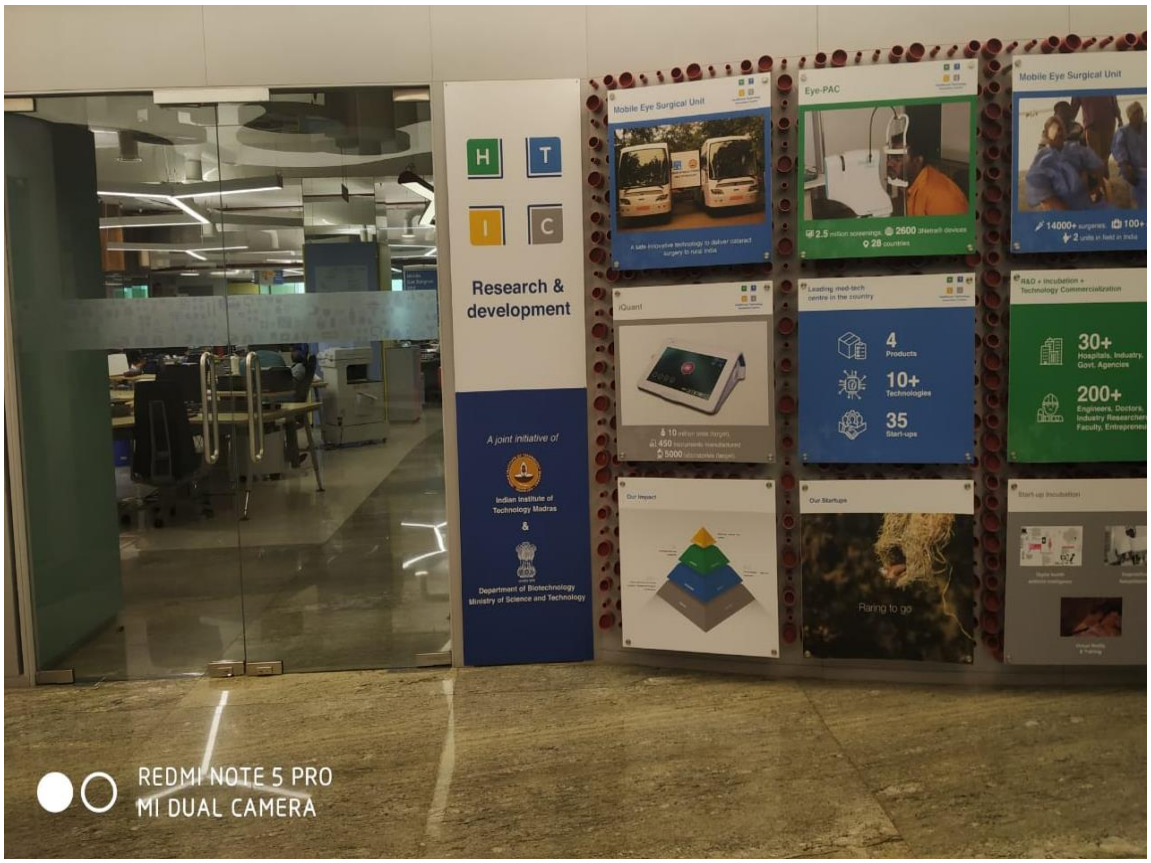
# Document : Environmental Health & Safety Procedure Manual

## Summary

This Environmental Health and Safety Procedure Manual (EH&S Manual) outlines procedures, rules and regulations governing health, safety and environmental protection in which to follow while working at HTIC. The EH&S Manual will be revised as necessary to add requirements and procedures involving newly identified exposures. Periodically, material in this manual will be updated, revised or supplemented in order to keep the manual current and relevant.

# Contents

# HEALTHCARE TECHNOLOGY INNOVATION CENTRE




## 1. Healthcare Technology Innovation Centre

### Introduction

The Management of HEALTHCARE TECHNOLOGY INNOVATION CENTRE has requested us to conduct a Safety Audit on their premises. The same was taken up on 12.02.2020. Following auditors formed the Audit Team.

**P. Subramani - Safety Auditor**: More than 35 years of industrial experience and lead auditor for Systems including OHSAS 18001.

**M.Lakshmi Narayanan - Safety Auditor**: More than 35 years of industrial experience in the field of Safety, HR, IR.

**Mr. Raghu Mahadevan** Sr. Manager -Operations coordinated the audit. An opening meeting was held on 10.02.2020 with the Management Team and Team Leads. They were explained about the scope,

objectives, goals and methodology of the audit and also the audit elements. List of documents to be perused and required for the audit was given to them.
Closing meeting was held on the same day with all the teams
Observations and findings of the auditors were discussed with them to finalize the recommendations.

## 1.1 Company Profile

Healthcare Technology Innovation Centre (HTIC), a multi-disciplinary R&D center, is a joint initiative of Indian Institute of Technology Madras (IITM) and Department of Biotechnology (DBT), Government of India that brings together technologists, engineers, doctors and healthcare professionals, industry and government to develop healthcare technologies for the country. The vision of HTIC is to develop technologies that create impact and drive innovation in healthcare and be a leader known for technical excellence and collaborative spirit.

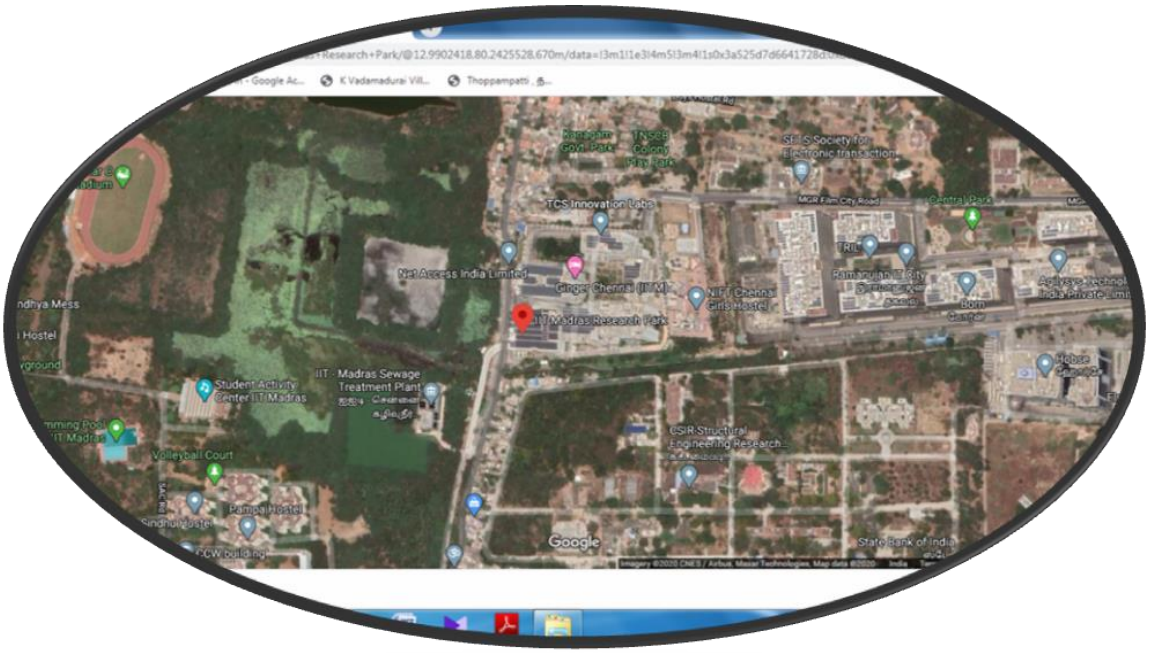
**Manpower:**

| | | |
|---|---|---|
| Total Number of Employees | : | Permanent roll |
| Adult male | : | 60 |
| Adult Female | : | 15 |
| Total number of Interns | : | Average 27 |

**Shift Working Pattern:**

Centre works on 8 hours shift pattern
General shift - 9:00 AM to 5:00 PM

**<u>Geological Location Data: Topo Plan</u>**



## Site Plan:


**Location Detail:**

Healthcare Technology Innovation Centre is located on 5th Floor, C Block of IIT Madras Research Park, Kanagam Road, Taramani, Chennai. 600113

**Following data shows the related geological location of HTIC**

**The nearest railway station in and around Taramani**

The nearest railway station to Taramani is Thiruvanmiyur which is located in and around 0.3-kilometre distance. The following table shows other railway stations

| | |
|---|---|
| Mandaveli railway station | 0.3 KM. |
| Triplicane railway station | 0.3 KM. |
| Thirumayilai railway station | 0.3 KM. |
| Taramani railway station | 0.3 KM. |
| Tiruvanmiyur railway station | 0.3 KM. |

**Nearest airport to Taramani**

Taramani 's nearest airport is Chennai International Airport situated at 11.6 KM distance. Few more airports around Taramani are as follows.

| | |
|---|---|
| Chennai International Airport | 11.6 KM. |
| New Chennai International Airport | 11.6 KM. |
| Tambaram Air Force Station | 21.5 KM. |

**Nearest districts to Taramani**

The nearest district headquarters from Taramani are as follows.

| | |
|---|---|
| Chennai (Chennai) district | 7.1 KM. |
| Tiruvallur (Tiruvallur) district | 39.7 KM. |
| Kanchipuram (Kanchipuram) district | 65.2 KM. |
| Vellore (Vellore) district | 123.3 KM. |
| Chittoor (Chittoor) district | 128.1 KM. |

**Nearest town/city to Taramani**

Nearest town/city to Taramani is Nerkunram located at a distance of 1.3 kilometre. Surrounding town/city/TP/CT from Taramani are as follows.

| | |
|---|---|
| Nerkunram | 1.3 KM. |
| Alandur | 4.3 KM. |
| Madippakkam | 9.6 KM. |
| Nandambakkam | 9.6 KM. |
| Neelankarai | 9.7 KM. |

**Schools in and around Taramani**

Taramani nearest schools have been listed as follows.

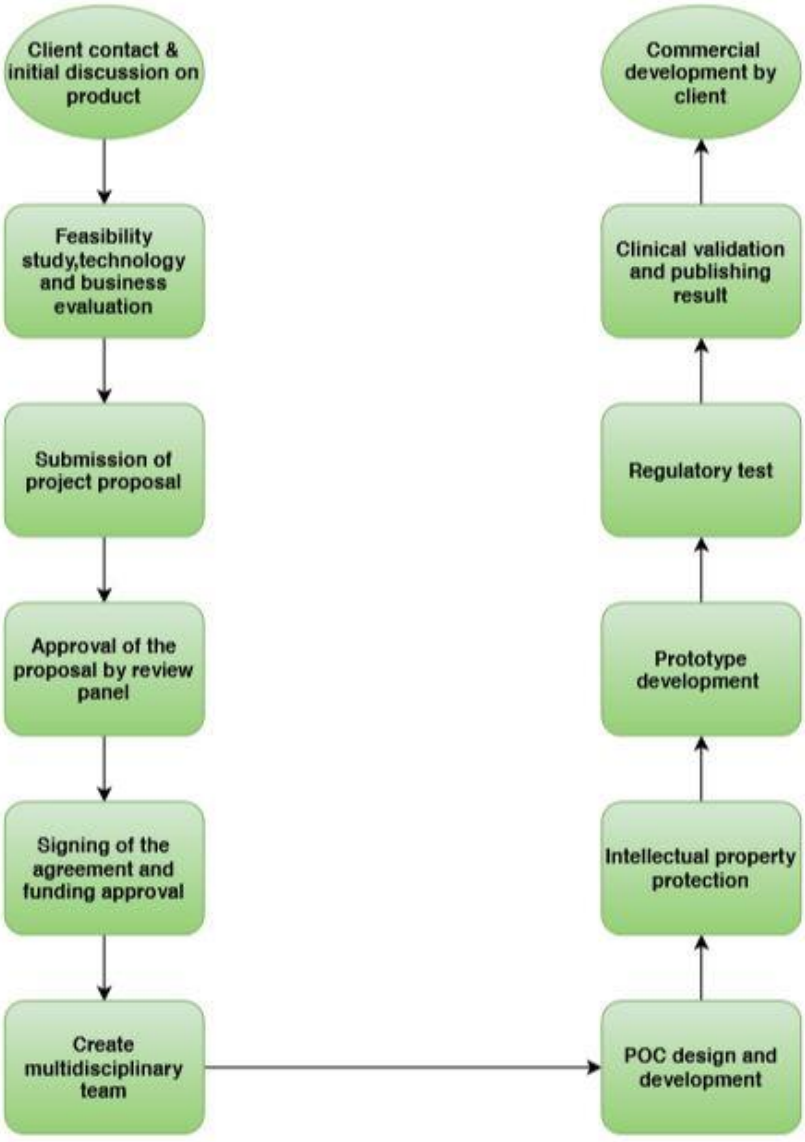
| | |
|---|---|
| Sir Siwaswami Kalalaya Senior Secondary School | 0.3 KM. |
| Lady Sivaswamy Iyer Girls Higher Secondary School | 0.3 KM. |
| Mohamed Ali School | 0.4 KM. |
| P S Matriculation School | 0.5 KM. |

**Beaches in and around Taramani**

Taramani ‘s nearest beach is Thiruvanmiyur Beach located at a distance of 3 kilometres. Surrounding beaches are as follows.

| | |
|---|---|
| Santhome Beach | 6.4 KM. |
| Marina Beach | 8.2 KM. |
| Elliots Beach | 3.4 KM. |
| Adyar Beach | 3.2 KM. |
| Thiruvanmiyur Beach | 3.0 KM. |

## 1.2 Process Flow Diagram



## 1.3 Process Description

Client contact & Initial discussion on product:

Clients from all over the world can approach Healthcare Technology Innovation Centre (HTIC), in IIT Madras Research Park, either directly in-person or through the e-mail mentioned on the website.

This is the phase where HTIC and the client conduct meetings to understand the client requirement and their objectives. This meeting can be done in person or through the Video Conference.

Feasibility study, technology and business evaluation:

Once HTIC has understood the client's requirement, it proceeds with the feasibility study for the requirement. In this study we look into two major key areas: Market feasibility and Technological feasibility. The time-period for the study depends on the project.

This process is flexible and completely depends on the client's demand and requirement as per the initial discussions. If the client has already done these studies, then we skip this part and take their inputs and move forward to the next step.

Submission of project proposal:

This is the part where HTIC comes up with a complete project proposal based on the feasibility report. This proposal clearly states the deliverables, project timeline and methodology besides the budget of the project.

Signing of the agreement and funding approval:

Both the parties sign an agreement once the proposal submitted by HTIC to the client is approved. And once the fund from the client is transferred to the HTIC's account, project's timeline starts from that point.

Create multidisciplinary team:

Multidisciplinary team involves a range of professionals like technologists, engineers, doctors and Healthcare professionals, industry and government to develop Healthcare technologies. Here in HTIC, we have teams working in Image processing, Embedded, Software development, Artificial Intelligence and Robotics. We also have a team of Mechanical Engineers to help the teams in prototype and validation.

POC design and development:

A Proof of Concept (POC) is a small exercise to test the design idea or assumption. The main purpose of developing a POC is to demonstrate the functionality and to verify a certain concept or theory that can be achieved in development. HTIC is achieved by rapid prototyping which not only cuts down the time but also bring down the cost of development.

Intellectual property protection:

We apply for Patents and Copyrights. Intellectual property is often used as a legal term to safeguard the rights of creators and inventors. By defining and establishing intellectual property rights, innovators and creators can have legal protection of their ideas and creations. This may be done by copyrighting written works, applying for patents for inventions, and trademarking brands, names, and logos.

Prototype development:

Prototype development involves development of an MVP which has the safety requirements of the medical equipment and the required functionality covered. The pre-production prototypes are created using manufacturing processes that are very similar to the final production processes and are used to identify potential problems at the final production stage. The prototypes created at this stage meets all the engineering specifications and are also used for applying for various product certifications. At this stage the design is optimized for Manufacturability (Design for Manufacturing).

Regulatory test:

In order to get into the market, the medical device needs to pass through certain regulatory compliance, subject to both regional and international standards. Medical device standards are helpful and enforced by law in specifying and evaluating the requirement for design and performance parameters for biomedical materials, tools, and equipment. These medical device standards allow HTIC to inspect and assess equipment and devices to ensure standard quality and usability.

Clinical validation and publishing result:

Clinical evaluation is to assess and analyse the clinical data to verify device safety. It's also to confirm its performance and effectiveness when used as intended by the manufacturer. HTIC with its collaboration with various hospitals and medical colleges takes care of this phase.

Commercial development by client:

HTIC does not manufacture a product. It takes care of research and development of a product on behalf of the client. The commercial development must be taken care by the client.

# ENVIRONMENTAL POLICY,

# OCCUPATIONAL HEALTH AND SAFETY POLICY

## 2. Environmental Policy, Occupational Health and Safety Policy

Healthcare Technology Innovation Centre is committed towards managing health, safety and environmental (HS&E) matters as an integral part of our business. In particular, it is our policy to assure the HS&E integrity of our processes and facilities at all times and at all places. We will do so by adhering Following principles:

**Compliance**

We will comply with applicable laws and regulations and will implement programs and procedures to assure compliance. Compliance with HS&E standards will be a key ingredient in the training, performance reviews, and incentives of all employees.

**Risk Reduction, Prevention, and Resource Management**

We will seek opportunities, beyond compliance requirements, for reducing risk to human health and the environment, and we will establish and meet our own HS&E quality standards where appropriate.

We will employ management systems and procedures specifically designed to prevent activities and/or conditions that pose a threat to human health, safety, or the environment. We will look for ways to minimize risk and protect our employees and the environment in which we operate by employing clean technology, including safe technologies and operating procedures, as well as being prepared for emergencies.

We will strive to minimize releases to the air, land, or water through use of cleaner technologies and the safer use of chemicals. We will minimize the amount and toxicity of waste generated and will ensure the safe treatment and disposal of waste. We will manage scarce resources, such as water, energy, land, and forests in an environmentally sensitive manner.

**Communication**

We will communicate our commitment to HS&E quality to our employees, vendors, and customers. We will solicit their inputs in meeting our HS&E goals.

**Continuous Improvement**

We will measure our progress and review at least on an annual basis. We will continuously seek opportunities to improve our adherence to these principles and will periodically report progress to our collaborators.

Director
Dr Mohanasankar Sivaprakasam

## 2.1 Standard Operating Procedure (SOP)

| | |
|---|---|
| **Environmental, Occupational Health and Safety Policy** | EHSP/HTIC/5.2/POLICY |
| | Rev No: 00 |

**Purpose**: To establish and maintain a procedure for establishing the EHS policy

**Scope**: HTIC, IIT MADRAS –CHENNAI

**Responsibility**: MR TEAM / Management Team

**Description**: EHS policy shall be framed according to the requirements of Clause 5.2 of ISO 14001: 2015 and ISO 45001: 2018 (Reference)

Following requirements shall be considered while framing the Policy:

- Commitment of the top management to health, safety and environment and compliance with all the relevant statutory requirement.
- Organizational setup to carry out the declared policy clearly by assigning the responsibility at different levels.
- Arrangements for making the policy effective.

**In addition to that:**

- Arrangement for involving the employees.
- Relevant techniques and methods, such as safety audits and risk assessment for periodical assessment of the status on health, safety and environment and taking all the remedial measures.
- Stating its intentions to integrate health and safety, in all decisions including those dealing with purchase of plants, equipment, machinery and material as well as the personnel.
- Arrangements for informing, educating, training and retraining its own employees at different levels and the public, wherever required.

**Document control**
Policy shall be signed by the Top management
Issue no. and Issue date shall be displayed in manual EHSM 5.2
Revision no. and Revision date shall be displayed in the EHSP 5.2
**Management review**
Policy shall be reviewed by the Management Committee once in every three years and also whenever new nature and scale of activity is added / modified.

Accordingly, the Issue no. to be updated.
Scope and nature of operation shall be reviewed in the core committee meeting for implementing any new changes.

**Communication:**
Effective measures to be implemented to communicate the Intention of the Policy as follows:

- Policy shall be circulated to all employees through mail.
- Policy shall be displayed in prominent places.
- Policy shall be printed back to back in English and Local language as pocket card and distributed to all employees.
- Policy shall be uploaded to the intranet.
- Adequate number of Pocket cards of policy kept for distributing to the visitors and interested parties.
- Awareness of objectives of Policy shall be imparted to all employees and visitors.

**Cross-references**
**Documents**

| Document Code | Description | Location |
|---|---|---|
| CLAUSE 5.2 OF ISO 14001 : 2015 | EMS SYSTEM | MR Office |
| CLAUSE 5.2 OF ISO 45001 : 2018 | OHS SYSTEM | MR Office |

**Records**

| **Record Reference** | **Description** | **Location** |
|---|---|---|
| EMSR/5.2/MR/IPF | Internal parties feed back | MR Office |
| EMSR/5.2/MR/EPF | External Party Feedback | MR Office |
| EMSR/5.2/MR/CR | Communication Register | MR Office |

Issue no:00
Revision no:00
Issue date: 12.02.2020
Revision date: 13.02.2020

| **Prepared by** | **Approved by** |
|---|---|

| Core Team | MR Team |
|---|---|
| | |

## 2.2 Reference Standard Clause

### 2.2.1 ISO 14001: 2015

**Clause 5.2: Environmental policy**

The environmental policy is the mechanism by which top management formally expresses its commitment to improving its environment performance.

Basic/Minimum commitments required/expected /needed are:

- The environmental policy is appropriate to the purpose and context of the organization, including the nature, scale and environmental impacts of its activities, products and services.
- Provides a framework for setting environmental objectives.
- Includes a commitment to the protection of the environment, including prevention of pollution and other specific requirements relevant to the context of the organization.
- Include a commitment to fulfil compliance obligations.
- Include a commitment to continual improvement of the environmental management system to enhance environmental performance.

It is important to share the organization's commitments with its employees, contractors and others who work on behalf of the organization so that they understand top managements' expectations and can perform their work in a manner that contributes to meeting these expectations. Making the environmental policy publicly available, or available on request, provides assurance to interested parties that the organization is doing its part to achieve positive environmental outcomes.

The environmental policy should be reviewed periodically to ensure that it remains relevant and appropriate to the organization.

### 2.2.2 ISO 45001: 2018

**Clause 5.2: OH&S policy**

The OH&S policy is the mechanism by which top management formally articulates its commitment to OH&S probity.

At a minimum, these commitments are required:

- Provide safe and healthy working conditions for the prevention of work-related injury and ill health which are appropriate to the specific nature of the OH&S risks to which workers and others are exposed.
- Provide a framework for setting the OH&S objectives.
- Include a commitment to fulfil legal and other requirements.
- Include a commitment to eliminate hazards and reduce OH&S risks.
- Include a commitment to continual improvement of the OH&S management system.
- Include a commitment to consultation with workers and participation of workers.

It is important to share the organization's commitments with its workers, contractors and others who work on behalf of the organization so that they understand top managements' expectations and can perform their work in a manner that contributes to meeting these expectations. Making the health and safety policy publicly available, or available on request, provides assurance to interested parties that the organization is doing its part to achieve positive OH&S outcomes.

The policy should take account of:

The current OH&S circumstances of the organization and what the organization wants to achieve.

Broader business objectives.

Opportunities for improving the health and safety of workers. The OH&S policy should be reviewed periodically to ensure that it remains relevant and appropriate to the organization.

# CORE TEAM FORMATION

## 3. Core Team Formation

| **Management Committee Core Team** | |
|---|---|
| Dr. Mohanasankar Sivaprakasam -Occupier | |
| Raghu Mahadevan -Operations Manager | |
| Dr. Jayaraj Joseph -Chief Technologist | |
| **Management Representative** | |
| Raghu Mahadevan - Operations Manager | |
| Preejith SP - Lead system designer | |
| **Committee Core Team** | |
| Dr. Jayaraj Joseph -Chief Technologist | |
| Keerthi Ram S S -Lead Engineer-Imaging | |
| Manoj Lakshmanan -Lead Engineer-Spine | |
| Malay Shah -Lead system designer | |
| Preejith SP - Lead system designer | |
| HR Manager | |
| **Safety Committee Core Team** | |
| **Mangers** | **Members** |
| HR Manager (7010905302) | Hari Narayanan (9514155876) |
| Operations Manager (9892548183) | A Maheshwari (7402198500) |
| Admin Manager (9384011942) | Mohan Kumar (8098047761) |
| **First Aid Core Team** | |
| Syamlal P | |
| Preethi kanakaraj | |
| Suhail Ansari | |
| **Training Committee Core Team** | |
| HR Manager | |
| Jayaraman Keerthi Vasan | |
| **Documentation Control Core Team** | |
| Preejith SP | |
| **Emergency Preparedness Response Plan Core Team** | |
| Emergency Operation Chief | Mr. Vishakh Maheswar Ravikumar |
| Site controller | Mr. Sathish |
| Fire control coordinators | Mr. Shubham Sharma |

| | |
|---|---|
| Medical Services coordinator | Mr. Amalan S |
| Safety Co Ordinator | Mrs. Maheswari |

# EMERGENCY PREPAREDNESS PLAN - MANUAL

# 4. Emergency Preparedness Plan - Manual

| Environmental, Occupational Health & Safety Management System | Doc. No: EHSM/8.2/MR/EM |
|---|---|
| | Rev. No: 00 |
| EMERGENCY PREPAREDNESS MANUAL | Rev. Date: 19-02-2020 |

Emergency Preparedness and Response Plan has been prepared as an administrative guide to outline action procedures for departments, and individuals providing essential services in the event of an emergency.

## 4.1 Introduction

The first priority of HTIC, IIT M is to promote organizational safety and prevent environmental (impact) by identifying potential hazards, responding to accidents and emergency situations along with preventing and mitigating the risks associated with them.

**Objectives:**

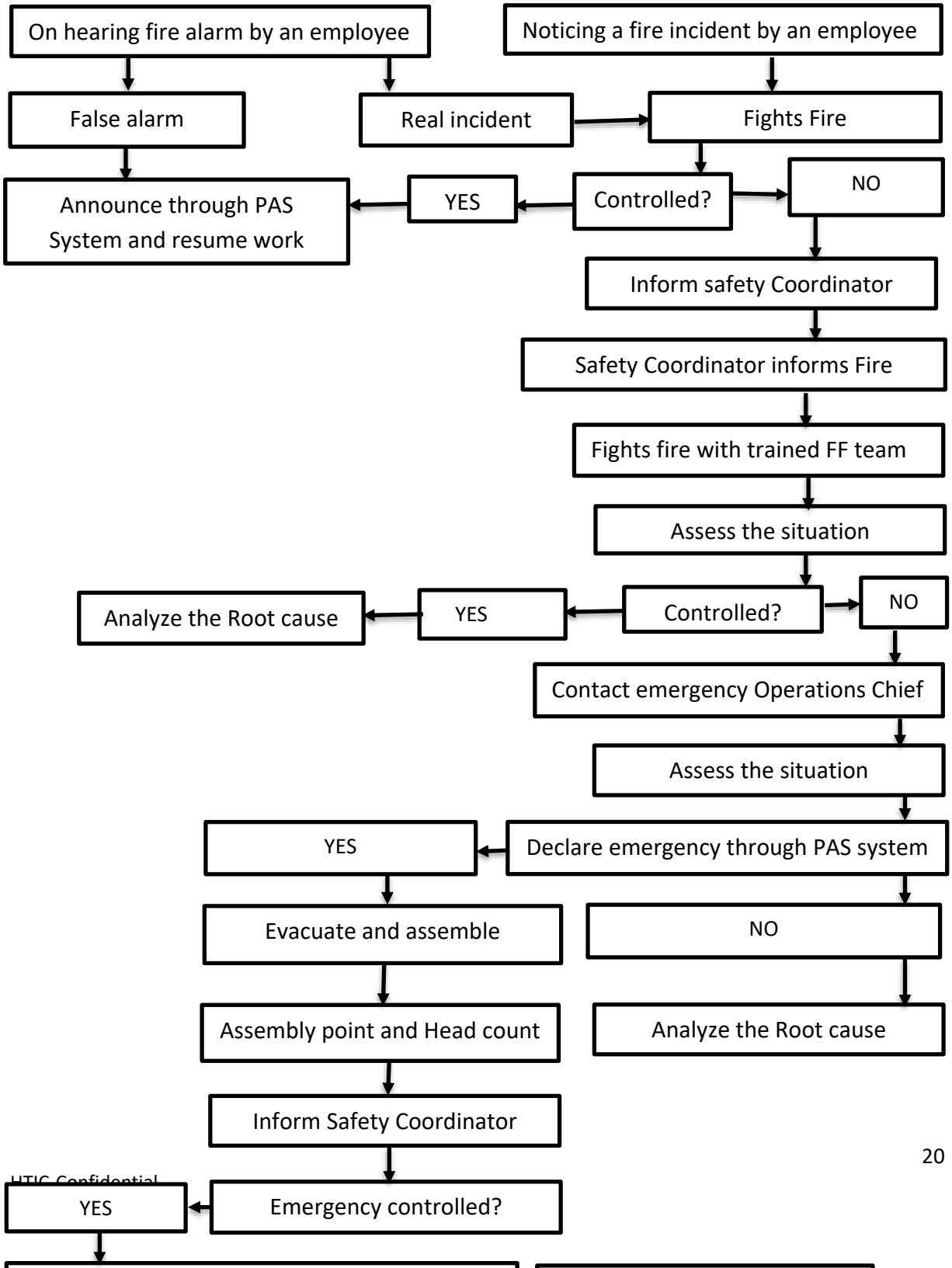
The Primary goal of the Emergency preparedness and response plan:

- Protection of life.
- Protection of property.
- Safe retrieval & continuity of operations.
- Avoiding environmental Pollution.

**Secondary objectives include:**

- Prescribing accountability, authority, responsibilities, functions and operations of the emergency management including management of critical resources.
- Co-ordination during emergency operations with those of other agencies.

## 4.2 Emergency Preparedness and Response Organization Structure – Flow Chart



## 4.3 Emergency Preparedness Stages

**Emergency Planning**

- Effective communication system shall be established and maintained.
- Strengthening the existing fire prevention systems.
- Conducting fire prevention/pollution prevention inspections.
- Establishing and maintaining chemical management procedures (i.e.) MSDS.
- Regulation of entry of visitors/ contractor's procedure through Security.
- Pre-commissioning inspection of equipment.

**Emergency Preparedness**

Potential emergency situation identification and communication.

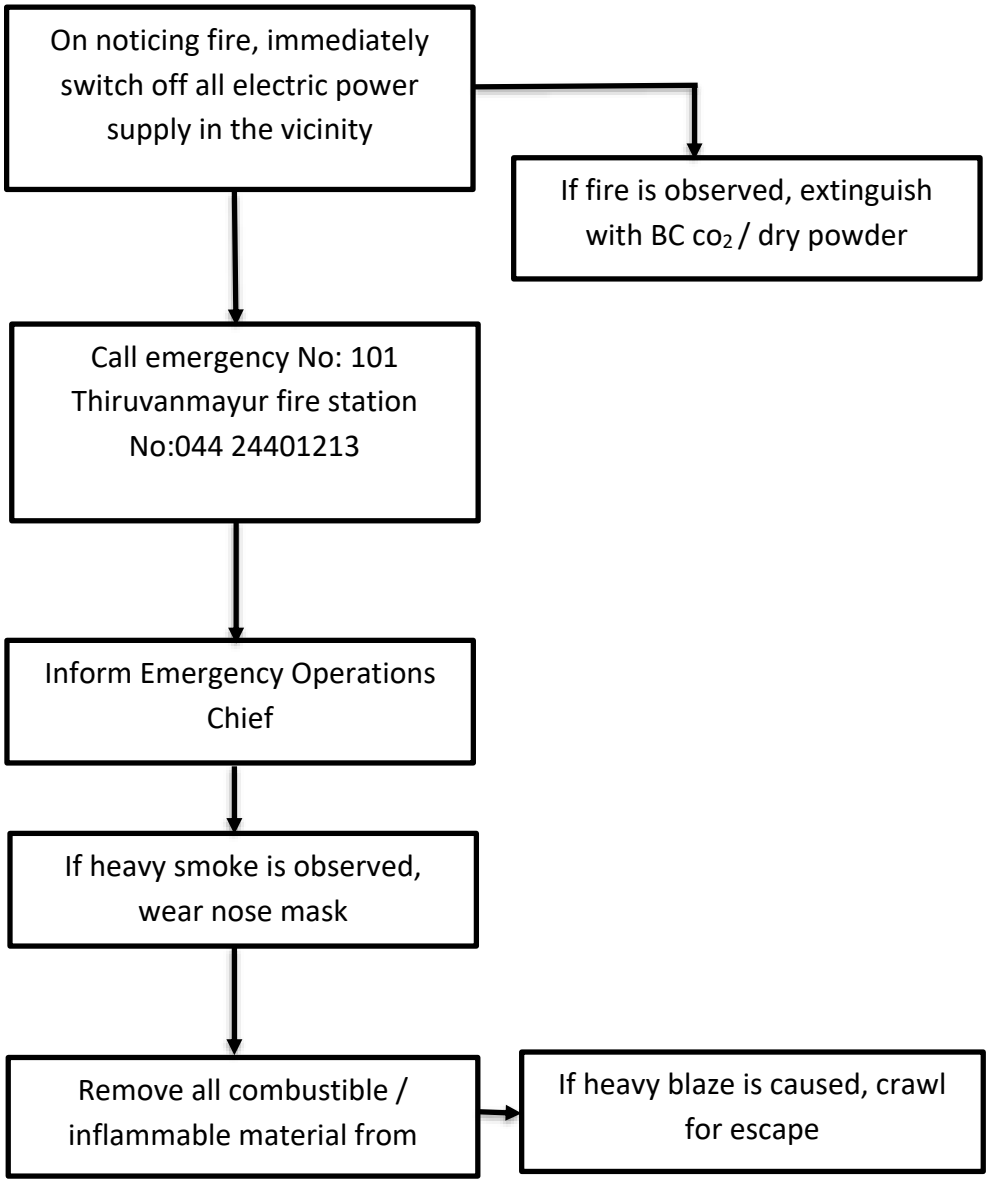
- Reviewing the emergency preparedness and response plan.
- Conducting exercises and Fire drills.
- Preparation of site plan for evacuation if required.

**Emergency Communication**

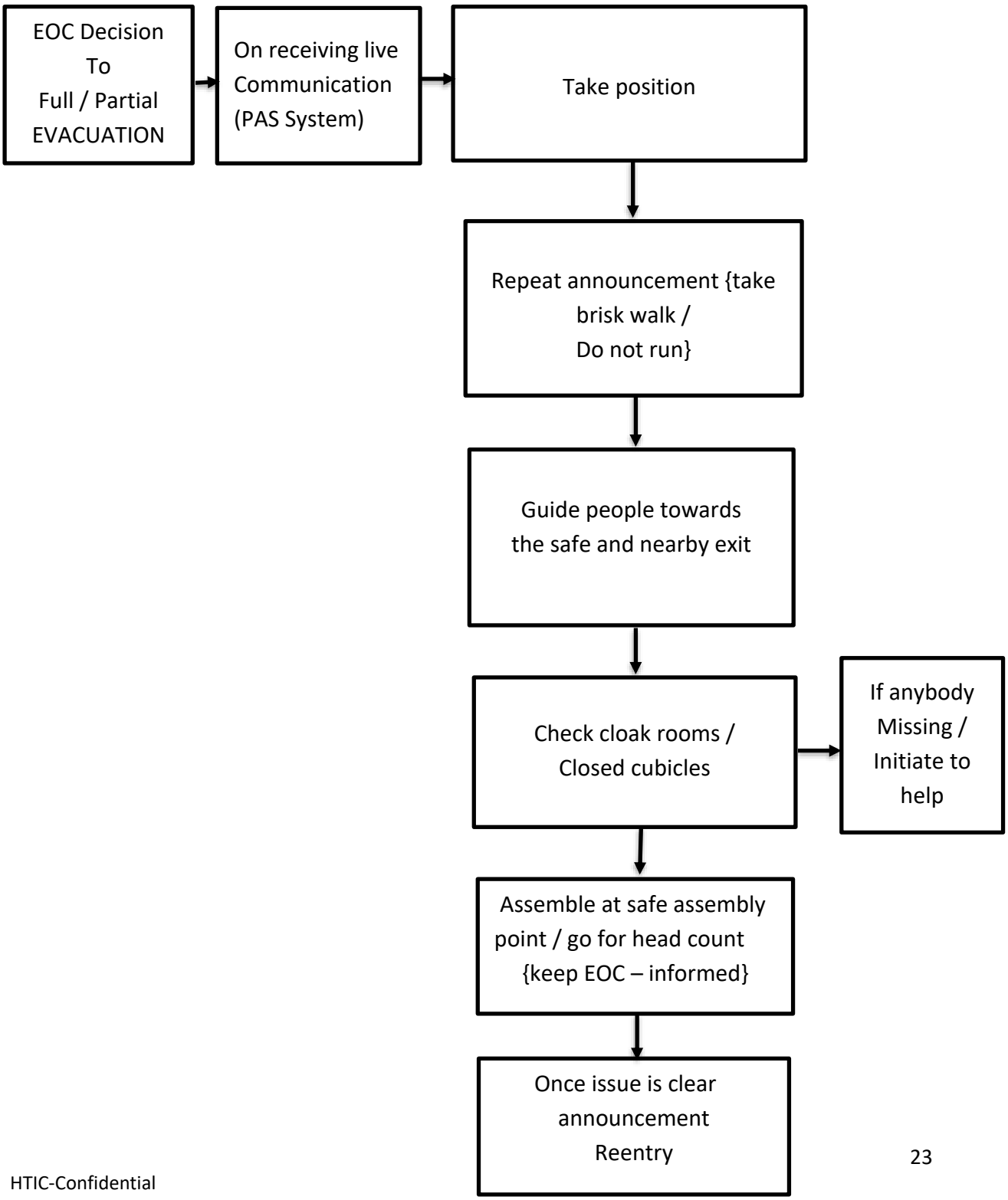
During and after a major crisis, it can be reasonably expected that telephone and internet systems and electrical power sources will be down for some period of time. Cellular telephones should be available always with the Emergency Operation Chief, Head of Departments or Team leads, Site Controller, Safety Coordinator and Security officer - on duty as a primary, as well as vital means of communication. Other communication equipment, such as mobile loud speakers, messengers, and telephones and walkie-talkie, pagers (as and when they become available) will be also used to supplement emergency communications.

## 4.4 Emergency Communication – Flow Charts

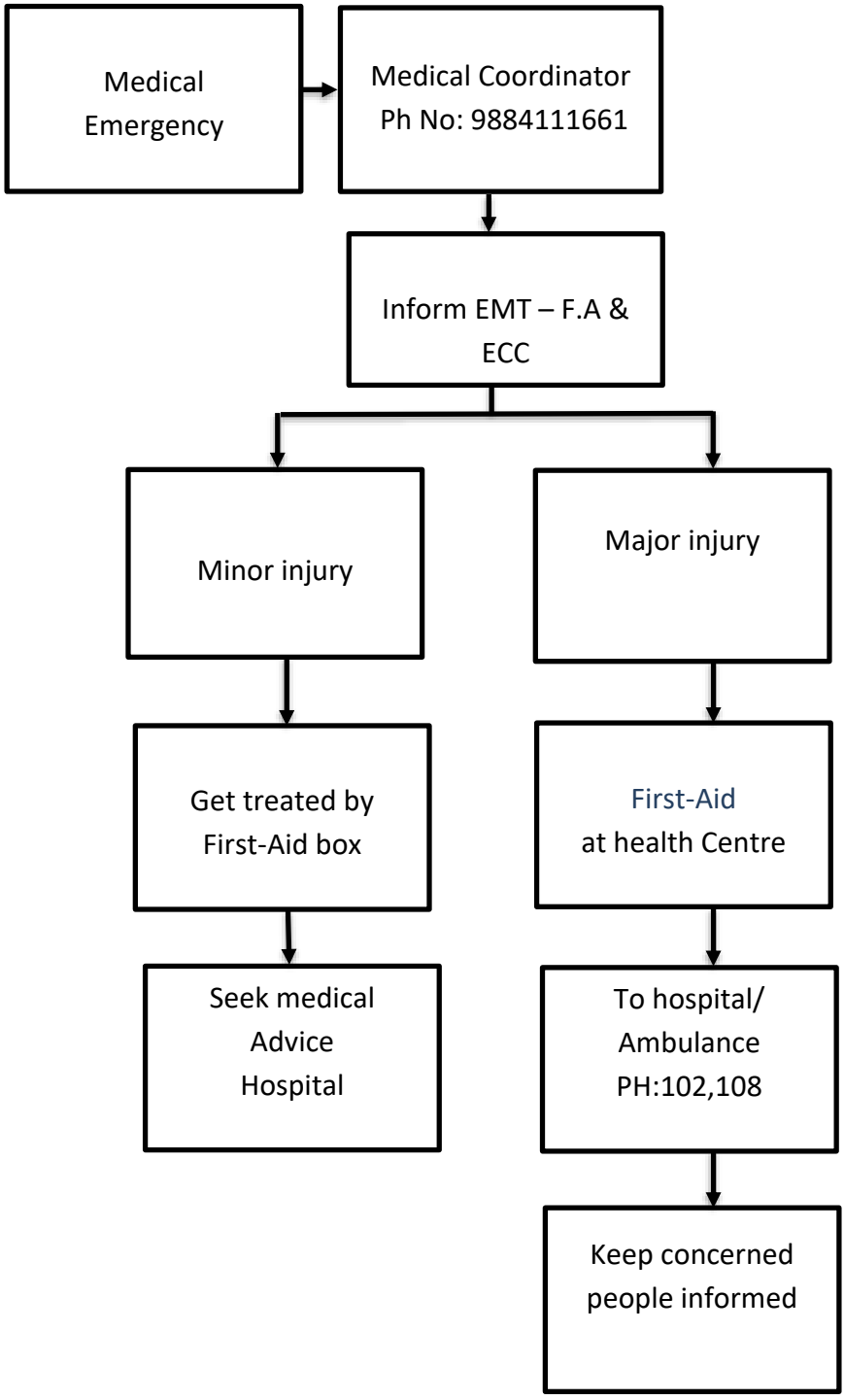
### 4.4.1 Emergency Response Plan -Flow chart – Fire



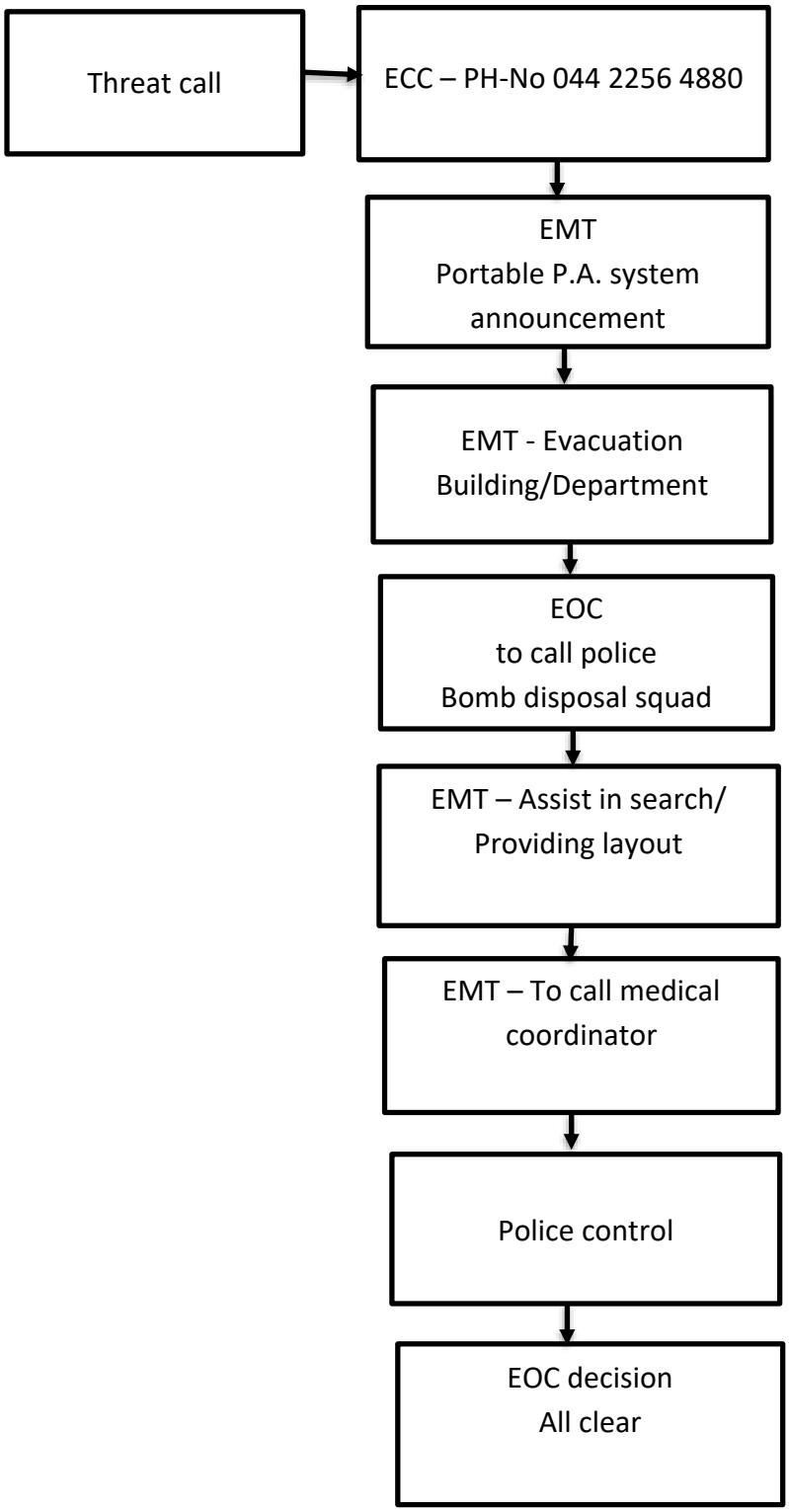
### 4.4.2 Emergency Response Plan - Flow Chart – Evacuation



### 4.4.3 Emergency Response Plan – Flow Chart - First Aid



### 4.4.4 Emergency Response Plan – Bomb Threat



## 4.5 **Emergency Control Centre (ECC) – Reception desk**

- The ECC describes the Emergency response system in the event of a major disaster, and how the efforts of the various groups will be coordinated to meet the emergency.
- The ECC will be fully empowered to support the coordination and direction of recovery operations till normalcy is restored.
- The ECC must be fully equipped to communicate with field units throughout the division as well as outside authorities to coordinate the activities.
- The Emergency Control Centre (ECC) is a vital part of HTIC's emergency preparedness and response plan. It will be staffed with experienced and trained personnel to meet any crisis and mobilize unit-wise resources to neutralize the disaster. The decision to mobilize the ECC will normally be made by Emergency Operations Chief. In his absence, site controller will make the decision. The ECC is a facility used for centralized direction and coordination of emergency operations. This document outlines an emergency operation plan to support recovery activities in the event of a major crisis.
- Emergency Control Centre include activities such as damage survey and assessment, utility shutdown and reactivation, establishment of temporary services, debris clearance, messenger service and other management of intelligence and resource coordination as needed.

**Responsibilities of Management Representative:**

- Management Representative reviews the status periodically for any change in the Emergency Plan with all personnel concerned and updates changes in the Plan.
- Receives information from site controller about the status of emergency and reacts with the following responsibilities
- Assembles and coordinates all news releases, if applicable.
- Responsible for providing shelter, food, water, sanitation and recreation.
- Responsible for identification and registration of employees.
- Coordinates with related local agencies.
- Provides other shelter activities as required.
- Ensures adequate medical supplies are available.
- Provides education and training on physical and psychological first aid.
- Responsible for providing first aid through internal or external sources.
- Establishes and mobilizes emergency care facility.
- Keeps accurate documentation of individuals requiring medical attention.
- Make contacts with and arranges for assistance from local medical facilities.
- Advises EOC chief about of medical actions and operations.

## Emergency Management Team (EMT)

The management of any kind of emergency shall be untaken by the following team

| S.No. | Member | Role | Contact Number | Location |
|---|---|---|---|---|
| 1 | Vishakh Ravikumar | Emergency Operations Chief | 9384011942 | Under Mezzanine |
| 2 | Sathes Kumar | Alternate to Emergency Operations Chief | 9965096252<br>8838766010 | Image Computing Cluster |
| 3 | Sathish Pandidurai | Site Controller for Machine Shop | 8825871752 | iQuant Cluster |
| 4 | Maheswari A | Safety Coordinator | 7402198500 | Endoscopy Cluster |
| 5 | Amalan S | Medical Services Coordinator | 9884111661 | Endoscopy Cluster |
| 6 | Shubham Sharma | Fire Coordinator | 7620942980 | Near Balcony |
| 7 | Anand | Maintenance Co-Ordinator | 9884385344 | At Reception |

## Responsibilities of Emergency Operations Team

**Emergency Operations Chief: EOC**

- Responsible for overall direction and control of all emergency operations.
- The Emergency Operations Chief who establishes basic policies, which govern the emergency management organization, declares an emergency when required and act as the highest level of authority during an emergency.
- The Emergency Operations Chief will activate the emergency preparedness plan in the event of an emergency.
- All the members of Emergency operation Centre are directed by the Emergency Operation Chief during emergency.

- The emergency operations chief is responsible for all aspects of the emergency preparedness and response plan, including training and implementation. The plan provides specific procedures regarding management of emergency operations.
- The Emergency Operation Chief will coordinate with HOD's of the unit on progress, action, and ideas, including evaluating training programs, drills and exercises, and make recommendations for improvements for emergency preparedness. The Security Department will also plan and coordinate emergency drills and exercises to ensure unit readiness in the event of an emergency.
- The emergency team is comprised of designated campus officials and functional units who are responsible for all emergencies – related operations in the unit. Additionally, the emergency team will also coordinate with local and neighbouring authorities as required for effective emergency response.

**Site Controller:**

- He assumes overall direction and control in the absence of EOC and Management Core Team.
- Responsible for damage assessment, risk assessment, hazard and Impact analysis, Coordinates with other key personnel to propose solutions and methods of mitigation.
- Responsible for damage control and subsequent recovery operations, including but not limited to the following.
- Provides safety and security to campus as part of recovery operations.
- Shutdown and restart of all affected utilities as required.
- Maintain and operate as required, emergency power generators, fixed and portable lighting, and other items necessary to establish temporary utility services.
- Assign and deploy structural assessment teams and damage control teams to identify problems, move debris and begin clean-up operations.
- Establish work orders and other cost accounting data to track labour, material and service costs for recovery effort.
- Maintain and provide transportation equipment and personnel as needed, and determine evacuation routes as required.
- Provide manpower as required.
- The site controller whose responsibilities are to control the severity of the emergency with the resources available and persons available and also to retrieve the activities.
- Site Controller is responsible for communicating the Situation of emergency operations to Emergency Operations Chief, MR Team and other respective officers.

**Safety Coordinator**

- In the absence of the site controller, the Safety coordinator will activate the emergency preparedness plan in the event of an emergency.

- In the absence of the Safety coordinator, the head of the department of respective departments will activate the emergency preparedness plan in the event of an emergency.
- Assists Site controller in carrying out his responsibilities. In conjunction with other Research park utilities personnel, assess damages and provides required technical advice for preventing further injury and damage and for recovery of operations.
- The Safety Coordinator is authorized to retain the services of any external agency / internal functions and to help in management of hazardous material, including analytical, abatement, and disposal services during emergency.
- The Safety Coordinator coordinates the safety needs for the campus at large. The Safety Coordinator will perform the following functions in coordination with other functions:
  - Provide information and training to all employees about methods and practices to minimize the risk of injury.
  - Provide guidance regarding the proper storage, use, and disposal of hazardous materials.
  - Respond to requests for assistance for the evaluation and control of spilled and damaged hazardous materials.
  - Provide environmental impacts and hazards monitoring and recommend building evacuations as necessary.
  - Assist Site controller with post-emergency recovery plans and operations to assure a return to normal operations as quickly as possible.
  - Direct safety related activities; determine type and quantity of additional assistance required.
  - Maintain contact with and coordinate safety activities with the Site Controller.

## Medical Coordinator

- Medical services team is responsible for health and first aid management.
- Gives first aid treatment for the cases which can be controlled through the first aid boxes available
- He interfaces with other EOC coordinators on matters concerning first aid and proposes solutions and mitigation methods.
- Make contacts and arrange for assistance from local hospitals / doctors / Para medical staff and ensure their services on call.

## Fire Control Coordinator

- On arrival of Firefighting team from Research Park, he will coordinate with them for showing the exact place of fire incident.
- Advising to a team about the various firefighting strategies.
- Supporting other teams in their responsibilities relating to mitigation, evacuation, disposal methods.
- Showing the available firefighting equipment and hydrant points and related first aid facilities.
- Showing the emergency escape route exits.
- Providing necessary support for bringing firefighting gadgets inside HTIC.

**Maintenance Co-Ordinator**

- Co-Ordinate and assist with Emergency control team.

## Actions During Non-Working Hours

If the disaster occurs outside of normal working hours, it is the responsibility of the Security Coordinator of Research park on duty to communicate the emergency to all the concerned through any mode of communication – cellular phone, in person, telephone or walkie-talkie.

## Responsibilities

### Utilities Department - Research park

The purpose of the Utilities Department is to provide temporary repair and restoration (as quickly as possible) of electric power, natural gas, water, sewer, and telephone systems to minimize the impact on critical services.

- Mobilize utility personnel and assign the responsibility to repair/restoration teams.
- Assign duties to team leaders and check communications.
- Depute teams to assess and report all utility damage to EOC or Site controller.
- Advise of danger or potential danger from damage to natural gas, electrical and water distribution systems, and from damage or shutdown of waste water systems. Also advise about other damage to utility equipment affecting proper operation and safety.
- Shut off utilities as required.
- Repair and return to the unit and report to the site controller.
- Provide other services as directed by higher authority.

### Head - Security coordinator – Research park

This plan outlines the Security Office's response system in the event of a crisis, which threatens human safety or vandalism to company property. The plan outlines the steps which must be taken to minimize the safety of personnel and the security of company property after an emergency has occurred. The purpose of the Security Department is also to mobilize transportation facilities, personnel, equipment, and supplies to respond to an Environment, Occupational Health & Safety Management System emergency or disaster.

- The Security Coordinator will, in conjunction with Site Controller coordinate the security needs for the campus at large. Specifically, it is the task of the Security Office staff to secure classified documents and various safes on campus and keep unauthorized personnel out of the campus. The chief of Security and the team leaders will perform the following functions.

- The Security officer - on duty will depute watchmen to perform continuous patrols of the campus and report on damages and/or the need for security assistance.
- Security officer - on duty will place the barricades and no entry signs as needed.
- Head watchmen and watchmen's will be posted to crowd control locations, shelters and first aid areas, as needed.
- Develops an orderly and manageable plan within the department for responding to the emergency.
- Security Officers on duty - will alert and mobilize security watchmen.
- Prepare a list of buildings by priority for use by the teams.
- Provide for a method of deputing / posting guards to a specific building area.
- Provide for communication link between Security Watchmen.
- Activate emergency transportation plans.
- Curtail non-essential services.
- Transport emergency equipment supplies to vehicles, field locations, or wherever required.
- In case of emergencies, Main siren will be operated if required for Total Plant evacuation.
- For local emergencies, Local Hand operated siren (fixed in a bi-cycle) will be operated to evacuate the respective area/dept.
- Operate emergency firewater pumps and related equipment as required.
- Provide manpower support as requested in adequate numbers.
- Assist in evacuation of buildings and transport of people as required.
- Assist in setting up emergency shelters and mass care facilities.
- Provide auxiliary ambulances services.
- Designate routes, alternate routes, and detours (Stickers on the floors, Evacuation route maps) for evacuation and resources distribution.
- Remove, haul, and dispose of debris, which hampers emergency response activities.
- In the event of an emergency, Security Personnel will report directly to the highest-level security on site.
- The Security officer - on duty will report the status of his team EOC and provide a regular line of communication.
- The Security officer - on duty retains the services of a firm licensed and authorized to provide guard services. In the event that we require services of the Security Watchmen, this firm will be advised to provide immediately
- Reporting and communicating to the Security watchmen shall be by walkie – talkie / intercoms.
- Existing security force will receive training on Security's role in the Emergency Preparedness Plan on a regular basis. Updates and related training will be provided as updates are received.
- Display the internal and residential telephone numbers of designated officials who are to be communicated about the emergency, conspicuously at the security office.

- Display the important telephone numbers of outside emergency services like Fire station, Hospitals etc.,
- Test, maintain, safeguard all emergency communication equipment, and place that equipment is service or on standby.
- Provide instruction on proper operation, frequency control, and radio discipline to all users. Radio transmissions will be handled on a priority basis, with emergency transmission being the highest priority, operational transmissions second priority. Higher priority message may cut in and supersede lower priority message. Proper radio discipline must always be observed.

**Head – Finance- Research park**

The purpose of the Finance Department is to establish work order documentation and to track all expenditures associated with the disaster. It is also their function to provide contractor assistance as required in support of the disaster.

- Establish work orders and/or other cost accounting documentation on track labour, material, and other associated costs related to the emergency and subsequent recovery.
- Solicit contractor assistance and obtain permits as needed related to the emergency and subsequent recovery, and serve as contracts administrator to all such contracts.
- Determine insurance benefits resulting from emergency, and coordinate receipt and expenditure of same.
- Provide summary reports of rupee value related to total damage sustained.

## 4.6 List of Emergency Situations

- **Fire in server room**
- **Fire in AHU duct**
- **Emergency Situations which may prove to be fatal (E.g. Fatal due to Electrocution, Fall from height)**
- **Emergency Situations arising out of natural calamities (Earthquake, Cyclone, Tsunami)**

## 4.7 Emergency Contacts

| Internal Emergency Operations Communication Numbers | |
|---|---|
| Emergency Operations Chief | 9384011942 |
| Alternate to Emergency Operations Chief | 9965096252<br>8838766010 |
| Site Controller for Machine Shop | 8825871752 |
| Safety Coordinator | 7402198500 |
| Medical Services Coordinator | 9884111661 |
| Fire Coordinator | 7620942980 |
| Maintenance Co-Ordinator | 9884385344 |

| Research Park Communication Numbers | |
|---|---|
| Shift Engineer | 91378 41561<br>91378 41652 |
| Help Desk | 044 6646 9840 / 850 |
| Fire man | 91509 37633 |
| Security main gate | 044 6646 9851 |
| Property Manager | 93848 48681 |

**External Communication Numbers**

MR / Security in-charge shall maintain a list of residential telephone numbers of the important persons such as plant heads, head of personnel etc

| **External Communication Numbers** | |
|---|---|
| Fire station telephone numbers: Control room | 101 |
| Thiruvanmiyur fire station | 044 2440 1213 |
| Guindy fire station | 9445086050 |

| **Police station telephone numbers<br>Control room -100** | |
|---|---|
| **Thiruvanmiyur police station** | |
| Law and order | 044 2345 2602 |
| Crime | 044-2345 2603 |
| Traffic | 044- 2345 2604 |

| **Hospital Telephone Numbers** | |
|---|---|
| Apollo Multi-Specialty Hospital, OMR road | 044 3322 1111 |
| VH Hospital, Rajiv Gandhi Salai | 98847 30000 |

| **Other Important Contact Numbers** | |
|---|---|
| Ambulance service | 102 / 108 |
| Blood bank | 044 2488 1392 |
| Disaster management | 1078, 1077, 1070 ,011-26701728 |
| Bomb disposal | 044 2256 4880 |

| Prepared by | Approved by |
|---|---|
| Core Team | MR Team |

## 4.8 Emergency Preparedness Plan SOP

| Environmental Occupational Health & Safety Management System Procedures | Doc. No: EHSP/8.2<br>Rev. No: 00 |
|---|---|
| Emergency Preparedness Plan SOP | Rev. Date: 12.02.2020<br>Initial release |

**Revision History Sheet**

| Section No. | Issue | | Revision | | Nature of change | Approved by MR Team | Controlled byManagement Representative | Date of Revision |
|---|---|---|---|---|---|---|---|---|
| | From | To | From | To | | | | |
| All Sections | 00 | 00 | -- | 00 | Initial Release | | HR | 11.02.2020 |

**Purpose**: This procedure is to promote organizational safety by identifying potential Aspects / hazards and response to accident and emergency situations and for preventing and mitigating the environmental impacts and risks, which are associated with them.

**Scope**: HTIC, Chennai

**Responsibility**: Management Representative

**Clause reference**:

8.2 of ISO 14001: 2015

8.2 of ISO 45001: 2018

**Abbreviations, terms and definitions:**

**Environment:** surroundings in which an organization operates, including air, water, land, natural resources, flora, fauna, humans, and their interrelation.

**Environmental impact:** any change to the environment, whether adverse or beneficial, wholly or partially resulting from an organization's environmental aspects.

**Hazard:** Source, situation or act with a potential for harm in terms of human injury or ill health or a combination of these.

**Risk:** Combination of the likelihood of an occurrence of a hazardous event or exposure and the severity of injury or ill health that can be caused by the event or exposure.

**EMT**: Emergency Management Team

## Procedure:

### General

- An emergency situation in the context of this procedure is a condition, which can result in Major environmental emergency, major human injury, which can create environmental impacts and severe risks.
- The emergency situations that are identified in the Aspect-impact and hazard - risk study and a list of past incidents that form the basis for the setting of Emergency Manual.
- An Emergency Management Team is constituted with Persons from all respective departments to review /initiate actions for identified potential Emergency situations identified through the significant impact study and significant risk Study in line with the respective significant guidelines.
- The Emergency Manual is prepared by MR Team. Emergency Program(S) and plans will be tested periodically wherever it is practical. Emergency plans and Program (S) will be reviewed and (as necessary) revised as required by Regulation or as part of the corrective/preventive actions following a drill or immediately after the occurrence of an actual accident or emergency situation.
- The Emergency operation chief is overall responsible for controlling emergency and the associated members are Site Controller, Fire controller, Safety coordinator and medical services coordinator.
- These coordinators have their own teams for execution of activities during emergency. MR Team will plan for conducting the emergency critiques in line with the annual plan and maintain this information Fire drill record.
- Nonconformance in the plans/procedures will be addressed via the Nonconformity and Corrective and Preventive Action procedure

**Emergency Situations**

- The emergency response Manual is made for the following emergencies, which are listed out in the hazard & risk list:
    - Fire in server room
    - Fire in AHU duct Emergency Situations which may prove to be fatal (E.g. Fatal due to Electrocution, Fall from height)
    - Emergency Situations arising out of natural calamities (Earthquake, Cyclone, Tsunami)

**Fire hazard Emergency**

Research park shall own the primary responsibility to carry out the fire emergency mitigation which includes firefighting, mobilizing transportation facilities, personnel, equipment, and supplies to respond to a fire, environmental emergency or disaster and coordinate with other Emergency Management Team s to initiate the recovery.

**Uncontrolled release of Hazardous/Flammable/Toxic Material**

Research park shall own the primary responsibility to identify hazardous materials which have been released and to determine the action for preventing and mitigating contamination to land, air, water and coordinate with other Emergency Management Team s to initiate the recovery.

**Overflow of sewage / Effluent from the treatment plant**

Research park will execute the emergency preparedness procedure on such an occurrence.

**Emergency Preparedness Phases**

- Prevention Phase
- Preparedness Phase
- Response / Mitigation Phase
- Recovery Phase

**Procedure to be followed during Various Phases of Emergency**

**Prevention phase:**

- Training the employees on emergency preparedness and response
- Effective communication system shall be established and maintained.
- Strengthening the existing fire prevention systems.
- Conducting fire prevention/pollution prevention inspections.
- Establishing and maintaining chemical management procedures (i.e.) MSDS
- Regulation of entry of visitors/ contractor's procedure through Security
- Pre-commissioning inspection of equipment.

**Preparedness phase**

- Potential emergency situation identification and communication.
- Reviewing the emergency preparedness and response plan.
- Conducting exercises and Fire drills.
- Preparation of site plan for evacuation if required.

The following considerations are also to be included in this phase relating to emergency preparedness

- Displays / booklets
- EPR equipment requirement
- Budget requirements
- Chemicals inventory
- Structure and responsibility

**Mitigation / Response phase:**

The following considerations shall be included in this phase relating to response phase of the emergency preparedness

- Reporting system of emergency
- Processing the emergency calls
- Internal emergency communications
- Emergency Operations Team co-ordination
- Mitigation process
- Termination of emergency response phase
- External communication system
- Shut down and start-up procedures
- Medical assistance

**Recovery phase**

The following activities shall be included in the recovery phase of emergency preparedness

- Damage assessment
- Follow up with medical ailments
- Clean-up and recovery system
- Post -emergency reports / Investigation / analysis
- Countermeasure / preventive measure
- Review meeting chaired by EOC

**Mock Tests:**

Mock tests are conducted in the form of drills every once in Six months for the planned emergencies as indicated in the Fire drill plan. The Fire drill record is prepared with all information of the happenings during the Fire drill and is maintained by MR Team. The procedure of emergency may be revised to accommodate any corrective actions or to increase the performance of the emergency preparedness.

**Formats**

| Format Ref | Description | Location |
|---|---|---|
| EHSF/8.2/MR/MDP | Fire drill plan | MR Team |
| EHSF/8.2/MR/ EM | Emergency Preparedness & Response Manual | MR Team |
| EHSF/8.2/MR/LES | List of emergency situations | MR Team |
| EHSF/8.2/MR/MDR | Fire drill awareness training | MR Team |

**Documents**

| Document Code | Description | Location |
|---|---|---|
| EHSD/8.2/MR/LES | List of emergency situations | MR Team |
| EHSD/8.2/MR/MDP | Fire drill plan | MR Team |
| EHSD/8.2/MR/EM | Emergency Preparedness & Response Manual | MR Team |

**Records:**

| Record no | Description | Location |
|---|---|---|
| EHSR/8.2/MR /MDR | Fire drill awareness Training | MR Office |

| Prepared by | Approved by |
|---|---|
| Core Team | MR Team |

### 4.8.1 ISO 14001: 2015 Reference – Emergency Preparedness and Response

**8.2 Emergency preparedness and response**

The organization shall establish, implement and maintain the processes needed to prepare for and respond to potential emergency situations identified in 6.1.1.

**The organization shall:**

- Prepare to respond by planning actions to prevent or mitigate adverse environmental impacts from emergency situations.
- Respond to actual emergency situations.
- Act to prevent or mitigate the consequences of emergency situations, appropriate to the magnitude of the emergency and the potential environmental impact.
- Periodically test the planned response actions, where practicable.
- Periodically review and revise the process(es) and planned response actions, in particular after the occurrence of emergency situations or tests.
- Provide relevant information and training related to emergency preparedness and response, as appropriate, to relevant interested parties, including persons working under its control.

The organization shall maintain documented information to the extent necessary to have confidence that the process(es) is (are) carried out as planned.

### 4.8.2 ISO 45001: 2018 Reference – Emergency Preparedness and Response

**8.2 Emergency preparedness and response**

- The organization must establish, implement and maintain processes needed to prepare for and respond to potential emergency situations.
- The organization must establish a planned response to emergency situations, including the provision of first aid. It must provide training for the planned response.
- It must periodically test and exercise the planned response capability. The organization must evaluate performance and, as necessary, revising the planned response, including after testing and in particular after the occurrence of emergency situations.
- It must communicate and provide relevant information to all workers on their duties and responsibilities.
- It must be communicating relevant information to contractors, visitors, emergency response services, government authorities and, as appropriate, the local community.
- It must consider the needs and capabilities of all relevant interested parties and ensuring their involvement, as appropriate, in the development of the planned response.
- The organization shall maintain and retain documented information on the processes and on the plans for responding to potential emergency situations.

# TRAINING PROGRAMS

# 5. Training Programs

## 5.1 Core Committee Training

**Training Index**

| HEALTHCARE TECHNOLOGY INNOVATION CENTRE - IIT MADRAS | | | | | | |
|---|---|---|---|---|---|---|
| TRAINING PROGRAM INDEX | | | | | | |
| | **FACULTY** | **M LAKSHMINARAYANAN** | | | | |
| | **FACULTY** | **P SUBRAMANI** | | | | |
| **Month** | **Date** | **Time** | **Training Title** | **Target Audience** | **No. of Trainees** | **Total Manhours** |
| February | 13-02-2020 | 11:00 AM to 12:00 PM | Safety Training Awareness Program for core committee | Core Team | 6 | 6 |

**Faculty Team:** PS / MLN

**Topics Covered:**

- Fire Safety
- Evacuation
- Legal Requirements
- Chemical Safety
- Laser Safety
- Roles and Responsibilities
- Awareness on Fire drill
- EHS Policy
- Sops

## 5.2 Employee Training

**Training Index**

| HEALTHCARE TECHNOLOGY INNOVATION CENTRE - IIT MADRAS | | | | | | |
|---|---|---|---|---|---|---|
| TRAINING PROGRAM INDEX | | | | | | |
| | **FACULTY** | M LAKSHMINARAYANAN | | | | |
| | **FACULTY** | P SUBRAMANI | | | | |
| **Month** | **Date** | **Time** | **Training Title** | **Target Audience** | **No. of Trainees** | **Total Manhours** |
| February | 11-02-2020 | 10:30 AM to 3:00 PM | Safety Training Awareness Program | Employees | 18 | 81 |
| February | 11-02-2020 | 3:00 PM to 6:00 PM | Safety Training Awareness Program | Employees | 25 | 75 |
| February | 12-02-2020 | 10:30 AM to 3:00 PM | Safety Training Awareness Program | Employees | 16 | 72 |

**Topics Covered:**

- Fire Safety
- Hard Identification
- Evacuation
- Chemical Safety
- Laser Safety
- Awareness on Fire drill
- EHS Policy
- Sops Related to Their Activities

# FIRE FIGHTING DEMO

# 6. Fire Fighting Demo

## 6.1 Training Index

| HEALTHCARE TECHNOLOGY INNOVATION CENTRE - IIT MADRAS | | | | | | |
|---|---|---|---|---|---|---|
| TRAINING PROGRAM INDEX | | | | | | |
| | **FACULTY** | M LAKSHMINARAYANAN | | | | |
| | **FACULTY** | P SUBRAMANI | | | | |
| **Month** | **Date** | **Time** | **Training Title** | **Target Audience** | **No. of Trainees** | **TOTAL MANHOURS** |
| February | 13-02-2020 | 3:00 PM to 4:30 PM | Fire Demo Training | Core Team & Employees | 70 | 105 |





## 7. Fire drill Plan

| EHS MANGEMENT SYSTEM - FIRE DRILL PLAN | | | Doc.No: EHSD/8.2/MR/MDP<br>Rev.No.00<br>Rev.Date: Initial - 13.02.2020 |
|---|---|---|---|

| S. No | Identified Emergency Situation | | 2020 | | | | | | | | | | | | 2021 | | | | | | | | | | | | 2022 | | | | | | | | | | | | 2023 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP | OCT | NOV | JAN | FEB |
| 1 | Fire in server room | Plan | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | Actual | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 2 | Fire in AHU duct | Plan | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | Actual | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 3 | Emergency Situations which may prove to be fatal (E.g. Fatal due to Electrocution, Fall from height) | Plan | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | Actual | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 4 | Emergency Situations arising out of natural calamities (Earthquake, Cyclone, Tsunami) | Plan | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | Actual | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

| Prepared By: Core Team | Reviewed By : MR Team |
|---|---|

# PLASTIC WASTE MANAGEMENT

# 8. Plastic Waste Management

## 8.1 Standard Operating Procedure (SOP)

**Purpose:** To establish a procedure for usage of plastic and disposal.

**Scope:** HTIC –IIT Madras

**Responsibility**

**Overall** **:** MR Team

**Operating:** Team Leads

| Operating Criteria | Monitoring Responsibility | | |
|---|---|---|---|
| | Method | Frequency | Responsibility |
| Check for thickness of plastic | Physical measurement | As required | Team |

**Instruction:**

**Points of Operation**

- Refuse / Reduce / Recycle concept shall be followed in the procedure of purchase, usage of items made out of plastic.
- Any items plastic item below 40 microns thickness shall not be used in any form.
- Recyclable plastic items can only be purchased and used.
- Training to be provided for Identification ad labelling of Recyclable plastic displayed in container, bags, packing sheets etc.,
- Any process waste containing plastic ingredients to be segregated and kept separately for safe disposal to authorized recycler.
- An agreement shall be entered between authorized recycler and the Management for safe disposal.
- Any Purchase order should include the clause of conditions prescribed under Plastic management Rules.

**Point for checking**

Ensure that the collected plastic waste is taken by SMA Enterprises, Perungudi periodically
Carryout periodical inspection for identifying the use plastic bags and other packing items

Train the employees on Awareness of Pollution due to usage and improper disposal of plastic
Necessary steps shall be taken up for implementing National Policy on Plastic usage like Refuse / Reduce / Reuse etc.,

**Points for Preventive Maintenance**

Nil

**Cross Reference If Any:**

| Record no | Description | Location |
|---|---|---|
| EHSP/HTIC/PMP | Plastic management procedure | MR office |
| - | Agreement with SMA enterprises | MR office |

Issue no: 00

Revision no: 00

Issue date: 14.02.2020

Revision date: 14.02.2020

| **Prepared by** | **Approved by** |
|---|---|
| Core Team | MR Team |

# BATTERY WASTE MANAGEMENT

# 9. Battery Waste Management

## 9.1 Standard Operating Procedure (SOP)

| | |
|---|---|
| Environmental, Occupational Health and Safety<br>Battery Disposal Procedure | EHSP/HTIC/BDP/00 |
| | Rev No: 00 |

**Purpose:** To establish a procedure to dispose of Scrap and Waste batteries.

**Scope:** HTIC –IIT Madras

**Responsibility:**

**Overall** : MR Team

**Operating**: Maintenance Coordinator

| **Operating Criteria** | **Monitoring Responsibility** | | |
|---|---|---|---|
| | Method | Frequency | Responsibility |
| Order for new with old buy back clause | Order monitoring | As required | Maintenance Coordinator |

**Instruction:**

**Points of Operation**

- Whenever new batteries are required, quotation is to be called for new ones along with offer for old one buying back.
- The amount sanction request from the budget should include the old battery price
- Reduction in cost projection.
- Purchase order should include the clause of old battery buying back, reducing the
- Cost of old battery from the new battery price.
- As soon as the new battery is received, the old one is to be send to the supplier.

**Points of Checking**

- Check the serial no of the old scrap battery to ensure that is the specified scrap battery.
- While moving & loading, battery should be kept as straight up position to avoid spillage.

**Points for Preventive Maintenance**

Nil

**PPEP (Personal Protective Equipment Plan)**

| S. No | Activity | PPE Required | PPE Recommended | PPE Available |
|---|---|---|---|---|
| 1 | Handling of old or new battery | Knitted Gloves | IS 6994:1973 | IS 6994:1973 |

**Impact in Case of Deviation:**

The spillage of electrolyte leads to land pollution and if the disposal is not proper the lead content will pollute the land and is one of the hazardous substances.

**Corrective Action in Case of Deviation:**

- If there is any leakage/ spillage of electrolyte contain by spill control sponges and dispose it with regard to standard.
- Wash the area with plenty of water. Ensure that washed water does not enter into the drain.
- If old battery sold without purchasing new batteries, ensure that it is sold to authorized agencies.

**Cross Reference If Any:**

| Record no | Description | Location |
|---|---|---|
| EHSR/HTIC/BDP | Battery disposal procedure | MR office |

Issue no: 00
Revision no: 00
Issue date: 14.02.2020
Revision date: 14.02.2020

| Prepared by | Approved by |
|---|---|
| Core Team | MR Team |

# E-WASTE MANAGEMENT

# 10. E-Waste Management

## 10.1 Standard Operating Procedure (SOP)

| | |
|---|---|
| Environmental, Occupational Health and Safety<br><br>E-waste Disposal Procedure | EHSP/HTIC/EWDP/00 |
| | Rev No: 00 |

**Purpose:** To establish a procedure to disposal of E-waste disposal.

**Scope:** HTIC –IIT Madras

**Responsibility:**

**Overall** : MR Team

**Operating:** Team Leads

| **Operating Criteria** | **Monitoring Responsibility** | | |
|---|---|---|---|
| | Method | Frequency | Responsibility |
| Collect all e-waste in one place | Physical | As required | Team |

### Instruction:

**Points of Operation**

- Any waste arising out of items relating to electronic and communication like computers, laptops, PCB, Chips etc., are to be segregated and stored separately
- An inventory of items to be to be disposed has to be prepared
- An agreement shall be entered between authorized recycler and the Management for safe disposal
- Any Purchase order should include the clause of conditions prescribed under E-waste management Rules

**Point for checking**

- Ensure that the collected e-waste is taken by SMA Enterprises, Perungudi periodically.
- Carryout periodical inspection for identifying the proper disposal of e-waste to the designated place.
- Train the employees on Awareness of Pollution due to usage and improper disposal of e-waste.

**Points for Preventive Maintenance**

Nil

**Cross Reference If Any:**

| Record no | Description | Location |
|---|---|---|
| EHSR/HTIC/EWDP | E-waste management procedure | MR office |
| - | Agreement with SMA enterprises | MR office |

Issue no: 00

Revision no: 00

Issue date: 14.02.2020

Revision date: 14.02.2020

| Prepared by | Approved by |
|---|---|
| Core Team | MR Team |

# AMBIENT AIR QUALITY MEASUREMENT

# 11. Ambient Air Quality Measurement

## 11.1 Report No: EN20020023-01

| | | | | | |
|---|---|---|---|---|---|
| **Report No** | : | EN20020023-01 | **Report Date** | : | 21 Feb 2020 |

**SAMPLE DRAWN BY LABORATORY**

| | | | | | |
|---|---|---|---|---|---|
| **Customer Name** | : | M/s.Healthcare Technology Innovation Centre | | | |
| **Customer Address** | : | No.1,5th Floor,'c' Block Phase-II,IITM Research Park Kanagam Road,Taramani,Chennai-600013 | | | |
| **Sample Name** | : | Workzone Monitoring | | | |
| **Sample Description** | : | Workzone Monitoring | | | |
| **Sample No** | : | EN20020023-01 | **Sampling Date & time** | : | 18 Feb 2020 & 12:35 pm to 12:50 pm |
| **Sample Identification** | : | IIT/HTIC/Work zone/Location 1 | **Sample Received on** | : | 18 Feb 2020 |
| **Sample Location** | : | Soldering Section (Non Lead) | **Test Started on** | : | 20 Feb 2020 |
| **Instrument** | : | Thermo | **Test Completed on** | : | 21 Feb 2020 |

**Test Results**

| Sl.No | Test Name | Test Method | Results | Units | As Per Limit ACGIH TLV-TWA |
|---|---|---|---|---|---|
| 1 | Barium as Ba | NIOSH-7300 | 156.92 | µg/m³ | 500 |
| 2 | Copper as Cu | NIOSH-7300 | BLQ(LOQ:4.0) | µg/m³ | 200 |
| 3 | Iron as Fe | NIOSH-7300 | 6.10 | µg/m³ | - |
| 4 | Manganese as Mn | NIOSH-7300 | 13.15 | µg/m³ | 200 |
| 5 | Selenium as Se | NIOSH-7300 | BLQ(LOQ:4.0) | µg/m³ | 200 |
| 6 | Silver as Ag | NIOSH-7300 | BLQ(LOQ:4.0) | µg/m³ | 100 |
| 7 | Zinc as Zn | NIOSH-7300 | BLQ(LOQ:4.0) | µg/m³ | - |
| 8 | Cadmium as Cd | NIOSH-7300 | BLQ(LOQ:4.0) | µg/m³ | 10 |
| 9 | Thallium as Ti | NIOSH-7300 | BLQ(LOQ:4.0) | µg/m³ | 100 |
| 10 | Lead as Pb | NIOSH-7300 | BLQ(LOQ:4.0) | µg/m³ | 50 |
| 11 | Molybdenum as Mo | NIOSH-7300 | BLQ(LOQ:4.0) | µg/m³ | 5000 |
| 12 | Nickel as Ni | NIOSH-7300 | BLQ(LOQ:4.0) | µg/m³ | 1000 |
| 13 | Arsenic as As | NIOSH-7300 | BLQ(LOQ:4.0) | µg/m³ | 10 |
| 14 | Chromium as Cr | NIOSH-7300 | BLQ(LOQ:4.0) | µg/m³ | 500 |
| 15 | Cobalt as Co | NIOSH-7300 | BLQ(LOQ:4.0) | µg/m³ | 20 |

**Note: ACGIH:** The American Conference of Governmental Industrial Hygienists
BLQ-Below Limit of Quantification, LOQ-Limit of Quantification

.....End of Report.....

## 11.2 Report No: EN20020023-02

| | | | | | |
|---|---|---|---|---|---|
| **Report No** | : | EN20020023-02 | **Report Date** | : | 21 Feb 2020 |

**SAMPLE DRAWN BY LABORATORY**

| | | | | | |
|---|---|---|---|---|---|
| **Customer Name** | : | M/s.Healthcare Technology Innovation Centre | | | |
| **Customer Address** | : | No.1,5th Floor,'c' Block Phase-II,IITM Research Park Kanagam Road,Taramani,Chennai-600013 | | | |
| **Sample Name** | : | Work zone Monitoring | | | |
| **Sample Description** | : | Work zone Monitoring | | | |
| **Sample No** | : | EN20020023-02 | **Sampling Date & time** | : | 18 Feb 2020 & 12:50 pm to 01:05 pm |
| **Sample Identification** | : | IIT/HTIC/Work zone/Location 2 | **Sample Received on** | : | 18 Feb 2020 |
| **Sample Location** | : | Mech Work Shop | **Test Started on** | : | 20 Feb 2020 |
| **Instrument** | : | Thermo | **Test Completed on** | : | 21 Feb 2020 |

**Test Results**

| Sl.No | Test Name | Test Method | Results | Units | As Per Limit ACGIH TLV-TWA |
|---|---|---|---|---|---|
| 1 | Barium as Ba | NIOSH-7300 | 16.67 | µg/m³ | 500 |
| 2 | Copper as Cu | NIOSH-7300 | 4.23 | µg/m³ | 200 |
| 3 | Iron as Fe | NIOSH-7300 | 91.0 | µg/m³ | - |
| 4 | Manganese as Mn | NIOSH-7300 | 14.62 | µg/m³ | 200 |
| 5 | Selenium as Se | NIOSH-7300 | BLQ(LOQ:4.0) | µg/m³ | 200 |
| 6 | Silver as Ag | NIOSH-7300 | BLQ(LOQ:4.0) | µg/m³ | 100 |
| 7 | Zinc as Zn | NIOSH-7300 | 30.45 | µg/m³ | - |
| 8 | Cadmium as Cd | NIOSH-7300 | BLQ(LOQ:4.0) | µg/m³ | 10 |
| 9 | Thallium as Ti | NIOSH-7300 | BLQ(LOQ:4.0) | µg/m³ | 100 |
| 10 | Lead as Pb | NIOSH-7300 | BLQ(LOQ:4.0) | µg/m³ | 50 |
| 11 | Molybdenum as Mo | NIOSH-7300 | BLQ(LOQ:4.0) | µg/m³ | 5000 |
| 12 | Nickel as Ni | NIOSH-7300 | BLQ(LOQ:4.0) | µg/m³ | 1000 |
| 13 | Arsenic as As | NIOSH-7300 | BLQ(LOQ:4.0) | µg/m³ | 10 |
| 14 | Chromium as Cr | NIOSH-7300 | BLQ(LOQ:4.0) | µg/m³ | 500 |
| 15 | Cobalt as Co | NIOSH-7300 | BLQ(LOQ:4.0) | µg/m³ | 20 |

**Note: ACGIH:** The American Conference of Governmental Industrial Hygienists
BLQ-Below Limit of Quantification, LOQ-Limit of Quantification

.....End of Report.....

## 11.3 Photographs

# SAFETY AUDIT

## 12. Safety Audit

### 12.1 Audit observations

HTIC AUDIT OBSERVATIONS
12.02.2020


Obv:
Fire extingusher kept inside server room, of obsolete model

Suggestion :
1. It has to be replaced phased manner with recent model having pressure guage to show the limits
2. Fire extingusher shall be kept outside the room
3. Labelling, identification tags are to be provided with the number, test dates


Obv:
Fire extingusher kept inside server room, location is non-standard

Suggestion :
1. It has to be fixed outside the room
2. And a trolley to be povided for easy handling due to heavy weiight
3. It shall be kept away from any electical gadgets


Obv : Earthing not provided to the panel board

Suggestion :
1. Double earthing to be given as per IS 3043


Obv : Plug in socket is located
At unreachable location

Suggestion :

1. Any switch, plugin socket,
Valves have to placed near to
Reachable location and height


Obs : Many of the batteries found
Expanded on sides, potential for
Fire and explosion

Suggestion:
1.Periodical maintenance
Should include the percentage of
Deterioration to the battery

2. Labelling and traceability with
ID stating the date of purchase
Date of disposal etc to be displayed
In sticker format

3. Load distribution study to be
Carried out to uniformly distributing
The load
4.SOP to be followed for buy-back


Obv : Earthing not provided to the panel board

Suggestion :
1. Double earthing to be given as per IS 3043


Obv : Poor house keeping observed . Undue materials Stored in the vulnerable area For fire incident

Suggestion :
1. Removal of the materials to And proper disposal to be carried out
2. 1S / 2S system to be Implemented to upkeep the Area


Obv : Poor house keeping observed . Undue materials Stored in the vulnerable area Potential For fire incident

Suggestion :
1. Removal of the materials to And proper disposal to be carried out
2. 1S / 2S system to be Implemented to upkeep the Area


Obv : Poor house keeping observed . Undue materials Stored in the vulnerable area Potential For fire incident

And also the panel board is wide Open, posing spark ignition threat

Suggestion :
1. Removal of the materials to And proper disposal to be carried out
2. 1S / 2S system to be Implemented to upkeep the Area

3. Proper maintenance of panels to be ensured and LOTO system to be followed


Obs : Pressure control device fitted to the ducting. But the level of pressure is not evidenced for monitoring

Suggestion :

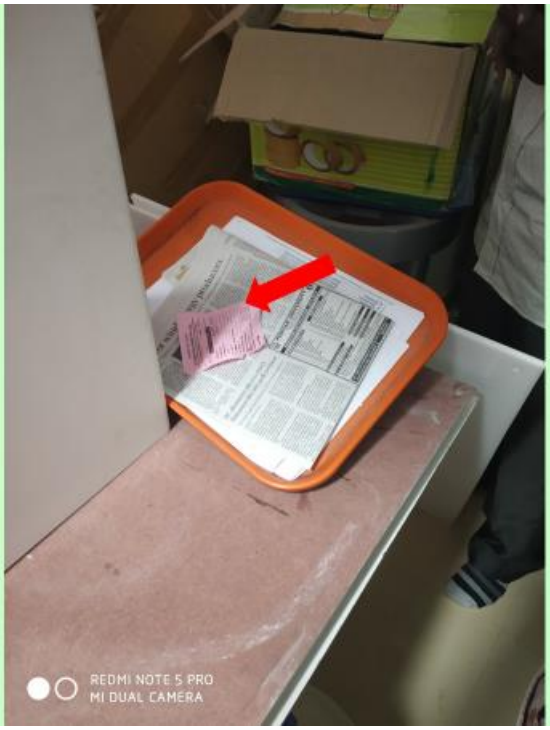
U-Tube manometer to be fixed to the AHU duct to indicate the pressure and flow rate for identifying the choking of duct line


Obs : The main fire hydrant, hose reel , Hose box etc. which very much important to protect the whole floor is not accessible .
Lot of unused items are stored in the area causing inability to open the cabinet in case of emergency

Suggestion :

Removal of all unused materials to be be carried out and 1S –Redtag campaign may be implemented

And also the fire hydrant cabinet to be clearly marked with the important instructions relating to emergency action during fire




Obv : Poor house keeping observed . Undue materials Stored in the vulnerable area For fire incident

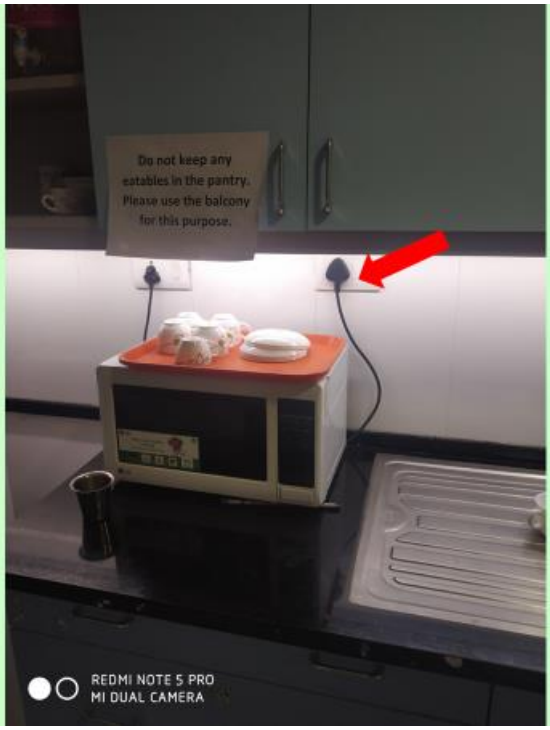
Suggestion :
1. Removal of the materials And proper disposal to be carried out

2. 1S / 2S system to be Implemented to upkeep the Area

3. Vital documents like Manifest Receipt have to be filed neatly


Obv : Poor house keeping observed . Undue materials Stored in the vulnerable area For fire incident

Suggestion :
1. Removal of the materials to And proper disposal to be carried out
2. 1S / 2S system to be Implemented to upkeep the Area




Obs : Electrical switch box is directly connected to the oven, where the potential for shock is existing since employees operate with wet hands

Suggestion :

It is suggested to provide a ELCB to the switch box here itself


Obs : Containers used for chemicals storage are found lying in may places without any label and proper storage without identifying the compatibility

Suggestion :
It is suggested to carryout a thorough chemical inventory audit referring the relevant MSDS .
And to find out the safety requirements relating to safe storage handling and disposal of chemicals including the Compatibility


Obs : Humidity at this location is found not suitable due to occupancy

Suggestion :

Air circulation to be ensured without any complaint by relocating the employees occupied in this area to provide adequate breathing air percapita


Obs : Containers used for chemicals storage are found lying in may places without any label and proper storage without identifying the compatibility

Suggestion :
It is suggested to carryout a thorough chemical inventory audit referring the relevant MSDS .
And to find out the safety requirements relating to safe storage handling and disposal of chemicals including the Compatibility


Obs : The extinguisher module is located in a position where the spray can not cover the whole area

Suggestion :
1. It has to be relocated or lowered to a center place to cover the whole area to quench the fire


Obs ; The sheet cutting machine is having a potential for finger injury due to exposure of the blade

Suggestion :

Suggested to provide a transparent perplex sheet guard or any other type of guard to cover the opening so that the finger cannot reach the point of operation


Obs : There is a potential for leakage of solution causing pollution as well as related hazards

Suggestion :

Suggested to provide a secondary container inside the incubator or to provide a absorbing beading on the edge of the work bench inside


Obs : Regular nose mask is being used during handling all chemicals and in other operations

Suggestion :

Suggested to provide suitable nose mask referred by the relevant MSDS obtained from the supplier

Obs : Un-related material stored in place of the fire extinguisher

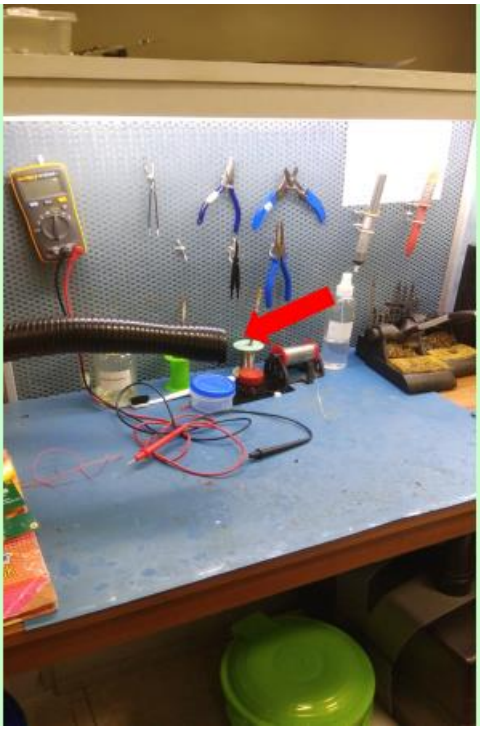
Suggestion :
Suggested to remove the unused material from the location and place the fire extinguisher in trolley under the arrow mark


Obv : Poor house keeping observed . Undue materials Stored in the vulnerable area Potential For fire incident

And also the panel board is wide Open, posing spark ignition threat

Suggestion :
1. Removal of the materials to And proper disposal to be carried out
2. 1S / 2S system to be Implemented to upkeep the Area

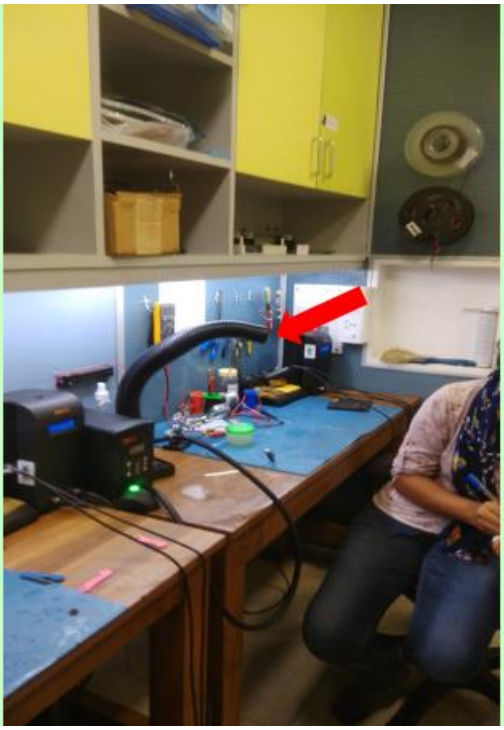
3. Proper maintenance of panels to be ensured and LOTO system to be followed



Obs : The fume exhaust system hose is not capturing the fumes effectively

Suggestion :

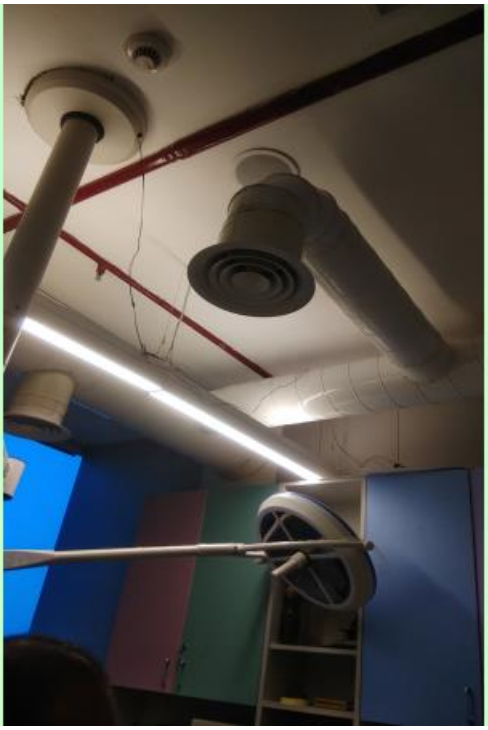
Suggested to provide the funnel or canopy end fitting to widen the area of capturing the fumes effectively



Obs : The fume exhaust system hose is not capturing the fumes effectively

Suggestion :

Suggested to provide the funnel or canopy end fitting to widen the area of capturing the fumes effectively



Obs : Loose electrical wire with loose joints running over the hoods posing short circuit hazard

Suggestion :
Suggested to recondition the same and route it through proper conduit pipe

Obv : Plug in socket is located At unreachable location

Suggestion :

1. Any switch, plugin socket, Valves have to placed near to Reachable location and height

Obs : CO2 cylinder is kept unsafe
Without proper fastening

Suggestion :

Suggested to rigidly fasten the cylinder
With suitable chain or belt so that it is
Protected from falling

Obv : Poor house keeping
observed . Undue materials
Stored in the vulnerable area
Potential For fire incident

Suggestion :
1. Removal of the materials to
And proper disposal to be
carried out
2. 1S / 2S system to be
Implemented to upkeep the
Area
3. All materials stored above the
Shoulder level to avoid sever injury
By falling objects

Obs : It is evidenced that the drilling Machine is operated with gloves in hands

Suggestion :

It is suggested to device an administrative Control to prohibit usage of gloves in the Drilling operation

Obs : The electrical panel board is not able to be opened due to blockage by working tables kept in front

Suggestion :

Suggested to restudy the layout to provide access for opening the panel board during emergency

Obs : A table cloth evidenced that it has got burnt by the laser beam Which shows the laser is easily accessible while the machine is running –severe potential hazard

Suggestion :
Suggested to provide an interlock to The protection cover of the laser Machine to avoid the direct Exposure to the laser beam

Obs : Potential hazards like direct exposure to the laser beam and also to the eyes

Suggestion :

Suggested to provide an interlock mechanism so that the cover can not be opened during running of machine

And also appropriate shade of goggles to be used by the operator in addition to the cover

Safe operations to be ensured by regular monitoring of the protection systems like exhaust, interlock etc.,

Obs : The main switch plug point is kept secured with a conventional method to avoid unintentional operation

Suggestion :

Suggested to implement the LOTO system to facilitate the intention

Obv : Poor house keeping observed . Undue materials Stored in the vulnerable area For fire incident

Suggestion :
1. Removal of the materials to And proper disposal to be carried out
2. 1S / 2S system to be Implemented to upkeep the Area

Obs : PCB heating machine is awaiting inauguration

Suggestion :
Suggest to implement the pollution prevention measures like exhaust and proper disposal

Obs : Fire extiguishers are kept on floor and the first aid box contains least required items

Suggestion :

Suggested to place the fire extinguishers in a trolley to avoid handling heavy weight during emergency

And the first aid box to be replenished with adequate and appropriate medicines and first aid items by a trained person under lock and key mechanism


Obs : MCP is not evidenced to be interfaced with the mainframe fire protection system

Suggestion :

Suggested to interface the same with the annunciation system


Obs : The fire console was not able to be tested easily since the accessibility denied with password

Suggestion :

It has to be revisited with the supplier to provide easy password to test the system and the same to be trained to the concerned employees

Obv : Poor house keeping observed . Undue materials Stored in the vulnerable area For fire incident

Suggestion :
1. Removal of the materials to And proper disposal to be carried out
2. 1S / 2S system to be Implemented to upkeep the Area

Obv : Poor house keeping observed . Undue materials Stored in the vulnerable area For fire incident

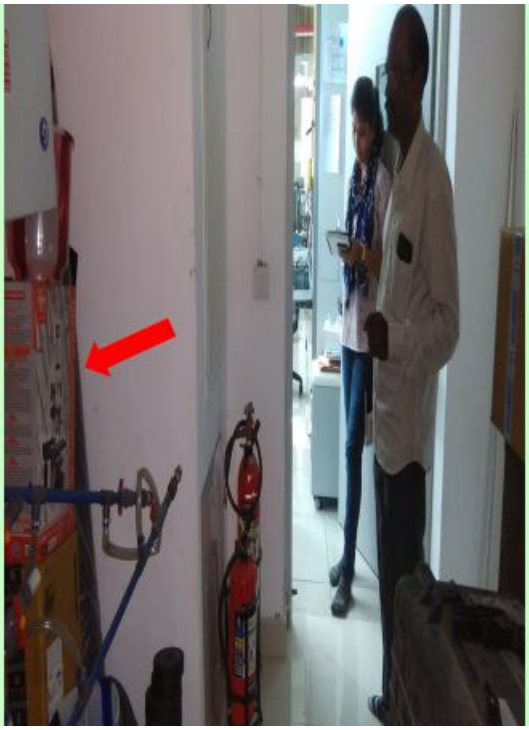
Suggestion :
1. Removal of the materials to And proper disposal to be carried out
2. 1S / 2S system to be Implemented to upkeep the Area

Obv : Poor house keeping observed . Undue materials Stored in the vulnerable area For fire incident

Suggestion :
1. Removal of the materials to And proper disposal to be carried out
2. 1S / 2S system to be Implemented to upkeep the Area

Obv : Poor house keeping observed . Undue materials Stored in the vulnerable area For fire incident

Suggestion :
1. Removal of the materials to And proper disposal to be carried out
2. 1S / 2S system to be Implemented to upkeep the Area



Obv : Poor house keeping observed . Undue materials Stored in the vulnerable area For fire incident

Suggestion :
1. Removal of the materials to And proper disposal to be carried out
2. 1S / 2S system to be Implemented to upkeep the Area

Obv:
Fire extingusher kept inside server room, of obsolete model

Suggestion :
1. It has to be replaced phased manner with recent model having pressure guage to show the limits
2. Fire extingusher shall be kept outside the room
3. Labelling, identification tags are to be provided with the number, test dates

## 12.1 Safety Audit Report

**Safety audit goals**

Audits are normally designed to achieve the following goals

- To provide the auditee with an opportunity to assess its own EOS & H system against standards and identify areas for improvement.
- To determine the conformity of the implemented EOS & H systems with specified requirements and identify areas for improvement.
- To meet regulatory requirements.

**Audit objectives**

Occupational safety and health (EOS & H) audits are conducted

- To carry out a systematic critical appraisal of all potential hazards involving personnel, plant, services and operational methods.
- To ensure that EOS & H system fully satisfy the legal requirements and those of company's written safety policies, objectives and progress.

**Audit methodology**

- Appraisal of audit procedures to the concerned executives.
- Familiarization visit to various sections of the unit.
- Visit to various sections for in- depth study of hazard potential.
- Interaction with various levels of employees.
- Perusal of documents relating to EOS & H.
- Appraisal of major observations to the sr. Officials who are decision makers to improve she system.

**Methodology of audit followed at Healthcare Technology Innovation Centre**

- **Site visit / observation**
- **Brief discussion**
- **Photography**
- **Report preparation**
    - Macro level of findings and suggestions are given in the sections wherever applicable.
    - Micro level of suggestions is given along with the photographs.
    - Location of spots have been assisted by company staff (who accompanied).

# Executive summary of audit report

## Meritorious features of HTIC

- General ambience of the organisation
- The level of participation of employees
- Overall ventilation
- Greenery
- First aid firefighting system / fire alarm system

## Areas with scope for improvement

- There are potential for lot of improvements towards
    - Fire prevention – currently system does not support for evacuation during emergency
    - Energy conservation
    - Pollution prevention
- Electrical audit and fire audit to be carried out separately.
- Continuous surveillance audit for at least every 3 months to assess the status maybe considered.
- Many bench-marking systems to be initiated for fire prevention which are given as follows:
    - HIRA / JSA – hazard identification and risk analysis.
    - ISO 14001: 2015- environmental management system.
    - ISO 45001 – health and safety management system.
- Many programs to be initiated for improvement in the existing systems for accident prevention
    - Standard operating procedures
    - Training
    - Internal audit
- Some programs / campaigns / procedures are to be carried out for betterment and avoiding repetition of accidents.
    - Monitoring measurement program (MMP)
    - 5S Campaign in terms of house keeping
    - Why – why analysis
    - LOTO system for electrical safety
    - Legal training
- Legal requirements relating to the business shall be identified and complied.
- Common documents like site plan, fire hydrant system layout drawings etc., shall be obtained from research park and kept as record.

## Elements of safety – observation and suggestions

### Health and safety policy

The company has formulated a draft level safety and health policy in 2020. The policy is yet to be signed by the director. Once it is revised and will be informed to all.

**Observations and suggestions:**

- Policy covered almost all the requirements relating to EMS and OHS Clauses.
- Policy has to be further made known to all by training, display and other modes of communication like email etc.,
- Training plan has to be included with the salient features of the policy.
- And also, to review the same once in three years and to be made available with all the interested parties including the contractors.
- Awareness training to be imparted about the salient features of the policy to all levels of employees and contractors as well other related interested parties.
- Display of the policy in English and also in local languages to be carried out in predominant places in the plant.
- It has to be reprinted in the visitor's pocket guide also along with the emergency escape route.

### Safety organization

**Observations and suggestions:**

- Currently there is no separate safety function.
- It is suggested to assign the duty of safety to a qualified person for monitoring the safety health and environment issues.

**Employees participation in EHS**

**Observations and suggestions:**

It was evidenced that committees are formed for managing EHS.
Minutes of meetings are available and the decisions taken were found recorded

- Safety committee meetings may be regularly held once in a month and all the members may be required to attend the meeting. Minutes of the meetings may be circulated. Copies of the minutes may also be exhibited in the notice board.
- The safety performance of the unit for the month may be reviewed in the meeting as follows:
    - Details of incidents and discussion.
    - Training programmes conducted.
    - PPE (Personal Protective Equipment) compliance by various departments.
    - Action taken on points raised in the previous meeting.

**Safety manual and rules**

Safety, health and environment (she) manual is required to provide guidelines at every level of personnel for their day-to-day implementation of plants' she programs and for safe operation and maintenance.

**Observations and suggestions:**

Currently, emergency manual and procedures are in place.
EHS manual may be prepared and documented.

**First aid and occupational health**

**Observations and suggestions:**

- boxes of first aid are kept in the facility
- They are to be kept under lock and key under the supervision of the first aid trained personnel.
- Some of the employees to be trained in first aid by the approved organizations like St. Johns ambulance / Indian red cross society
- Further it is suggested to have a tie-up with the nearby hospitals for association in case of illness or emergency
- A baseline medical record to be prepared for the employees working in soldering area.

**Personal protective equipment**

**Observations and suggestions:**

The nose mask used during handling the chemicals is observed to be regular dust mask.
It is suggested to provide an appropriate nose mask suitable to the chemical fumes

**House keeping**

General housekeeping inside the plant is found to be inadequate. Efficient and good housekeeping adds up to the safety standard and also to the quality and productivity. 5s practices are to be practiced inside the premises.

**Observations:**

- Many areas of server room, ups room, gangway and some more places like pantry, machine shop etc., - occupied with unwanted materials
- It was found difficult to move across any area during audit
- Walkways and as well the working areas are accumulated with lot of undue waste materials
- Inadequate housekeeping – observed to be potential for major injuries
- No labelling of chemicals lying on floor.
- Hazardous materials are found in few places.

**Suggestions:**

- 1s / 2s campaign to be adopted to start up the house keeping improvement
- 5s(Seiri/Seiton/Seiso/Seikutse/Shitsuke) campaign is suggested for betterment of house keeping
- Training on 5s to be imparted to employees.
- PEP talks to be included with the need of importance of house keeping

**Machine guarding**

During the field visit it was observed that the portable film cutting machine guarding principle is not well observed, which is potential for finger injury. It has to be covered with a rigid guard.

**Electrical and personal safe guarding**
**Observations and suggestions:**

Electrical safety requires a review since some deviations are observed as follows:

- Many of the electrical panels are open, not provided with insulation mat, not properly earthed, access denied to approach due to poor housekeeping and as well layout.
- Loose cables are found in some areas.
- Potential situation for electrical shock is existing in some areas.

**Suggestions:**

- All rubber mats should be laid with accordance with is 15652.
- Reroute the loose cables.
- Earthing according to is 3043 to be implemented wherever missing.
- The switch boxes in the areas like pantry, chemical storage etc., where the employees operate the switch with wet hands to be provided with ELCB or RCCB to protect from shock.

## Safe operating procedures

**Observations:**

Safe operating procedures (sop) is a vital document required for the safe operation of the unit. Safe operating procedures are written guidelines for procedures and tasks involving recognized hazards. They provide the tools for teaching how to work consistently with a maximum degree of efficiency and safety.

- Currently, some vital SOPs are available like SOP for policy, waste management etc.,
- It is suggested to further develop many missed-out sops like ahu unit's maintenance etc.,

**Fire prevention, protection, fighting system**

Fire prevention system through either hydrant system or portable fire extinguishers depends upon the nature of industry and the potential for fire occurrence are required to be in place.

**Observations and suggestions:**

- Potential for fire is observed in following areas due to housekeeping or due to short-circuit.
    - UPS room
    - Server room
    - Laser cutting area
- Fire extinguishers are inadequately maintained and placed.
- Hydrant points are not accessible.

**Suggestions:**

- Fire extinguishers to be placed in conspicuous, easily reachable location at a height of 750mm.
- Periodical firefighting training to committee members and other employees including contractors are to be continued.
- Sop may be made for servicing, inspecting the fire extinguishers, fire hose box / stations and a separate register may be maintained.

**Emergency preparedness plan**

Emergency preparedness is addressed in the sop of emergency plan and documented for mitigating major emergencies in the plant.

**Observation / suggestion:**

- It is suggested to test the procedure periodically through drills.

**Pollution control measures**

- The management has obtained consent orders from the Tamil Nadu pollution control board under air act and water act, which are valid.
- All prescribed parameters were found to be well within limits. Greenery has been well developed around the plant with trees / shrubs and lawns.

- Legal requirement relating to waste disposal of plastic / e-waste / solid waste are compiled by the support of common facility management.

## Conclusion

Safety audit was conducted on the request of the management. Due consideration has been given for safety of the facility. Safety is also incorporated in systems and procedures. Cross section of the executives and employees interacted by the audit team, are technically competent and keen to improve safety system in their respective areas. The audit team has formulated the recommendations based on their findings and interaction with executives and employees of the concern.

Annexure: photographic representation of observations / suggestions

# APPROVALS & AUTHORISATIONS

## 13. Approvals & Authorisations