelihood table & Severity table for allocating values for Likelihood (L) & Severity (S)

While assigning Likelihood (L) & Severity (S) ratings, consider the adequacy and effectiveness of existing risk control measures (probable failures in existing risk control measures). Some Examples of probable failures in control measures.

Supervision / Human intervention is must for Controls.

People not wearing PPE, / PPEs not available,

People not aware of control measures / untrained personnel,

Damaged PPEs etc.

Additional control measures shall be recommended to reduce the Risk

as per Action plan mentioned in Action plan table.

Step — 4A:

Hierarchy of Risk Control measures: While determining risk controls or considering changes to existing controls, consideration shall be given to reducing the risks according to the following hierarchy:

i) Eliminate (Remove) / Substitution

(Example - If practicable, Eliminate the hazards altogether, or combat the risk at source, for example Use tools instead of handling with bare hands, Use trolley and truck instead of hand carrying, Use man lift instead of Ladder)

ii) Engineering Controls

(Example - Fully automate process, Application of interlocks, Installation of Safety Valve, Alarm & Detection System etc.)

iii) Administrative Controls.

(Example- Good housekeeping, Training and information, Appreciation, Penalty, supervision etc.)

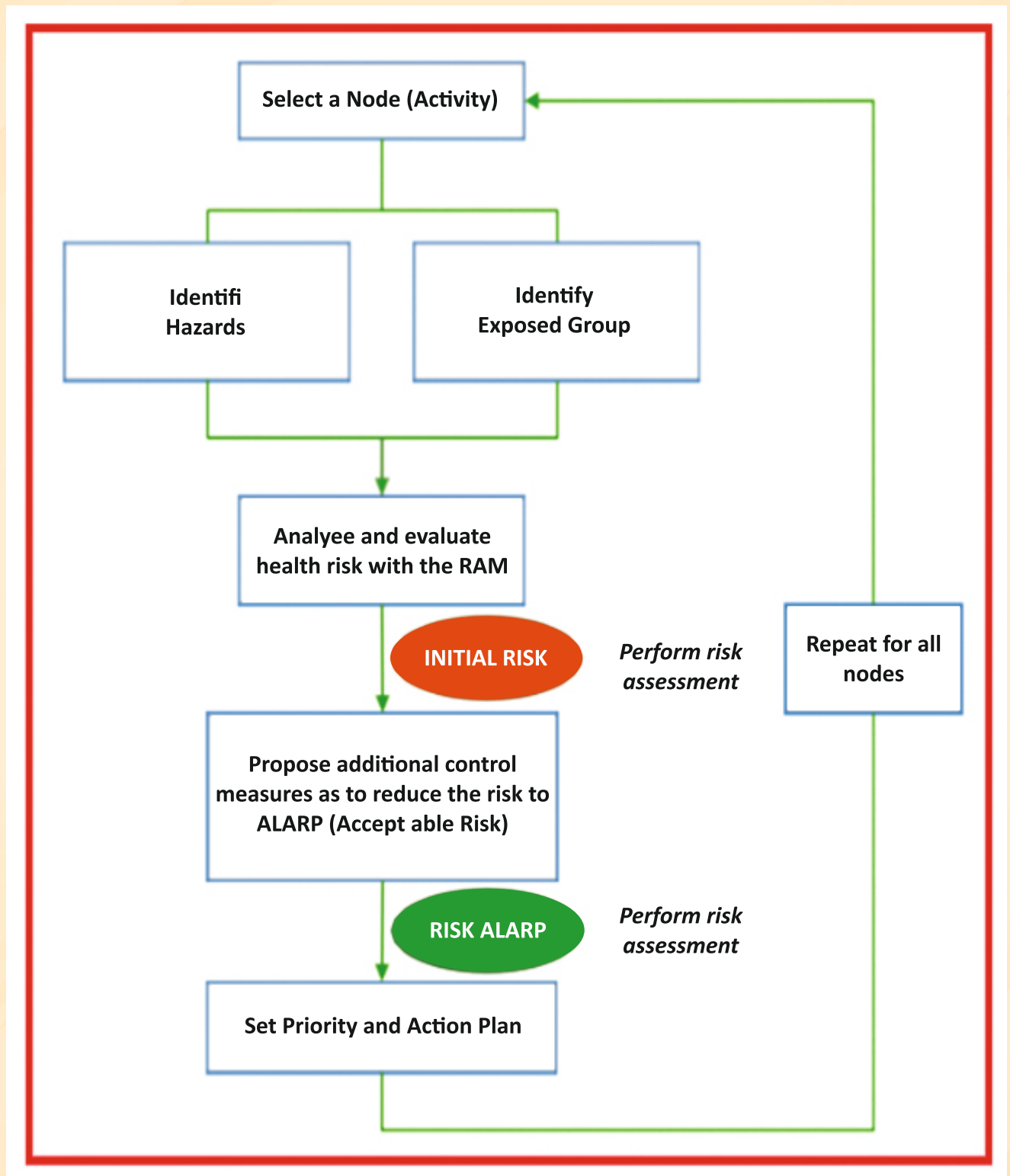
iv) Personal Protective Equipment's (PPEs). However, PPEs are mandatory for all jobs.

Step — 5:

Review Hazard identification and Risk assessment shall be reviewed at least once in two (02) years to keep this information up-to-date.

However, Hazard identification and Risk assessment shall be reviewed before implementing changes to the activity' process/ equipment/ existing risk control measures. Review of Risk assessment shall be carried out during the following situations.

- i. During changes from normal operation,
 - ii. New or modified process/ installation,
 - iii. During expansion, contraction, restructuring
 - iv. New or modified legislation etc.
 - v. New information/inputs from interested parties
 - vi. Recommendations in Incident investigation reports.
-



Chapter 6

INSPECTION, AUDIT, AWARENESS & TRAINING

6.1 EHS Inspection

An EHS inspection is a comprehensive review of a facility, workplace, or process to identify potential safety, health, and environmental hazards.

General safety inspections shall be conducted to identify potential safety hazards in the workplace. These inspections typically focus on areas such as fire safety, electrical safety, hazardous materials storage, and personal protective equipment.

Health and safety inspections are conducted to identify potential health and safety hazards in the workplace. These inspections typically focus on areas such as ventilation systems, hazardous materials storage, and personal protective equipment.

Environmental inspections are conducted to identify potential environmental hazards in the workplace. These inspections typically focus on areas such as air emissions, water pollution, and hazardous waste management.

6.2 Internal & External EHS Audits

Value of an Environmental Health & Safety (EHS) Audit

				
<p>Evaluating the details of processes regularly and comparing them to best practices throughout your industry can help to show areas needing improvement.</p> <p>EFFICIENCY</p>	<p>An audit can help assess potential hidden costs and money saving opportunities, and also help manage your business' environmental impact.</p> <p>COST SAVINGS</p>	<p>Better to identify solutions, compliance needs and regulatory timeline before potential problems become a reality.</p> <p>PREVENTION</p>	<p>Safety is top priority and identifying dangerous situations and developing preventative actions makes good people and business sense.</p> <p>SAFETY</p>	<p>Transparency is important in today's economy. Going a step beyond everyday standards shows your business is committed to sustainability and excellence.</p> <p>COMPETITION</p>

Internal audits shall be conducted 6 Monthly at all stations, projects, and field units by cross-functional teams comprising Safety Officers under the supervision of Additional Chief Safety Officer. Each Circle's Safety Officer shall ensure planning and execution of these audits in line with the EHS calendar and submit consolidated reports to Chief Safety Officer of the Zone. Third-party audits shall be conducted at all MSETCL locations to ensure unbiased review of Occupational Health, Safety and Environment compliance. The scope includes Substations, Transmission Lines, HVDC, Projects, Civil & PAC Circles, and Corporate Office.

Sefty Audit Check List : - Annexure C)

Audit Frequency and Responsibility:

Location	Internal Audit Frequency	External Audit Frequency
400 kV / 765 kV Stations/HVDC	Six monthly	Yearly
Transmission Lines & EHV Cables	Six monthly	Yearly
Remaining Sub-Stations	Yearly	Once in two years
Project Circles	Yearly	Once in two years
Civil & PAC Circles	Yearly	Once in two years
Corporate Office	Yearly	Once in two years

6.3 EHS Awareness, Training & Promotion

All Safety Officers and Additional Chief Safety Officers shall undergo mandatory refresher and advanced training programs once a year on ISO 45001, risk management, emergency response, incident analysis, behavior-based safety, and legal compliance. These trainings shall be coordinated centrally and documented as part of the training matrix.

A minimum of 5 hours (1 day) EHS training either by VC or Physical shall be imparted annually to all employees and contractors.

Site-specific EHS awareness and toolbox talks shall be conducted by Safety Officers and documented accordingly.

WHAT ARE THE 12 BENEFITS OF HEALTH AND SAFETY TRAINING?

1. INCREASED AWARENESS
2. COMPLIANCE WITH REGULATIONS
3. IMPROVED PRODUCTIVITY
4. COST SAVINGS
5. INCREASED EMPLOYEE RETENTION
6. PROTECTING EMPLOYEES
7. IMPROVED REPUTATION
8. BETTER RISK MANAGEMENT
9. ENHANCED EMPLOYEE SKILL SETS
10. IMPROVED EMERGENCY RESPONSE
11. IMPROVED MORALE
12. FOSTER SAFETY CULTURE



Chapter 7

PROMOTION OF EHS

Promotion of Environment, Health & Safety

MSETCL recognizes Environment, Health, and Safety (EHS) as integral to its operational excellence, employee well-being, and social responsibility. The promotion of EHS across all levels of the organization strengthens its commitment to ISO 45001:2018 standards, national regulations, and industry best practices.

1. EHS Vision & Mission

Vision: To be a transmission utility that ensures zero harm to people, property, and environment through proactive EHS practices.

Mission: To embed EHS into the core culture of MSETCL by fostering awareness, building competency, and enabling continuous improvement in safety and sustainability.

2. EHS Promotion Strategy

The key pillars for promoting EHS at MSETCL include:

- i. Leadership Commitment – Ensuring top management drives EHS values through policies, resourcing, and example.
- ii. Employee Participation – Engaging employees in safety committees, suggestion schemes, and hazard identification.
- iii. Awareness & Training – Conducting regular EHS training, toolbox talks, and mock drills for staff and contractors.
- iv. Recognition Programs – Acknowledging best EHS performers with awards, certifications, and appreciation events.
- v. EHS Communication – Use of safety posters, email campaigns, digital dashboards, and newsletters for awareness.
- vi. Cross-Functional EHS Teams – Active participation by engineers, supervisors, and zonal safety officers.

3. EHS Events & Campaigns

To reinforce EHS culture, MSETCL shall organize:

- i. National Safety Week (March) with theme-based programs.
- ii. World Environment Day (June 5) with plantation drives and eco-awareness.
- iii. Fire Safety Week with live fire drill demonstrations.
- iv. Annual EHS Awards Ceremony to recognize outstanding practices.
- v. Zone-wise Safety Competitions and Quizzes for awareness engagement.



4. Digital EHS Promotion

MSETCL shall integrate in near future EHS awareness with its upcoming digital platforms, online HIRA registers, whereby training videos, and e-learning modules shall be deployed across substations, HVDC stations, Lines and project sites.

5. Contractor & Vendor EHS Promotion

All contractors and vendors shall be on-boarded with a mandatory EHS awareness session. EHS letters shall be issued with validity and linked to work order clearance. Their participation in EHS meetings and trainings shall be documented.

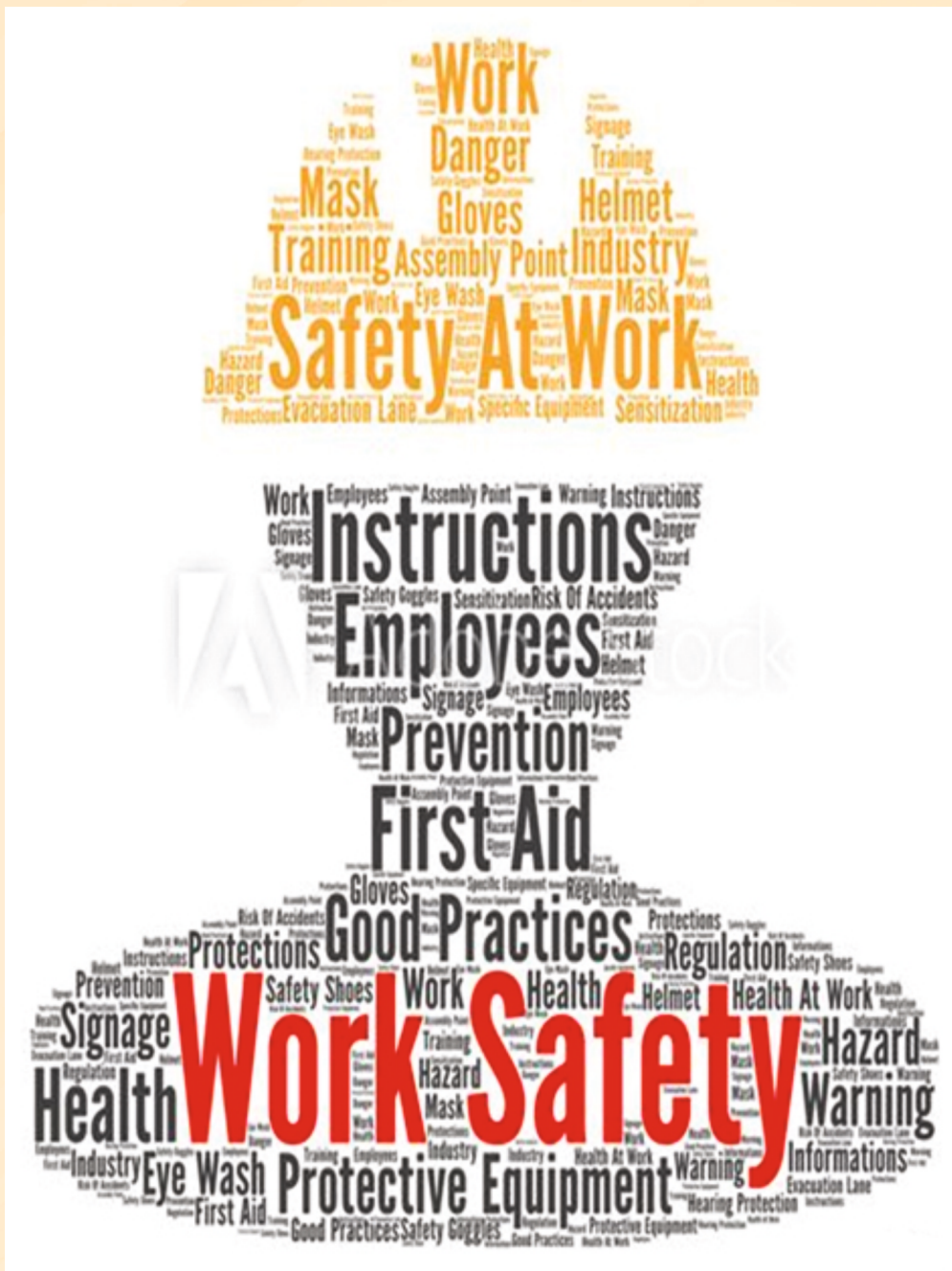
6. Review & Continuous Improvement

The EHS promotion program shall be reviewed annually by the Corporate Safety Council. Inputs from audits, observations, and employee feedback shall be used to fine-tune strategies. Key performance indicators (KPIs) shall be tracked for measurable progress.



Chapter 8

PERSONAL PROTECTION



Personal protective equipment (PPE) is equipment worn to minimize exposure to hazards that cause serious workplace injuries and illnesses.

Allotment of PPEs

Personal Protective Equipment are issued / made available to personnel/s performing duties of operation & Maintenance.

At MSETCL PPE are issued vide Admin circular 93 dated 17/05/2008 & Admin circular 267 dated 25/05/2011

Chapter 9

SAFETY TAG & EHS VIOLATION SLIP

9.1 Safety Tag:

All portable power tools/ equipment used by the vendor/contractor shall be inspected for its healthiness & properly tagged by EHS coordinator appointed by MSETCL. The procedure to be followed is as below....

9.1.1. Issue of Safety tag

- i. Blank safety tags shall be issued by EHS Section to the EHS coordinators.
- ii. No electrical equipment shall be used without safety tag.
- iii. For all non-electrical equipment which pose hazards during its operation, safety tag shall be issued.
- iv. Validity of the safety tag shall be decided by the safety coordinator.

Guidelines for the same are.

One month or less validity shall be given for equipment having wear & tear.

E.g. cutting m/c, drill m/c etc.

Under no circumstances the validity shall be more than two months.

After expiry of validity, the tag shall be taken back and disposed of properly to avoid any misuse.

9.1.2. Safety tags shall be issued after ensuring following.

- i. The physical inspection of the equipment.
- ii. Availability of proper earthing point if electrically required.
- iii. Cleanliness of the equipment.
- iv. Availability of identity on the equipment.
- v. Availability of safety attachments if any.
- vi. Verification of test certificates, dim fit.

9.1.3. Safety Tag Register.

A register for issue of safety tags shall be maintained by the EHS coordinator of the site/station.

The register shall have the following columns.

- i. Sr. No.
- ii. Name of the Agency/contractor/individual.
- iii. Details of the equipment. (Equipment identity is must.)
- iv. Date of issue.

- v. Validity of the safety tag (Date)
- vi. Name & sign of issuer.
- vii. Date of Return receipt of safety tag.
- viii. Name & sign for disposal of expired safety tag.

9.1.4. Short Titles for stations/site.

Every Substation first three letters and Sites first three letters of both Substations will be considered for short title.

Example: For Vashi Substation – VAS will be the Short title, while for Padgha – Bableshtar Site the Short title will be PAD-BAB



9.1.5. Unique Safety Tag number

Each Safety Tag shall have a unique number as explained below A/B/C/XY

Where

A= short title of site/station.

B= Section Le. O&M, Project or TRANSMISSION LINES & EHV CABLES

C= E for electrical equipment & NE for non-electrical equipment.

X= Current financial year.

Y= Sr. no. in the register at which the entries for this equipment's are made after ensuring all safety aspects.

Example:-

For Pardi Sub-station of O&M section for electrical equipment during financial year 2025-26 having Sr. no 1 in the safety tag register the entry will be:

PAR/O&M/E/25-26/001

9.2. EHS Violation Slip.

EHS Violation slip shall be issued against violation of EHS practices. As approved by senior management, penalty shall be levied on contractor.

9.2.1. Issue of EHS Violation Slip

- i. Blank "EHS violation slip" books shall be issued by Concern Divisions to the EHS coordinators.
- ii. Site/station EHS coordinator & EHS officer is authorized to issue the "EHS violation slip"
- iii. The "EHS violation slip" books are in duplicate.
- iv. The original page is of yellow colour.
- v. The office copy is of white colour.
- vi. The yellow copy shall be used for issue and the white copy shall be retained in the book.
- vii. Whenever an EHS violation is noticed/observed by the EHS coordinator of the site/station or the EHS officer present on site, the "EHS violation slip" shall be issued to the concerned worker/employee.
- viii. For EHS violations recorded by Security camera, EHS Violation slip shall be issued by the site EHS Coordinator.
- ix. The details shall be filled clearly.

a. Location:

Station, project site name and the geographical part of the station or site e.g. Kalwa Sub-station /220kV switchyard, Vasai Project site / 25 MVA Transformer. etc.

b. Name of the Employee/contractor:

Employee name if employee is involved.

If contractor worker is involved then name of the worker with the agency name shall be recorded. E.g. Mr. AB.Surname of M/s XYZ

c. Work execution in progress:

Here details of type of work being executed, where EHS violation is observed to be recorded. e.g. Electric welding work for Transformer emulsifier system.

d. Violation of following EHS norms/aspects is observed.

Here details of the observation to be recorded.

e.g. Mr. AB.CDEF was found performing welding operation without shield.

Mr. AB.CDEF was found working without safety belt & fall protection.

- i. Whenever such "EHS violation slip" is issued proper name & signature of the EHS coordinator or EHS officer of MSETCL shall be clearly recorded.
 - ii. Whenever such "EHS violation slip" is issued proper name & signature of the worker/employee shall be taken on both the copies.
 - iii. After issuing of Safety Violation Slip, Correction is to be done immediately and mention on issued violation slip.
 - iv. Corrective actions to avoid recurrence shall be finalized by Site / Station In-charge in coordination with EHS officer.
-

Chapter 10

SAFE WORKING ENVIRONMENT

10.1. Safe Working Environment

Safe working environment is necessary for carrying out works in safe manner. Illumination levels and noise level are important criteria for a safe environment.

10.1.1. Illumination

Working area shall be well illuminated so as to facilitate un-stressful working condition. The Indian standard has clearly defined the illumination levels vide IS 3646 (Part-II) 1966 "Code of practice for interior illumination." As per which the following applicable illumination levels are identified, which is suggested to be ensured at work place.

(Ref. 51 No: 21 (h), 70 (a) & (b) of TABLE 1: Recommended Values of Illumination and Limiting Values of Glare Index, (Clauses 3.1, 3.2 and 3.4))

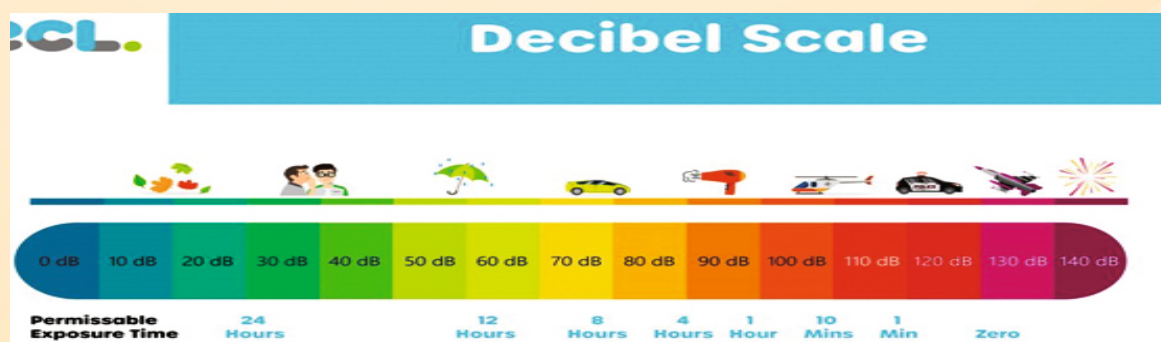
SN	Process Area	Illumination (Lux)
1	Transformers and outdoor switchgear	100
2	Entrance halls and reception areas	150
3	Conference rooms, executive offices	300

10.1.2. Noise pollution

Noise causes health effects, its effects cannot be evaluated immediately. Noise is generated from variety of sources. A number of Acts and Rules have been framed in our country, for control of noise pollution. Referring them the following are the noise level limits to be adhered.

Category of area	Limits in dB		Note 1: Day time reckoned in between 6.00 am to 9.00 p.m. Note 2: Night time reckoned in between 9.00 p.m. to 6.00 am
	Day time	Night time	
Industrial area	75	70	
Commercial area	65	55	
Residential area	55	45	
Silence zone	50	50	

Any worker should not be allowed to enter, without appropriate ear protection, an area in which the noise level is 115-dB or more.



**SAFETY
FIRST**



**SAFETY
BEGINS WITH
TEAMWORK**

Chapter 11

Material Handling and Storage

11.1 Introduction

At MSETCL, the safe handling and storage of materials is a critical component across and not limited to Operations, Maintenance, and Projects—including the construction of 132 kV, 220 kV, 400 kV, and 765 kV substations and transmission lines. Given the nature of high-voltage infrastructure and heavy equipment, even routine tasks such as replacing an insulator or erecting a tower can expose personnel to significant safety risks.

The implementation of ISO 45001:2018 at MSETCL provides a systematic framework to identify hazards, assess risks, and establish safe work practices to prevent incidents. Material handling activities—from unloading and moving equipment to storing it at yards or substations—must comply with clearly defined safety and health principles, reinforced by SOPs, legal compliance, and on-going workforce awareness.

11.2 Scope

This document applies to all material handling and storage activities at MSETCL in the following areas but not limited to:

- 11.2.1 Operation and Maintenance of AIS and GIS substations (132 kV to 765 kV)
- 11.2.2 Transmission line erection and maintenance
- 11.2.3 Project activities and substation construction (civil and electrical)
- 11.2.4 Use of material handling equipment such as forklifts, JCBs, cranes, hydras, lifting jacks, slings, ropes etc.
- 11.2.5 Storage yards, storehouses, construction sites, and warehouse areas

11.3 Mandatory Awareness Before Material Handling – MSETCL Employees and Workers

At MSETCL, all personnel involved in handling and storing materials shall be made aware of the following before commencing any such activity:

- 11.3.1 Type, weight, and centre of gravity of the material/equipment
- 11.3.2 Potential hazards to human safety, assets, and the environment
- 11.3.3 Correct tools and lifting mechanisms (slings, chains, ropes, hooks)
- 11.3.4 Weather and terrain conditions for fieldwork or tower erection
- 11.3.5 Nearby energized equipment and required clearances
- 11.3.6 Emergency procedures, fire protection measures, and first aid locations
- 11.3.7 Legal and regulatory compliance applicable to handling specific materials (e.g., SF₆, oil drums)

11.4 Material Handling in Operation & Maintenance (AIS Substations)

Routine and breakdown maintenance at MSETCL AIS substations involves the replacement and handling of high-voltage components. Every activity must be preceded by risk assessment and job briefing.

11.5 Common Material Handling Scenarios:

- 11.5.1 Replacement of 132 kV/220 kV/400 kV/765 kV Insulators
- 11.5.2 Use of insulated lifting tools, nylon slings
- 11.5.3 Tower/platform access with fall protection
- 11.5.4 Replacement of Lightning Arrestors (LAs)
- 11.5.5 Disconnection
- 11.5.6 Use of scaffoldings and safe access ladders
- 11.5.7 Lifting and replacement of Current Transformers (CTs) and Potential Transformers (PTs)
- 11.5.8 Slings to be certified and inspected before use
- 11.5.9 Use of cranes/hydras for 220 kV and above
- 11.5.10 Replacement of Circuit Breakers, Isolators
- 11.5.11 Mechanical lifting with overhead cranes or forklifts
- 11.5.12 Use of lock-out/tag-out (LOTO) for safety

11.6 Transformer Bushing or OLTC Lifting

- 11.6.1 Cranes, Slings, Lifting jacks, torque wrenches, Filtration machine, Oil Storage tanks, Trailer loaded Oil Tank, oil-resistant gloves
- 11.6.2 Certified rigging plan required

11.7 Installation/removal of communication panels, relay Panel, Control Panel, SCADA panels

- 11.7.1 Use of wheeled trolleys, anti-static packaging
- 11.7.2 Head loading
- 11.7.3 Movement only along clear aisles and marked pathways



11.8 Material Handling in GIS Substations

GIS substations (Gas-Insulated Substations) at MSETCL have enclosed equipment and restricted space, making material handling more sensitive.

11.8.1 GIS floors must have overhead EOT cranes, which shall be operated by certified personnel only.

11.8.2 All gas compartments and SF6 cylinders must be handled with proper leak detectors, upright storage, and use of MSDS.

11.8.3 Handling of GIS modules or bus ducts shall require custom jigs, rubber-padded slings, and anti-static mats.

11.8.4 A clear access and egress path must be maintained on GIS floors at all times.

11.9 Material Handling During Substation Construction (132 kV to 765 kV)

During substation construction (both civil and electrical phases), heavy components such as transformer tanks, switchgear panels, gantries, and structural steel are transported and handled. Activities include:

11.9.1 Civil works: Handling and storing cement, bricks, steel bars, and shuttering plates.

11.9.2 Erection: Lifting gantry beams, post insulators, CTs, PTs, and CBs using cranes or hydras.

11.9.3 Cable laying: Drum transport using trolleys and jacks; coiling via winches and rollers.

All lifting operations at substation construction sites shall require a rigging and lifting plan certified by the site engineer and safety officer.

11.10 Transmission Line Material Handling

During the erection and maintenance of transmission lines (132 kV, 220 kV, 400 kV, and 765 kV), handling involves:

11.10.1 Erection of steel towers using hydras, derricks, or cranes, slings

11.10.2 Stringing conductors using tensioners and pullers

11.10.3 Use of taglines, pulleys, and disc insulator assemblies

11.10.4 Storage of tower parts with stacking limitations and bundling

11.10.5 Application of anti-slip platforms, safety harnesses, and barricades

11.10.6 Transmission line workers must be trained in manual handling, climbing safety, and risk of electrocution from adjacent live lines.

11.11 EHV Cable Works / GIS Ducts

At MSETCL, handling of Extra High Voltage (EHV) cables—ranging from 132 kV to 400 kV—requires specialized equipment and tightly controlled work processes. The cables are heavy, sensitive to mechanical stress, and must be pulled through narrow trenches, ducts, or GIS floor raceways with precision.



The activities include:

11.12 Receiving and unloading of cable drums

11.12.1 Drums weighing up to several tons must be unloaded using boom cranes or hydras.

11.12.2 Cable drums shall be stored on firm, level ground with drum supports/jacks and properly chocked.

11.12.3 Storage of cable drums

11.12.4 Cable drums must be stored with the drum arrow facing in the direction of pull.

11.12.5 Exposure to sunlight and water must be avoided; use of tarpaulin covers and periodic drum rotation is necessary.

11.12.6 Shifting of drums to site

11.12.7 For narrow cable trenches, drums must be shifted on manual or mechanical trolleys with directional control.

11.12.8 Drums should never be rolled across rough terrain or over cable trays.

11.12.9 GIS Cable Termination Works

11.12.10 Handling of cables into GIS cable basement involves lowering into trenches or ducts using pulleys/rollers.

11.12.11 Inside GIS rooms, mechanical winches or cable socks must be used for gradual entry.

11.12.12 Heavy sheathed cables in ducts shall be pulled with monitored force to avoid internal damage.

11.12.13 Cable Pulling Operations

11.12.14 Motorized or hydraulic winches are used for long-route cable pulling.

11.12.15 Use of bend rollers, trench rollers, bell mouth guides, and cable socks is mandatory.

11.12.16 A load cell or tension meter must monitor pulling tension to avoid overstraining the cable.

11.13 Equipment-Specific Safety Measures and Checklist

Equipment	Safety Measures
Forklift	Pre-operation inspection; stability triangle observed; operate at slow speed; never carry people on forks.
Hydra	Certified operator; do not swing loads over personnel; outriggers deployed.
Crane (Mobile or EOT)	Load charts visible; safe working load not exceeded; slings and hooks certified.
JCB	Bucket loaded only to rated capacity; clear blind spots before movement.
Bucket Crane (Aerial Lift)	Full body harness; ground observer mandatory.
Lifting Jacks	Used on flat ground; double-blocking method; inspection before use.
Slings, Chains, Ropes	Inspection before every lift; no knots or frays; safe angle of loading ensured.

11.14 Aisles, Passageways, and Storage Guidelines

11.14.1 Aisles and passageways at MSETCL sites and stores must be kept clear of obstructions and marked distinctly.

11.14.2 Materials must be stacked securely and with proper height limits (e.g., 1.5 m for cable drums, 2 m for boxes).

11.14.3 Storage of transformer oil drums, SF6 cylinders, and control panels shall follow segregated zoning and proper labelling.

11.15 Potential Hazards and Precautionary Measures

11.15.1 Hazards

11.15.2 Physical injuries from dropped loads, entrapment, or pinch points.

11.15.3 Overloading of cranes or jacks.

11.15.4 Fire from flammable materials or electrical short-circuits.

11.15.5 Gas leakages from SF6 containers.

11.15.6 Damage to sensitive equipment from rough handling or moisture.

11.16 Precautions:

- 11.16.1 Always use certified lifting tools and operators.
- 11.16.2 Avoid stacking materials under overhead lines.
- 11.16.3 Ensure use of PPE—gloves, shoes, helmets, eye protection.
- 11.16.4 Conduct tool-box talks before high-risk activities.
- 11.16.5 Keep fire extinguishers and spill kits in storage areas.

11.17 Basic Safety, Fire Safety, and Health Principles

At MSETCL, the following principles form the foundation of material safety:

- 11.17.1 Basic Safety: Eliminate hazards at source; follow safe lifting techniques; maintain discipline at work zones.
- 11.17.2 Fire Safety: Use spark-proof tools near flammable storage; ensure ABC fire extinguishers are accessible; avoid open flames.
- 11.17.3 Health: Prevent overexertion and musculoskeletal strain through load-sharing; maintain hydration and ventilation; proper sanitation in stores and yards.

11.18 Applicable Legal Requirements and Compliance

MSETCL material handling operations shall comply with:

- 11.18.1 Factories Act, 1948 – Sections on safe lifting and stacking
- 11.18.2 The Maharashtra Factories Rules, 1963
- 11.18.3 The Electricity Act, 2003
- 11.18.4 The Gas Cylinder Rules, 2016 (for SF6 and similar gases)
- 11.18.5 IS Codes (IS 3696, IS 4081, IS 13367 for material handling)
- 11.18.6 Motor Vehicle Act – For transport of heavy loads on public roads

Routine audits, safety committee reviews, and training records must be maintained for internal and legal inspections.



Chapter 12

SAFE WORKING PROCEDURES

12.1. Safe Working Procedures

12.1.1. Contractor EHS Management

12.1.2 Purpose

- i. To provide guidelines for selection of contractors based on review of their commitment towards EHS.
- ii. To define and communicate the responsibility of contractors for EHS.

12.2 Scope

This procedure is applicable to all contractors as well as their Sub contractors working under the control of MSETCL officers..

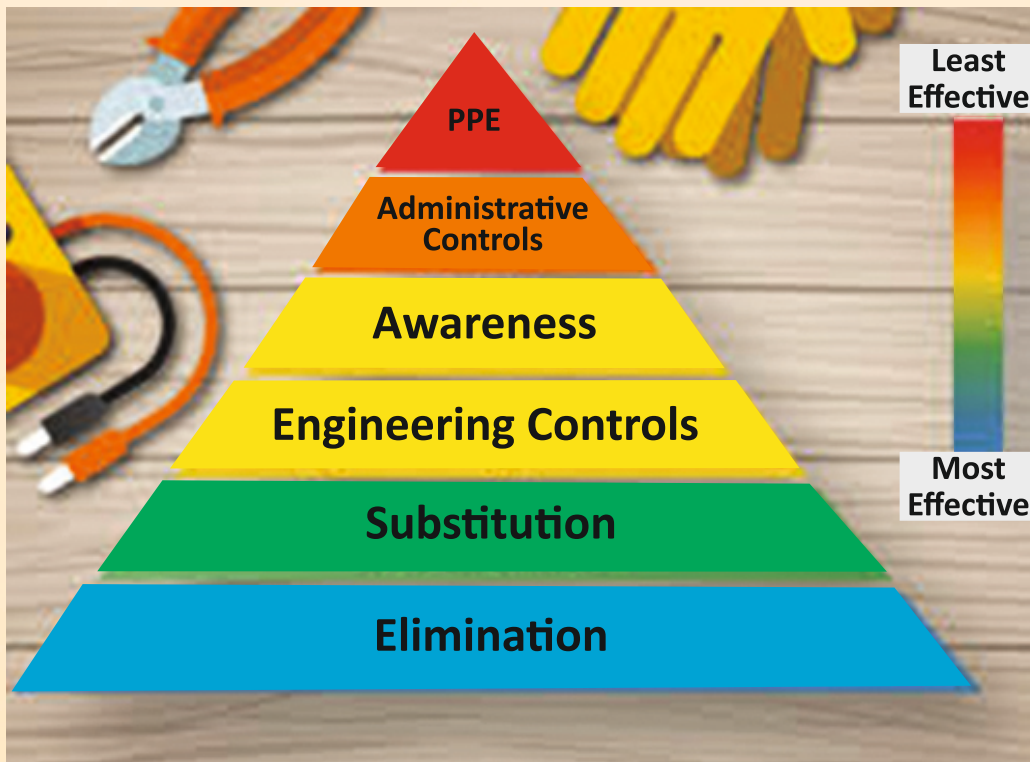
12.3 Responsibility

- i. The contractor will be fully responsible for EHS performance of his sub-contractor.
- ii. The company shall monitor the contractor's performance in managing EHS aspects.

12.4 Procedure

Detailed procedure mentioned in Operation Manual

The provisions in the manual will supersede all other instructions for safe working on lines and equipment's as guiding principles for all operations.



Chapter 13

Fire Safety at MSETCL

MSETCL is fully committed to safeguarding its workforce, stakeholders, and critical infrastructure from fire-related hazards. The organization will continually assess and implement measures to prevent fire incidents and ensure compliance with all statutory fire safety obligations. This circular is applicable to all EHV/HV Substations (AIS/GIS), HVDC stations, transmission line installations, control rooms, cable vaults, offices, and support infrastructure under MSETCL.

1. Fire Hazards and Risk Sources

- i. Oil-filled transformers and reactors
- ii. Oil-insulated breakers, CTs, and bushings
- iii. Switchgear and cables
- iv. Battery rooms and DG sets
- v. Flammable storage and cable tunnels
- vi. Control, relay, AC/DC, and PLCC rooms
- vii. Marshaling boxes, HVAC rooms, and stores

2. Fire Protection Philosophy

Adopts a design-to-completion approach, incorporating:

- i. Active fire protection (sprinklers, hydrants, detection systems)
- ii. Passive fire protection (fire doors, barriers, fire-retardant materials)
- iii. Compliance with: CEA Regulations, BIS, NFPA 850, IS 2190:2010, NBC 2016, Factory Act, and other applicable laws

3. Fire Prevention Requirements

- i. Annual fire audits and ATRs
- ii. Mandatory flame-proof enclosures in hazardous areas
- iii. Condition monitoring (DGA, PD, thermography, LCM, etc.)
- iv. Prohibition on smoking and use of flammable fluids near energized equipment
- v. Emphasis on good housekeeping and cleared ROWs
- vi. Use of appropriate PPE including fire suits, gumboots, and SCBA kits

4. Passive Fire Protection

- i. Fire separation zones, fire barriers, fire doors
- ii. Smoke vents and pressurized HVAC systems for control rooms
- iii. Fire-resistant building materials (IS 1642, IS 1646, UL/FM rated)

- iv. Drainage with flame traps for oil-spill management

5. Active Fire Protection Systems

- i. Hydrant system: Comprehensive coverage of substation yard and buildings
- ii. High Velocity Water Spray/Nitrogen Injection Systems for >10 MVA transformers
- iii. Fire detection and suppression: Addressable alarm systems, VESDA for valve halls
- iv. Portable Fire Extinguishers: As per IS 15683; DCP, Foam, CO₂, Clean Agent types
- v. Trolley-mounted Extinguishers and CAF Guns for critical yards

6. Equipment Placement & Standards

- i. Strategic Hose-Hut placement with hose reels, nozzles, foam trolleys
- ii. Emergency lighting towers for night response
- iii. Marking of extinguisher locations, escape plans, and safety posters
- iv. All equipment must be vetted by FA&CFO

7. Specialized Requirements for HVDC Stations

- i. Fire zoning of valve halls, TSC/TCR areas
- ii. Early warning systems (VESDA + interlocks)
- iii. Fire/smoke dampers in HVAC
- iv. Drainage and containment for oil-filled bushings
- v. Use of dry-type alternatives where feasible

8. Emergency Preparedness

- i. On-site and Off-site Fire Emergency Response Plans (FERP)
- ii. Fire and disaster mock drills (monthly onsite, annual offsite)
- iii. Siren codes and communication protocols
- iv. Mutual aid agreements with neighboring industries

9. Roles and Responsibilities

- i. Substation In-Charge: Policy enforcement, inspections, training
- ii. Employees/Contractors: Compliance with SOPs, participation in drills
- iii. FA&CFO: Vetting of fire equipment, statutory guidance

10. Training and Awareness

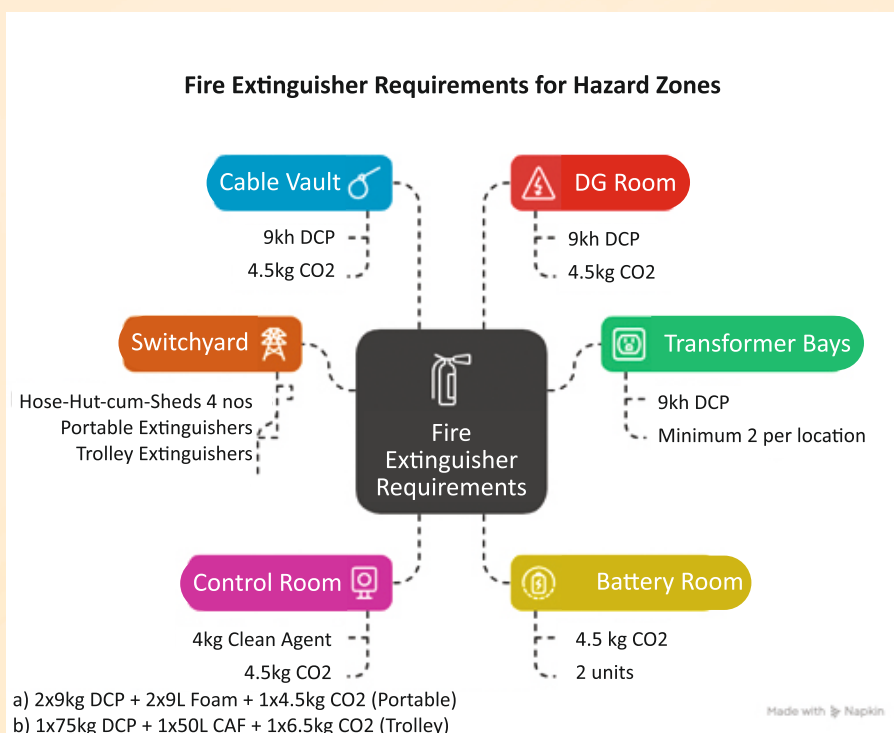
- i. Periodic training for technical/non-technical staff
- ii. Display of Do's and Don'ts, No Smoking signs
- iii. Drill participation logs and evaluation reports

11. Technical Vetting & Procurement & Review

- i. All fire safety equipment must be technically vetted by FA&CFO
- ii. Maintain inventory of 10% spares/refills for immediate replacement
- iii. Reviewed regularly in consultation with FA&CFO

12. Fire Extinguisher Scale for Each Hazard Zone

- i. Transformer Bays: 1x9kg DCP per unit (min 2 per location)
- ii. Control Room: 1x4kg Clean Agent + 1x4.5kg CO₂ per 100 sq.m
- iii. Battery Room: 2x4.5kg CO₂
- iv. Cable Vault: 4x9kg DCP + 2x4.5kg CO₂
- v. DG Room: 2x9kg DCP + 1x4.5kg CO₂
- vi. Switchyard (400 kV+): 4 Hose-Hut-cum-Sheds, each with:
 - a) 2x9kg DCP + 2x9L Foam + 1x4.5kg CO₂ (Portable)
 - b) 1x75kg DCP + 1x50L CAF + 1x6.5kg CO₂ (Trolley)



13. Mobile Firefighting Equipment Standardization

- i. CAF Gun: 50L Water Mist-cum-Foam Gun, PESO-approved
- ii. Trolley DCP: 75kg MS/HDPE build
- iii. CO₂ Trolley: 6.5kg wheeled type

Chapter 14

Crisis & Disaster Management Plan

MSETCL has a well-designed Emergency preparedness plan in line with OHSAS 45001 in their Crisis and Disaster Management for MSETCL --- Document No. MSETCL/CO/DMP/OM --- Version 1.0 --- 27th March 2025.

The “Disaster Management Plan for Power Sector” prepared by CEA and published by MoP in January 2021 provides a framework and direction to the utilities in the power sector for all phases of the disaster management cycle (i.e. Mitigation, Preparedness, Response and Recovery). It is intended to guide all agencies within the sector with a general concept of potential emergency and roles and assignments before, during, and following emergency situations. The plan covers the subjects of Institutional Framework for Disaster Management, Hazard Risk and Vulnerability Analysis (HRVA), Coherence of Disaster Risk Management across Resilient Development and Climate Change Action, Mainstreaming Disaster Risk Reduction, Disaster Risk Reduction and Building resilience, Preparedness & Response, Recovery and Reconstruction, Capacity Building & Financial Arrangements in separate chapters. This document is in accordance with the provisions of the Disaster Management Act 2005 and the guidelines issued by National Disaster Management Authority (NDMA) from time to time and aligned with National Disaster Management Plan 2019. It is also consistent with the three landmark global agreements reached in 2015 – (i) the Sendai Framework for Disaster Risk Reduction, (ii) Sustainable Development Goals of United Nations and (iii) Climate Change Agreement (COP21) that together represent a nearly complete agenda for building disaster resilience.

In order to eliminate or if not possible, to minimize damage/disruption in its electricity transmission business, MSETCL adopts all the provisions applicable to the state transmission domain in the said Disaster Management Plan for Power Sector.



Chapter 15

Design

- 15.1.** MSETCL recognizes and accepts its statutory and moral responsibilities for ensuring safe design, construction, operation and maintenance of equipment and for the provision of safe methods of work and healthy working conditions.

At the design stage, safety requirements are incorporated in the design and specifications.

- 15.2.** Inspections are carried out at vendor sites and project sites to ensure that equipment with the required safety standards are delivered. The contractors used for various project sites are selected through a diligent vendor selection process, as per the Contractor Safety Code.
- 15.3.** Project safety guidelines are issued as per nature of projects, which specify various safety studies/interventions that need to be followed during the different project stages.

15.4. Construction:

During project construction stage, several safety measure shall be implemented which include.

- 15.4.1** Preparation of Job Safety Analysis (JSA), and Hazard Identification & Risk Assessment (HIRA) before initiating and construction activity. Organizing daily Tool Box Talk with the contracts' workforce to sensitize about safety practices.
- 15.4.2** Safety Intervention Audits (SIAT), Contractors Field Safety Audits (CFSA), contractors workforce trainings, Employees safety training, inspections and certifications of lifting equipment, tools and tackles, Alcohol & Drug Usage monitoring, First Aid & Medical Service including Ambulance, Pre-Employment and Periodic Medical check-up for contractors workmen, as per standard/job specific requirement.
- 15.4.3** Business Continuity Plan (BCP) Activities like firefighting arrangement, display of appropriate safety signages, Emergency evacuation mock drill, Safety Review / engagement meeting. Welfare activities like Hygienic Drinking water, resting shelters at the locations, equipment safety compliance report- green tagging.
- 15.5.** Implementation of pre-start up safety reviews (PSSR), prior to commissioning of projects is done to ensure that design and construction deficiencies are adequately addressed before the equipment is commissioned and then taken in service.

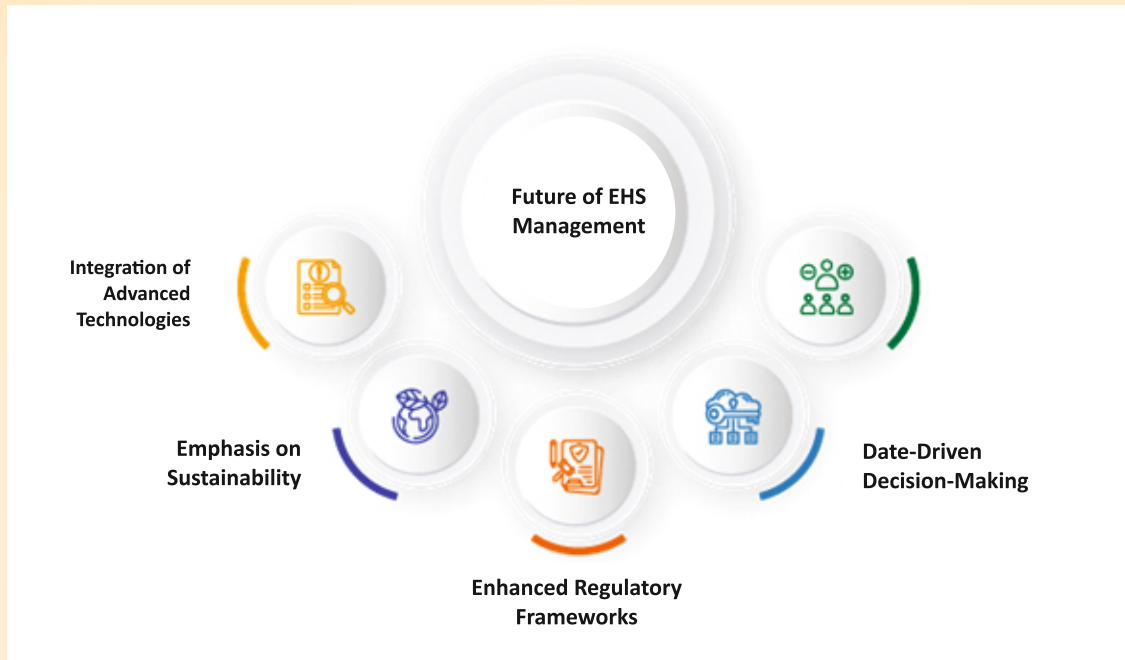
15.6. Operational Controls:

Post implementation of the project, MSETCL safety procedures as applicable to MSETCL operating sites, are mandated to be followed.

- 15.6.1** Routine operational activities are carried out by trained workforce using Standard Operating Procedure (SOP)/Work Instructions (WI).
- 15.6.2** Non-Routing Jobs are executed under Permit-To-Work (PTW) and Job Safety Analysis (JSA). Tool-Box-Talk (TBT) is suggested to be a mandatory procedure before start of all such jobs.
- 15.6.3** To Support and provide exhaustive MSETCL has developed safety manual at Corporate level,

with an objective to make them available to all divisions. These safety manual includes procedures to help site execution team to identify hazards and required controls for safety execution of the jobs.

- 15.6.4 SOPs/WIs are used and followed for all operations in MSETCL. These SOPs/WIs include safety requirements, as appropriate. All employees should be trained on respective SOPs before they take charge of operations.



15.7. People, Competency & behaviours:

- 15.7.1 People are the assets of the organization, and it is aimed to maintain their competencies at par with the magnitude of risks that they encounter while performing their assigned jobs.
- 15.7.2 Safety capability building sub-committee drive and monitor competency of MSETCL employees at their Regional Training centers.
- 15.7.3 Contractor Safety Management (CSM) Sub-Committee drives and monitor competency of Business Associates. MSETCL Training department at their Regional Training centers is suggested to conduct safety training program to meet the safety Capability of Business Associates.
- 15.7.4 All employees safety induction trainings (including audio-visual), on first entry into the premises to ensure that they are informed adequately about safety processes and instructions, as appropriate.
- 15.7.5 The IITS (Information, Instruction, Training and Supervision) is followed in all the capability building processes. Employees and contractors shall be adequately trained and supervised on their assigned jobs.
- 15.7.6 Visitors are escorted by the hosts while on plant tours and they are safe guarded by the hosts during any emergency situations.

- 15.7.7 MSETCL shall devise various Safety Reward & Recognition (R&R) mechanisms in order to encourage positive safety behaviours across various levels.
- 15.7.8 Specific KRAs on safety will be introduced in performance Management System (PMS) for all employees.
- 15.7.9 Consequence Management Policy will be in place to guide employees to prevent unsafe act and violation which may lead to untoward incidents. Appropriate actions will be taken for the safety violations done employees.

15.8 Communication, Consultation & Empowerment Communication

- 15.8.1 Regular safety communication shall be done to all in MSETCL. Every meeting in MSETCL commences with a Safety Instruction.
- 15.8.2 Safety Themes shall be decided every month and communicated to create safety campaign across organization. Safety fliers will be displayed MSETCL web page and shared through corporate emailer to create awareness about the safety theme.
- 15.8.3 All safety procedures, guidelines and advisories, when reviewed and improved, will be shared with all through MSETCL web portal.
- 15.8.4 Learning's from incidents shall be communicated to all divisions for sharing and improvements at their locations.
- 15.8.5 Mass awareness on fire and safety form employees and stakeholders shall be done during the celebration of National Safety Week and Fire Week across the organization. Employees and their families shall be involved in various activities during the week.
- 15.8.6 As per the safety policy, all employees are empowered to stop any unsafe work. These employees are also rewarded from time to time.

15.9. Consultation

- 15.9.1 Safety Committees are in place at various level to ensure adequate consultation. Safety Governance Structure for more information.
- 15.9.2 Safety related documents such as policies, procedures etc. shall be circulated to all stakeholders in draft stages for obtaining inputs from all and inputs/comments received are considered before finalization of such safety documents in future.

15.10. Empowerment

Safety sub-committee for Stop Observations (Safety Observations) drives and promotes safe behaviour by way of carrying out safety interventions at work place. This helps to motivate/encourage persons and in getting commitments from the workers to follow safe work practices.

Every person in MSETCL is empowered to stop job in case it is going on in an un-safe manner.

Chapter 16

Environment, Health & Safety (EHS) Implementation Roadmap at MSETCL

16.1 Leadership Commitment & Governance

Objective: Strengthen leadership accountability and integration of OH&S in strategic decision-making.

Key Action	Timeline	Responsible
Appoint Director (Operations) as CEO (EHS) with Board-level reporting	Completed	CMD
Define roles of Zonal Chief Engineers as Chief EHS Officers	Completed	Director (Ops)
Embed EHS in strategic plans & business KPIs	Q3 FY2025-26	Director (Ops), GMs

16.2 Gap Assessment & Compliance Planning

Objective: Identify current compliance levels and gaps against ISO 45001 standards.

Key Action	Timeline	Responsible
Conduct baseline ISO 45001 gap assessment across Zones	Q3 FY2025-26	EHS Officers
Update and digitize Legal Register in ERP (e.g. Legatrix/SAP)	Q3 FY2025-26	Corporate Legal
Validate applicability of CEA, Factories Act, ICNRIP, and other regulations	Q3 FY2025-26	Safety Circles

16.3 Risk Management & Control Mechanisms (HIRA)

Objective: Institutionalize proactive risk-based thinking and hazard control.

Key Action	Timeline	Responsible
HIRA registers for EHV substations, TLs, HVDC, Cable works	Q4 FY2025-26	EHS Officers, Contractors
Integrate HIRA with Permit-to-Work system	Q4 FY2025-26	O&M Teams
Ensure ALARP-based control selection (Engineering > Admin > PPE)	Continuous	Field Engineers

16.4 Employee & Contractor Engagement

Objective: Drive a participatory safety culture with empowered workforce.

Key Action	Timeline	Responsible
Implement Toolbox Talks, Safety Violation Reporting, BBS	Q4 FY2025-26	Site In-Charges
Display safety posters, LSSR, and EHS signages	Continuous	EHS Coordinators
Ensure Contractor EHS accountability	Q4 FY2025-26	Contract Management Cell

16.5. Training, Awareness & Competency

Objective: Build competencies through continuous training and certification.

Key Action	Timeline	Responsible
Develop annual training calendar zone-wise	Q4 FY2025-26	Safety Training Cell
Ensure training in confined space entry, SF ₆ handling, CPR	Q4-Q4 FY2025-26	OEMs, Fire Dept.
Certification of PTW/LOTO, first-aid responders	Q4 FY2025-26	HR, Training

16.6. Documentation & Standard Operating Procedures (SOPs)

Objective: Standardize safety practices and maintain document control.

Key Action	Timeline	Responsible
Finalize and distribute updated SOPs	Q4 FY2025-26	Training dept
Control versions and approvals of safety documents	Q4 FY2025-26	O & M wing

16.7. Monitoring, Audit & Performance Evaluation

Objective: Establish systems for performance review, internal audit, and continual improvement.

Key Action	Timeline	Responsible
Implement leading (near-misses, unsafe acts) and lagging (LTIFR, fire incidents) indicators	Q4 FY2025-26	EHS Officers
Annual internal audit plan for each zone aligned with ISO 45001 clause 9.2	Q4 FY2025-26	Corporate EHS
Conduct Safety Committee Reviews and Apex Meetings	Yearly	Director (Ops)

16.8. Continual Improvement & Management Review

Objective: Ensure data-driven evaluation and top management commitment to improvement.

Key Action	Timeline	Responsible
Annual review of OH&S policy and objectives	Q1 FY2026-27	CEO (EHS), CMD
Close-loop learning from incidents	Ongoing	Zonal Chief Engineers
Benchmark against best practices	Ongoing	Corporate O & M Cell

This roadmap shall be reviewed and taken ahead appropriately.

Chapter 17

Definition & Terms

17.1 Accident

i. General (MSETCL-wide):

An unplanned event arising from work activities that results in injury, ill health, damage to property/equipment/environment, or disruption to operations or services.

- Site Operations / TL / Substations / HVDC / Cable Works: Includes falls, electrical shocks, equipment failure, or cable trench hazards.
- Offices / HR / Finance: Includes slips/trips, ergonomic injuries, data losses due to electrical faults, or mental stress from workload.

ii. Accident Prevention



All Departments:

The proactive use of controls, training, audits, signage, PPE, and risk assessments to eliminate or reduce workplace hazards.

- Construction & Maintenance (TL, Substations, HVDC, EHV Cables): Includes ensuring safety briefings, PTW (Permit to Work) systems, proper lifting techniques, and fall protection.
- Offices / HR / Finance: Includes DSE (Display Screen Equipment) assessments, mental wellness programs, fire drills, and ergonomic workstations.

17.2 ALARP

As Low As Reasonably Practicable: This is the level, where the time, effort, difficulty and cost of further reduction measures becomes disproportionate to the additional risk reduction from the incremental effects.

i. Audit



All Departments:

A systematic, independent, and documented process for obtaining audit evidence and evaluating it objectively to determine the extent to which the OH&S management system criteria are fulfilled. A formal process to review conformance to safety procedures and ISO 45001 standards.

- HR: Auditing training records, recruitment safety protocols, and grievance redressed for stress-related complaints.
- Finance: Audit of insurance claims, OH&S budget allocation, and financial compliance to safety-related purchases.
- Operations / Sites: Reviewing PPE usage, incident records, and equipment certifications.

ii. Audit Team

A group of competent cross-functional team / individuals trained in OH&S with field or domain-specific awareness possessing the required knowledge, skills, and experience in occupational health and safety and auditing techniques.

- Example: A team auditing HVDC stations would include technical engineers and an OH&S officer familiar with HVDC risks like high voltage isolation and confined GIS spaces.

iii. Competence

☐ **All Departments:**

The ability to apply knowledge and skills to achieve intended results while meeting applicable occupational health and safety requirements while performing tasks safely and efficiently based on knowledge, skills, and experience.

- HR: Ensures job descriptions include OH&S criteria.
- Field Teams (Transmission O & M /Cable / Projects): Must be competent in electrical safety, rescue techniques, and equipment handling.

iv. Confined Space

A space that is not designed for continuous human occupancy, has limited or restricted entry or exit, and may pose significant health and safety risks to persons entering, such as toxic atmosphere, engulfment, or inadequate ventilation.

☐ **Field Teams:**

Spaces like cable trenches, joint bays, transformer pits, or valve hall basements that are not designed for regular occupancy and pose high risk due to limited entry/exit, poor ventilation, or gas accumulation.

v. Consequence

The unmitigated impact of the hazard in terms of People, Environment, Asset and Reputation.

vi. Continual Improvement

An ongoing process of enhancing the OH&S management system to achieve improvements in overall OH&S performance, consistent with MSETCL's OH&S policy.

☐ **All Departments:**

A process of yearly or periodic review and enhancement of safety practices.

- Construction: Adopting newer safety technologies (e.g., fibre optic sensors for cable temperature).
- Offices: Enhancing wellness programs or implementing more effective fire evacuation systems.

vii. Elements

Core components or requirements of the OH&S management system that collectively enable effective management of occupational health and safety risks and opportunities.

☐ **MSETCL-wide:**

Foundational parts of the OH&S system, e.g., leadership commitment, risk assessment, incident reporting, training, and emergency preparedness.

Each function adapts these based on their operational context.

viii. Expectation

Observable behaviours, actions, or documented procedures that demonstrate conformity to the requirements or intent of specific OH&S management system elements.

☐ **Function-Specific:**

What compliance looks like in each department:

- Substations: Isolation procedures followed.
- HR: Training records up to date.
- Cable Works: Earthing ensured before jointing.
- Finance: Budgeting supports safety training and audits.

ix. Hazard

A source, situation, or act with the potential to cause harm, including ill health and injury, damage to property, products or the environment, or a combination of these outcomes.

- Site Operations: Electrical arcs, working at heights, confined spaces.
- Offices: Poor ergonomics, stress, fire risks from overloaded sockets.
- Finance: Data security breaches leading to mental stress.
- HVDC: High-voltage GIS zones, SF6 gas exposure.
- EHV Cables: Trench collapse, chemical exposure, or hot jointing fumes.

x. Hazardous Material

Any chemical, substance, or agent that poses a risk to health, safety, property, or the environment when improperly handled, stored, transported, or disposed of.

- Field Operations: SF6 gas, transformer oil, resin for joints, and cleaning agents.
- Offices: Toner, cleaning chemicals, batteries, Air conditioning gases

xi. Health

A state of complete physical, mental, and social well-being in relation to work activities, not merely the absence of disease or infirmity, with a focus on preventing occupational illnesses and promoting worker well-being.

Includes both occupational health (noise, heat, chemical exposure) for field workers and mental/emotional health (e.g., stress from deadlines) in office functions.

xii. Health and Safety Policy

☐ **MSETCL-wide:**

Top management's formal commitment to preventing work-related injuries, fulfilling legal obligations, and fostering a culture of safety across all functions.

xiii. Health and Safety Program

A structured set of coordinated processes, resources, and actions implemented to ensure effective risk control and compliance, in support of achieving OH&S objectives.

☐ **Tailored Programs:**

- Transmission Line Construction: Stringing protocols, tower climbing safety.
- Substations: Fire detection and suppression systems.
- Offices: First-aid training, health check-ups, and EAP (Employee Assistance Program).

xiv. Hierarchy of Control

An order of preference in application of risk mitigations. The order is: Eliminate, Substitute, Isolate, Engineer, Administration and PPE.

xv. Incident

An unplanned event or sequence of events that has caused or could have caused injury, illness, property damage, environmental impact, or disruption. This includes near misses and unsafe conditions requiring corrective action.

☐ **MSETCL-specific:**

Any deviation from normal operations that results in or could lead to harm.

- Example in HVDC: Near-miss involving bypass failure during polarity reversal.
- Finance: Fire in server room due to UPS overload.
- Transmission Lines: Collapse of tower or snapping of conductor

xvi. Incident Investigation

A structured and objective process for collecting and analysing facts related to an incident or near miss, identifying immediate and root causes, and recommending corrective and preventive actions to avoid recurrence.

- MSETCL Application: Investigation of events like electrical flashovers in substations, trench collapse during EHV cable laying, or ergonomic injuries in offices.

xvii. Inspection

A planned and detailed observation of work areas, equipment, and practices to identify potential OH&S hazards, unsafe conditions, or non-compliance with safety standards.

- Example: Tower climbing gear inspection in TL construction; chemical storage inspection in substations; fire extinguisher and wiring inspection in offices.

xviii. Interested Parties

Persons or organizations that can affect, be affected by, or perceive themselves to be affected by MSETCL's OH&S performance.

- Includes: Employees, contractors, regulatory bodies (CEA, MERC), residents near transmission corridors, local government, and unions.

xix. LTIFR - Lost Time Injury Frequency Rate

xx. Material Safety Data Sheet (MSDS)

A document provided by manufacturers or suppliers of hazardous materials that includes safety information about chemical properties, handling, exposure controls, first aid, and emergency procedures.

- Critical for: SF₆ gas in GIS, transformer oil, jointing compounds in EHV cable works.

xxi. Method Statement

A detailed description of how a specific task or activity will be carried out safely, often supported by risk assessments and control measures.

- Example: Method statement for cable jointing, erection of transmission towers, or confined space entry in valve halls.

xxii. Minutes

An official written record of the discussions, decisions, and agreed actions from a meeting.

- Application: Safety Committee Meetings, Pre-Bid Meetings, Site Safety Reviews.

xxiii. Management of Change (MoC)

A systematic and risk-based approach used to evaluate and control the OH&S impact of organizational, technical, or operational changes before implementation.

- Example: Changing the cable trench layout, altering HVDC converter design, or on boarding a new substation maintenance contractor.

xxiv. Near Miss

An unplanned event that did not cause injury, illness, or damage, but had the potential to do so.

- Example: A dropped tool from height at a TL site, short circuit during testing, or close contact with energized equipment in substations.

xxv. Occupational Health

- i. Occupational Health: The development, promotion, and maintenance of workplace programs that ensure the physical, mental, and emotional well-being of employees. These programs strive to:

- ii. Prevent harmful health effects caused by the work environments that includes noise surveillance in switchyards, ergonomic evaluations in offices etc.
- iii. Protect employees from health hazards while on the job that includes mental health support, and vaccination drives etc.
- iv. Place employees in work environments that are suitable to their physical and mental make-up
 - Address other factors that may affect an employee's health and well-being, such as:
 - Ineffective organization of work
 - Harassment and violence in the workplace
 - The need to balance work and family responsibilities (e.g. elder care, child care)
 - Promoting a healthy lifestyle.
- xxvi. Occupational Safety

The proactive efforts to prevent injuries and accidents by eliminating or controlling workplace hazards.

 - o Examples: Ensuring LOTO procedures, fall protection, correct PPE use, and safe lifting practices in all MSETCL operations.
- xxvii. OH&S Objectives

Measurable and achievable goals derived from the OH&S policy, focused on continuous ent in health and safety performance.

 - o Example: "Zero Lost Time Injuries (LTI) in 220 kV cable projects this fiscal year" or "100% fire drill compliance in regional offices."
- xxviii. Operations

All activities within MSETCL's functional scope, including asset planning, construction, maintenance, system operation, HR, Finance, procurement, IT, and project management.
- xxix. Permit-to-Work (PTW) System

A formal authorization system ensuring that specific high-risk activities are carried out under controlled and safe conditions.

 - o Examples: PTW required for live line work, confined space entry during HVDC maintenance, or hot work in cable trenches.
- xxx. Personal Protective Equipment (PPE)

Specialized clothing or equipment worn by workers to protect against health and safety hazards.

 - o Examples: Arc-rated suits in substations, helmets and harnesses in TL work, gloves and respirators during SF₆ handling.
- xxxi. Policy

A documented commitment by MSETCL leadership to protect workers' health and safety, fulfil

legal obligations, and drive continual improvement in OH&S performance.

xxxii. Probability

The possibility of the event happening.

xxxiii. Process

An interrelated set of tasks or activities that transform inputs into outputs with measurable outcomes.

- o Example: The transmission line patrolling process or the tendering and contractor on boarding process.

xxxiv. Procedure

A defined step-by-step instruction for carrying out tasks safely and effectively.

- o Examples: Procedure for rescue from heights, joint bay sealing, or finance system password resetting.

xxxv. Qualified Person

An individual who, through training, experience, and certification, is deemed competent to safely perform specified tasks.

- o Example: A licensed cable jointer, a certified PTW issuer, or an internal auditor trained in ISO 45001.

xxxvi. Quantitative Risk Assessment (QRA)

A numerical method used to evaluate risks by calculating the probability and severity of hazardous events.

- o Used for: Substation layout safety studies, fire risk in control rooms, or SF₆ leakage impact analysis.

xxxvii. Regulations

Legal requirements and standards set by government or regulatory bodies that MSETCL must comply with in its OH&S practices.

- o Examples: CEA Regulations, Factory Act, Electricity Act, and Environment Protection Rules.

xxxviii. Risk

The combination of the likelihood of a hazardous event and the severity of its consequences.

xxxix. Risk Assessment

A systematic approach to identifying hazards, evaluating risks, and determining appropriate control measures.

- o Mandatory before: Excavation, crane operations near live lines, or energization of newly commissioned systems.

x1. Risk Management

An ongoing process of identifying, evaluating, and mitigating workplace risks to acceptable levels.

xl. Root Cause

The fundamental reason why an incident occurred, often requiring deeper analysis beyond immediate causes.

xlii. Safe

A condition where risks are reduced to as low as reasonably practicable (ALARP) and within defined acceptable limits.

xliii. Safety Critical

Any task, system, or component that is vital to prevent or mitigate the effects of hazardous events.

- o Examples: Interlock systems in GIS, SOPs for EHV switching, real-time monitoring of cable temperature.

xliv. Safety Critical Activities

Work activities whose failure could result in catastrophic consequences.

- o Includes: Live testing, switching operations, commissioning of HVDC poles, or overhead line stringing.

xlvi. Safety Critical Equipment and Systems

Equipment and systems that prevent or mitigate major hazards.

- Examples: GIS circuit breakers, fire suppression systems, SF₆ detectors, DTS (Distributed Temperature Sensing) for EHV cables.

xlvi. Self-Assessment

An internal evaluation by MSETCL teams to review conformity with legal and OH&S requirements.

- Used for: Pre-audit checks, yearly compliance reviews, and safety culture maturity assessments.

xlvi. Standard

A benchmark or framework against which performance, quality, or safety practices are measured.

- Examples: ISO 45001, IEC 61936, IS 398 (Tower Design), company-specific SOPs.

xlvi. Severity

The extent of harm, damage, or disruption that could result from a hazardous event.

- Levels: Minor (first-aid case) to Catastrophic (fatality or major system blackout).

xlix. Stakeholder

Any individual or organization that has an interest in MSETCL's OH&S performance.

- Includes: Employees, vendors, state authorities, media, communities, and electricity consumers.

i. Site

'Site' refers to an operating location led by a management group with operation responsibility and accountability where MSETCL conducts activities—this includes but not limited to substations, transmission lines, control centres, HVDC terminals, offices, or warehouses.

ii. **Training:**

Training encompasses the steps necessary to ensure that employees and Contractors have the job competencies (knowledge, skills and values) necessary to fulfil their environmental, health and safety responsibilities.

Acronym	Definition
E&I	Electrical and Instrumentation
HIRA	Hazard Identification Risk Assessment
SHE	Safety, Health and Environment
HRA	Health Risk Assessment
RAM	Risk Assessment Matrix
OCP	Operational Control Procedure

17.3 Additional Definitions related to permit to work:

- Additional Earth(s): Temporary, portable Earth(s) which are issued to the recipient of the Permit to Work or Permit to Test and are included in an Earthing Schedule. They are applied within an Isolated Zone in order to discharge any induced voltage. Additional Earth(s) shall be minimum 35 sq. mm copper equivalent.
- Approved Procedure: STU Safety Instructions or other specialized procedures approved by OCC and GCC as the case may be.
- Authorized Person: Maintenance / Testing Engineer. Maintenance Engineer: Responsible for carrying out maintenance works of EHV & HV equipment, transmission lines & LT systems whereas Testing Engineer: Responsible for carrying out testing of protective systems, PLCC panels and other related equipment.
- Caution Notice: A notice in prescribed form to be placed at all points of isolation, or attached to all vents and drains and to Primary Earths where practicable and to control and operating devices to indicate that work or testing is being carried out
- Certificate of No Back Feed: A certificate which records the details of Isolation carried out at a remote substation in order to achieve safety from EHV/HV systems and from test supplies.

- vi. Certificate of Earthing: A certificate which records the details of Isolation & earthing carried out at a remote substation in order to achieve safety from EHV / HV systems and from test supplies.
- vii. Circuit Breaker: A device, capable of making and breaking the circuit under all conditions, unless otherwise specified, so designed as to break the current automatically under abnormal conditions.
- viii. Company: Maharashtra State Electricity Transmission Company Limited (MSETCL).
- ix. Competent Person: A person not below the level of Supervisor or Technician.
- x. Danger: A risk to health, or of bodily injury, or to life.
- xi. Danger Notice: An approved notice reading “Danger” in Marathi, Hindi and English with a sign of skull & bones * & voltage level.
- xii. Dead: Not electrically live or charged.
- xiii. Designated Officer: Authorized persons to be responsible for the co-ordination of safety across that company boundary, where PTW / PTT has been applied for.
- xiv. Earthing Device: An approved means of providing a connection between an electrical conductor / equipment and earth, being either a “Primary Earth” or an “Additional Earth”.
- xv. Earthing Schedule: A schedule indicating the requirements of Additional Earth(s) for each stage of the work or testing. It must show the number of earths required and either describe or show pictorially their position in the Isolated Zone.
- xvi. Equipment: Electrical and mechanical apparatus / equipment used to protect, control, measure, generate, transmit and distribute electricity to which the Safety Rules apply.
- xvii. Extra High Voltage (EHV): Any voltage in excess of 33,000 volts.
- xviii. General Safety: Those actions required to maintain a safe environment / place for work / testing, e.g., safe access and safe methods of work & testing and the correct use of personal protective equipment.
- xix. High Voltage (HV): A voltage between 650 volts and 33,000 volts.
- xx. Isolated: Disconnected from associated Equipment by Isolating Device(s) in the isolated position, or by adequate physical separation.
- xxi. Isolating Device: A device for rendering Equipment Isolated.
- xxii. Isolated Zone: All items of equipment contained within a work / testing area for which isolation has been achieved at all points of supply.
- xxiii. Keys (Safety Key): The key from a unique lock (at a location) which is used for locking / interlocking an Isolating Device, Earth or Drain / Vents.
- xxiv. Key Safe: A designated lockable cabinet for the safe custody of all Safety Keys.
- xxv. Live: Charged / Energized at a voltage by being connected to a source of electricity.

- xxvi. Lock / Locks: A device used for immobilization of an item of Equipment.
- xxvii. Lock Closed: To secure an item of Equipment with padlocks or other device such that it is immobilized in the closed position
- xxviii. Lock Open: To secure an item of Equipment with padlocks or other device such that it is immobilized in the open position.
- xxix. Low Voltage (LV): A voltage not exceeding 250 volts.
- xxx. Medium Voltage (MV): A voltage between 250 and 650 volts.
- xxxi. Western Region Load Dispatch Center (WRLDC): – The center where the operations of Western Regional Electricity grid constituting the power systems of the constituents of Western Region are monitored & coordinated.
- xxxii. Point(s) of Isolation: The point(s) at which Equipment has been Isolated and, when practicable, the Isolation Point must remain immobilized and Locked. Caution Notices shall be attached to all Points of Isolation.
- xxxiii. Primary Earth(s): Earth(s) {Either fixed earth Switch(es) or Portable Earth(s) with sufficient / suitable electrical capacity} applied between the point of work and all points of EHV / HV isolation before the Permit To Work or Permit To Test is issued. Primary earth(s) shall be minimum 95 sq. mm copper equivalent.
- xxxiv. Permits To Test (PTT): A safety Document specifying the EHV / HV Equipment and the testing to be carried out and the actions taken to avoid the disturbance of the system during the testing.
- xxxv. Permits To Work (PTW): A Safety Document specifying the Equipment / Area and the work / testing to be carried out and the actions taken to achieve Safety from the system.
- xxxvi. Purged: A condition of Equipment from which any dangerous contents have been removed.
- xxxvii. Safe Electrical Clearance: A minimum distance of 1.5 meters which must be maintained by lineman / workman from the conductors or jumpers of a de-energized overhead line which has been Isolated & Primary earthed and for which a Safety Document has been issued before connection of Additional Earths under the terms of that Safety Document.
- xxxviii. Safety Document: A Document specifying the Equipment / Area and the work / testing to be carried out and the actions taken to achieve Safety from the system (Permit to Work), or to safeguard the disturbance of the system during the testing (Permit To Test).
- xxxix. Safety from the System: That condition which safeguards persons working on or near to Equipment from the Dangers which are inherent in a System.
- xl. Safety Working Clearance: The minimum clearance to be maintained in air between the live part of the equipment on one hand and earth or another piece of equipment or conductor on which it is necessary to carry out the work, on the other.
- xli. Senior Authorized Person / Shift In charge: Engineer responsible for all operations and activities in substations.

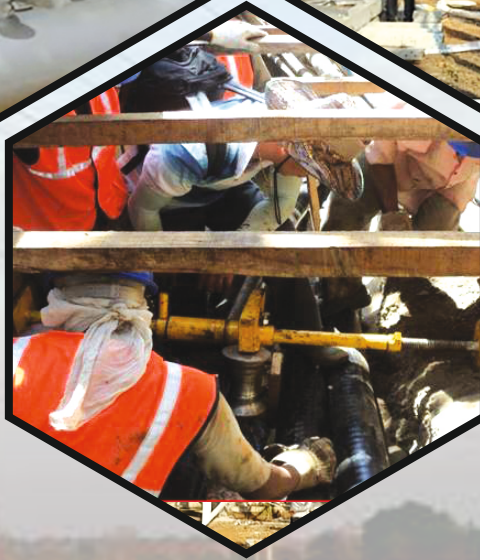
- xlii. Supervision: Supervision, Personal / direct, by an Authorized Person who is available at the point of work or testing at all times during the course of that work or testing.
 - xliii. State Load Dispatch Centre (SLDC): The SLDC control room is located at Kalwa, Mumbai for the purpose of managing the operation of the State Transmission System and co-ordination of State generation and Drawl on a real time basis.
 - xliv. System: Items of Equipment which are used either separately or in combination to generate transmit or distribute electricity.
 - xlvi. Transmission Licence: A licence granted under Section 14 of the Act to transmit electricity;
 - xlvi. Vented: Allowing a closed space to have an outlet to atmosphere so that the pressure has equalized to atmospheric.
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[illegible]

[illegible]

Annexure (C)

Safety Audit Check List (Not Limited to) - MSETCL			
Date of Audit			
Location / Substation / Site			
Audited by			
Zone / Circle			
Name of Site In-Charge			
Section	Audit Item	Yes/No	Remarks
A. Management & Documentation	Operation Manual available		
A. Management & Documentation	Permit to work documentation		
A. Management & Documentation	HIRA Document updated		
A. Management & Documentation	Legal Register maintained		
A. Management & Documentation	Tool Box meeting (TBM) conducted and attendance recorded		
B. General	EHS Policy displayed and communicated to all workers		
B. General	Emergency contact numbers displayed		
B. General	EHS Manual, SOPs available		
B. General	Site-specific JSA / Risk Assessment documented and available		
B. General	Work Permits issued and logged		
B. General	Safety Training records		
B. General	Emergency Assembly point identified		
C. Electrical Safety	All live equipment clearly marked and danger signage affixed		
C. Electrical Safety	Shock treatment charts displayed at visible locations		
C. Electrical Safety	Tools, trolleys, and equipment tagged and inspected		
C. Electrical Safety	Proper earthing of equipment ensured		
C. Electrical Safety	LOTO procedures followed during maintenance		
C. Electrical Safety	Electrical panels are free from obstruction and moisture		
D. PPE	All workers wearing helmets, safety shoes, etc		
D. PPE	Reflective vests used during night and roadside work		
D. PPE	PPE stock register maintained; damaged PPE replaced timely		
D. PPE	PPE usage training conducted		
E. Fire & Emergency Preparedness	Fire extinguishers available, inspected, and tagged		
E. Fire & Emergency Preparedness	Fire alarm and smoke detection system functional		
E. Fire & Emergency Preparedness	Emergency exits marked and unblocked		
E. Fire & Emergency Preparedness	Fire drill conducted and recorded		
E. Fire & Emergency Preparedness	Fire Emergency Response Plan (FERP) displayed and followed		
F. Cable / GIS / Survey Safety	Cable trenches and joint bays barricaded with signage		
F. Cable / GIS / Survey Safety	Link boxes, SVL, sheath bonding properly sealed		
F. Cable / GIS / Survey Safety	GIS rooms clean, SF ₆ detectors working, access restricted		
F. Cable / GIS / Survey Safety	Survey activities: proper PPE and reflectors used		
F. Cable / GIS / Survey Safety	Survey safety: snakes/insects precautions taken		
F. Cable / GIS / Survey Safety	Danger zones surveyed with appropriate support		
G. Working at Height / Lifting	Scaffolding, ladders, boom lifts inspected and tagged		
G. Working at Height / Lifting	Full body harness with double lanyard used		
G. Working at Height / Lifting	Fall arresters available for vertical access		
G. Working at Height / Lifting	Load charts for cranes, hydrams displayed		
G. Working at Height / Lifting	Lifting plan approved, banksman present		
H. Health, Hygiene & First Aid	Potable water and sanitation facilities available		
H. Health, Hygiene & First Aid	First Aid box with valid medicines and logbook		
H. Health, Hygiene & First Aid	Snake bite injection (AVS) available with usage chart		
H. Health, Hygiene & First Aid	Site Emergency Medical Contact List displayed		
H. Health, Hygiene & First Aid	Nearest hospital route map available		
I. Environmental Compliance	Waste segregated: hazardous / construction / domestic		
I. Environmental Compliance	Oil handling area bunded; spill control kits available		
I. Environmental Compliance	Diesel / SF ₆ / Oil storage tanks inspected and tagged		
I. Environmental Compliance	Noise and dust levels controlled		
J. Internal Audits & Observation Tracking	6 Monthly Internal Audit conducted and reports available		
J. Internal Audits & Observation Tracking	Corrective actions tracked through ATR		
J. Internal Audits & Observation Tracking	Safety Observation Cards / Near Misses recorded		
J. Internal Audits & Observation Tracking	Surprise inspections conducted by CE(EHS) / Zone		



MAHA TRANSCO
Maharashtra State Electricity Transmission Co. Ltd.
CIN No. U40109MH2005SGC153646

Maharashtra State Electricity Transmission Co. Ltd.

Prakashganga, Plot No. C-19, E-Block, Bandra Kurla Complex,
Bandra (East), Mumbai - 400 051.