

Chapter 6.0

RISK ANALYSIS & DISASTER MANAGEMENT PLAN

6.1 INTRODUCTION

Risk assessment forms an integral part of EIA study. Risk assessment study deals with identifying and evaluating the magnitude of impending risks to which the neighboring population is exposed due to occurrence of accidents involved in the project construction and implementation. This influences in demonstrating the guidelines for preparation of disaster management plan, which will be executed to handle the situation, if any emergency occurs.

A major emergency in works is one, which has the potential to cause injury or loss of life. It may cause extensive damage to the property and serious disruption both inside and outside the works. Depending on its magnitude and escalation potential, it may require the assistance of outside emergency services to handle it effectively. Although the emergency may be caused by a number of different factors viz. unsafe conditions, human error, natural causes, acts of disruption/terrorism, etc.

Emergency/disaster is an undesirable occurrence of events of such magnitude and nature that adversely affect operations, cause loss of human lives and property as well as damage to the environment. Ports and related infrastructure are vulnerable to various kinds of natural and manmade disasters. Examples of natural disaster are flood, cyclone, tsunami, earthquake, lightning, etc., Manmade disasters include fires, explosion, leakage of toxic gases, terrorist activities, sabotage, etc. It is impossible to reasonably forecast the time and nature of disaster, which might strike a common user infrastructure. An effective disaster management plan helps to minimize the losses in terms of human lives, assets and environmental damage and resumes working condition as soon as possible.

Disaster Management Plan (DMP) forms an integral part of any risk assessment and management exercise; any realistic DMP can only be made after proper risk assessment study of the activities and the facilities provided in the installation. Correct assessment and evaluation of the potential hazards, advance meticulous planning for prevention and control, training of personnel, mock drills and liaison with outside services available can minimize losses to the facility's assets, rapidly contain the damage effects and effectively rehabilitate the damage areas.

6.2 APPROACH TO Disaster Management Plan (DMP)

Modern approach to disaster management involves the following two steps;

- Risk Identification
- Risk Evaluation

Risk identification entails:

- Identification of hazardous events in the installation, which can cause loss of capital equipment, loss of operation, threatens health and safety of employees, threaten public health and damage to the environment.
- Identification of risk is important processes & areas, to determine effective risk reduction measures.

Risk evaluation involves calculation of damage potential of the identified hazards with probable damage distances, termed as consequence analysis. Quantitative risk assessment further evaluates the actual risk due to a probable event occurring over a period of time by factoring in the probability of the event occurring, or frequencies of occurrence of the event.

The effect of a hazardous event in atmosphere, and consequent damage in case of accident may depend on:

- Wind speed
- Wind direction
- Atmospheric stability
- Port assets & population exposed in the direction of wind

Action plan depends largely on results of risk assessment data and may include one or more of the following:

- Plan for preventive as well as predictive maintenance.
- Augment facilities for safety, firefighting, medical (both equipment and manpower) as per requirements of risk analysis.
- Evolve emergency handling procedure both onsite and offsite.
- Practice mock drill for ascertaining preparedness for tackling hazards/emergencies at any time of the day.

An important element of mitigation is emergency planning, i.e. recognizing that accidents are possible, assessing the consequences of such accidents and deciding on the emergency procedures, both onsite and offsite, that would need to be implemented in the event of an emergency. Emergency plans are likely to be separate for on-site as well as off-site matters, but they must be consistent with each other, i.e. they must be related to the same assessed emergency conditions. While an on-site plan will always be the responsibility of the works management, different legislation may place the responsibility for the off-site plan elsewhere.

6.3 OBJECTIVES

The overall objectives of the emergency plan are to:

- Localize the emergency and, if possible eliminate it.
- Minimize the effects of the accidents on people and property.

Elimination will require prompt action by operators and works emergency staff using, for example, fire-fighting equipment, etc.

Minimizing the effects may include rescue, first aid, evacuation, rehabilitation and giving information promptly to people living nearby.

6.4 IDENTIFICATION AND ASSESSMENT OF HAZARDS

Storms/floods, inventory fire, cyclones and tsunamis are potential disasters for the port. Their likelihood of occurrence and the resulting risk of damage have been incorporated into the design analysis of the Port. Disaster preparedness plans is summarized in Table 6.1.

Table 6.1: Summary of the Disaster Preparedness Plans

Disaster	Description	Response Plan	Stages
Storms	Depending on the magnitude the storms can partially and temporarily splash over the deck of the jetty, thereby affecting its operation	<ul style="list-style-type: none"> • Deck level design based on storm surge history of the location • Preparedness Plan • Secure insurance coverage. 	Alert, Response Recovery
Earthquake	Proposed site is not in an earthquake prone zone (Zone III Low intensity zone, as per IS 1893 (Part 1): 2002)). Hence, probability of occurrence of earthquake of significant intensity are very rare..	Building and Construction has adhered to/will adhere to relevant IS standards for structural design and construction.	Planning, Response, Damage Assessment and Recovery.
Fire	Local fire spots in the coal inventory can cue firefighting operations in the terminal.	<ul style="list-style-type: none"> • Fire Prevention and Preparedness Plan • Install firefighting equipment • Electrical work will be done by certified electrician. • Provide Insurance coverage. 	Response, Planning Fire Drills, Damage Assessment.
Cyclone	High winds and coupled torrential rains may disrupt operations of the terminal	<ul style="list-style-type: none"> • Cyclone preparedness plan 	Alert, Response Recovery

	temporarily		
Tsunami	High waves may disrupt operations of the terminal temporarily	<ul style="list-style-type: none"> Tsunami preparedness plan 	Alert, Response Recovery
Medical	Medical emergencies can occur at any moment and therefore requires a quick and coordinated effort to respond to the need	<ul style="list-style-type: none"> Medical Emergency Plan First aid equipment and trained staff 	Response, Recovery

The proposed development will take into consideration all the potential disasters and plan accordingly to mitigate any negative effects of these disasters on the project infrastructure.

6.4.1 Coal Storage and Fire Risk

The terminal stockpiles significant quantity of coal at any point of time. Coal is not a hazardous commodity as per MSIHC Rules, 1989.

The coal in the stack catches fire only when the coal contains high percentage of Sulphur stored for longer period. The SWPL terminal mainly handles coke and thermal coal, so there is very less chance of catching fire. In any case, maximum dwell time of the coal at the terminal is not in excess of 10 days. So chance of fire further reduces.

Fires in coal stock pile are unlikely, the same do not occur in the Terminal based on experience of several years. Generally, if any fire starts in the stockpile, it will start as localised hot-spots which are easy to spot and can be immediately doused using fire water monitors.

The coal stacks are covered with waterproof sheets and protected at the sites from collapse by crash barriers. Fire, if any, in the covered stockpile can not remain undetected for more than 15 to 20 minutes.

The firefighting arrangements in the SWPL Terminal comprise TAC conforming/approved annular fire water hydrant system provided with fire and

foam monitors, completely capable of containing any kind of fire within the battery limit of the Terminal. No offsite spread of fire is likely from the terminal.

A 5000 MT double integrity cup-in-tank type ammonia storage tank of M/s Zuari Industries Ltd is located south of the Adani Mormugoa Port Terminal about 500 m from the coal stack yards of the SWPL Terminal. The distance is too large for a coal stack fire to have any kind of risk on the ammonia tank. The POL bulk tanks of IOCL, HPCL and the three Phosphoric acid tanks of Zuari Industries Ltd. south of the fishing jetty are at a distance of about 1.85 km from the SWPL Terminal.

6.5 DISASTER CONTROL/RESPONSE PLAN

Disaster may arrive without any warning, unexpectedly in spite of all precautions and preventive measures taken. However, an efficient control/response plan can minimize the losses in terms of property, human lives and damage to the environment can be the minimum.

6.5.1 Emergency Plan for Natural Disasters

Due to its location (west coast), the terminal is not likely to be exposed to natural disasters of cyclones and tsunami. However, the operations will have preparedness for any unlikely event of natural origin.

Both the disasters give a short to very short notice, have potential to cause sudden and widespread damage to the Port infrastructure and the population beyond it, and make recover efforts difficult due to total collapse of administrative and welfare machinery.

It is essential for DMPs of a Terminal to have special provision for meeting with the challenges of cyclones and tsunamis. Since they do not give a long lead warning, pre-meditate and pre-rehearsed action between the first intimation and the onset of the event becomes crucial for effectiveness. Since both events involve mass evacuation and widespread public notice, DMPs for cyclone and tsunami can ill-afford to be complicated.

(a) Emergency measures during a Cyclone

IMD usually gives a 24 to 36 hours early warning on the onset of cyclone right from the time a depression starts forming in the Bay of Bengal or Arabian Sea. Aided by weather satellite, path of a cyclone can be traced almost in real time. The path of the cyclone can be reliably predicted and early warning/alerts can be given 10 to 12 hours prior to the hit of the cyclone. Table 6.2 gives the actions to be taken before, during and after a cyclone by the Port authorities.

Table 6.2: Actions to be taken in Cyclone Emergency

Sr.	Action	Responsibility
Actions before the Cyclone		
1.	The Control Room (CR) will depute a Nodal Person to be on standby for receiving cyclone alert messages from MPT, DG Shipping, DG Lighthouse and Lightships, and Distt. Collector, as also from AIR and DD news telecasts and keep the CR In-charge abreast of the situation.	Marine Control Room (MCR) In-charge
2.	The Terminal In-charge will start taking Cyclone Action 12 hours before the forecast time of hit. He will issue cyclone warning in the terminal by asking the Nodal Person to play out warning on the Terminal paging channel, and individual call to all the HODs including Port security at the gate complex to be on high alert for further instructions.	Terminal In-charge Nodal Person in MCR.
3.	The Terminal In-charge will order implementation of Port shutdown and evacuation 8 hours before the time of hit. Following actions will be taken: a. Cargo handling operation on the Port backup (bulk cargo area and on the berths) will be stopped. All machinery will be folded back, retracted, fixed, moored and close-secured. b. All material handling on the berths will be stopped. Outriggers of the cranes will be lifted	Terminal In-charge Dry Cargo Department Dry Cargo Department

Sr.	Action	Responsibility
	<p>and secured, booms and hoists retracted and secured in position, and the cranes to be locked and tie down with tie down hooks provided on the berths.</p> <p>c. All vessels berthed on the Terminal will be unmoored and set to sail to the anchorage area assisted by tugs.</p> <p>d. All loose material stored on the Terminal will be covered by tarpaulin and secured on the ground through grommets to the hooks provided on the edges of the hard stands.</p> <p>e. The ventilators of the covered godowns will be opened to provide cross movement of cyclonic winds.</p> <p>f. Terminal In-charge will ask the HOD through the Nodal Person to relieve all the employees on duty except few who will be needed for final shutdown.</p> <p>g. A jeep with battery power loudspeakers will be pressed to announce Cyclone Warning in local language on the nearby area as instructed by the MPT.</p>	<p>MCR Traffic and VTMS In-charge, Tug masters</p> <p>Dry Cargo Department</p> <p>Transport and Materials Coordinator</p> <p>Transport and Materials Coordinator</p> <p>Terminal In-charge, Nodal Person, HODs.</p>
4.	<p>The Terminal In-charge will order complete evacuation of the Terminal including the HODs 4 hours before the time of hit.</p> <p>Following actions will be taken:</p> <p>i. Security patrol party will announce evacuation in all the buildings by megaphone announcements.</p> <p>ii. The MCR will be closed down systematically</p>	<p>Terminal In-charge, Nodal Person</p> <p>Port security</p> <p>Terminal In-</p>

Sr.	Action	Responsibility
	<p>with all antennae lowered and secured, all equipment closed and powered off. All vessels at the anchorage will be asked to switch to VHS and UVHS channels as primary communication and maintain radio silence unless absolutely essential. MCR Communication will be put to roving mode. Communications will be handed over to the radio officer away from Vasco.</p> <p>iii. Port closure and security arrangements will be briefly communicated to the District Crisis Group Centre by the Port In-charge through the hotline.</p>	<p>charge, MCR In-charge</p> <p>Terminal In-charge</p>
Actions during the Cyclone		
1.	Terminal In-charge will be in contact with the MPT personnel and District Crisis Group Centre on need basis through his VHS radio set from his residence or City office.	Terminal In-charge
Actions after the Cyclone		
1.	Terminal In-charge will order assembly of all HODs at his residence after winds velocities have come down below 50 km/hr.	Terminal In-charge, HODs
2.	<p>Terminal In-charge will inspect damage in the Terminal personally along with HODs and verbally instruct corrective and remedial measures to be taken.</p> <p>Following actions will be taken:</p> <p>a. The MCR will be reopened and all communication and navigation equipment restarted, calibrated and synchronised.</p> <p>b. Vessel stationed at anchored will be supplied with necessary supplies and spares if required</p>	<p>Terminal In-charge, HODs</p> <p>MCR In-charge</p> <p>Harbour master</p>

Sr.	Action	Responsibility
	<p>by Port supply and pilot boats. Any medical causality will be rescued and hospitalized if necessary.</p> <p>c. All debris and wasted material spilled due to wind and rain will be collected, checked for contamination, and disposed off in a well-designed pit in the Terminal premises.</p> <p>d. Damage to structural work of the Terminal, namely the cranes and other tall material handling structures (conveyor galleries, watch towers, building glasses) will be inspected and necessary repairs and cleaning will be undertaken. Structures whose stability is under question will be cordoned off till they are inspected in detail and cleared for general use.</p> <p>e. Water supply will be tested for portability, and other sanitary services resumed after suitable inspection. Water accumulated due to heavy rains will be drained and area dried, sprayed with disinfectant, etc.</p> <p>f. Status of Terminal will be communicated to the District Crisis Group Centre by the Port In-charge through the hotline</p>	<p>Transport and Materials Coordinator</p> <p>Engineering department</p> <p>Communications and Medical Coordinator</p> <p>Terminal In-charge.</p>
3.	<p>After the Terminal housekeeping has been brought to order, all machineries will be sequentially tested. Terminal operations will be resumed with berthing of cargo handling vessels</p>	<p>Terminal In-charge.</p>
4.	<p>Terminal medical, logistics, communication and personnel facilities will be suitably extended to the Crisis Group Centre Team the leadership of the Distt. Collector for any further relief work as desired by the local and distt. administration.</p>	<p>Terminal In-charge.</p>

(b) Emergency measures during a Tsunami

Early warning for a tsunami can be as short as one hour. Tsunami can be predicted by a network of seismic detection centers installed by the bordering

nations after the December 2004 tsunami, as well as deep sea telemeterd buoys placed by the MoES. Tsunami warning will be communicated to the Terminal MCR by the District Crisis Group Centre by telephone/emergency hotline.

Rapid action after the alert is critical to effective tsunami response. Unlike cyclone, tsunami is not accompanied by tell-tale disturbed weather and high winds, therefore Port must effectively communicate and elicit urgent action in this regard. Table 6.3 gives the actions to be taken in a Tsunami emergency.

Table 6.3: Actions to be taken in Tsunami Emergency

Sr.	Action	Responsibility
a. Actions before the Tsunami		
1.	The MCR will initiate high–intensity emergency tsunami warning through all communications channel including Terminal paging channel, and individual call to all the HODs, including Terminal security at the gate complex with clear instruction to shut down all operations possible within 20 minutes, and move as far as possible from the sea front using any means of transportation available, including running away.	MCR In-charge
2.	<p>The MCR In-charge will carry out the following understanding authorization of the Terminal In-charge..</p> <p>Following actions will be taken:</p> <ul style="list-style-type: none"> a. All cargo handling operation on the Terminal and backup will be stopped immediately. All machinery will be folded back, retracted, fixed, moored and close-secured. Outriggers of the cranes will be lifted and secured, booms and hoists retracted and secured in position, and the cranes to be locked and tide down with tie down hooks provided on the berths. b. Mooring ropes of all vessels berthed on the Terminal will be slackened. Vessels will be asked to be on full power for any during-tsunami power assists. Tugs will be pressed to turn and send off any inbound vessel in the 	<p>MCR In-charge</p> <p>Dry Cargo Department</p> <p>MCR Traffic and VTMS In-charge, Harbour master, Tug masters</p>

Sr.	Action	Responsibility
	<p>channel. All vessels in the anchorage will be communicated tsunami alert. All tugs and other MPT Port flotilla near the Terminal berth will be securely moored to the berths in the best wave shadow part of the berths.</p> <p>c. All HODs will ensure rapid and complete evacuation of the Port.</p> <p>d. MCR will be manned and operational with essential staff for communication and coordination.</p> <p>e. Decision on electrical shut down will be taken by the MCR In-charge after consultation with the Port In-charge depending on the size of the Tsunami waves predicted and communicated.</p>	<p>Dry Cargo Department</p> <p>HODs.</p>
b. Actions after Tsunami		
1.	<p>Terminal In-charge will resume office within minutes of waves subsiding to below deck height. He will inspect damage in the Terminal personally along with relevant HODs and verbally instruct corrective and remedial measures to be taken.</p> <p>Following actions will be taken:</p> <p>a. Vessels at the berths will be immediately attended for evacuation of any medical emergency.</p> <p>b. All debris and wasted material floated over dye to wave hit will be collected, checked for contamination, and disposed off in a well-designed pit in the Terminal premises.</p> <p>c. Damage to civil and structural work of the Terminal, namely the berths, cranes, etc. will be inspected and necessary repairs and cleaning will be undertaken. Structures whose stability is under question will be cordoned off till they are inspected in detail and cleared for general use.</p>	<p>Terminal In-charge, HODs</p> <p>MCR In-charge, Harbour master, Tug masters, Communication and Medical Coordinator</p> <p>Dry Cargo Department</p> <p>Engineering department</p>

Sr.	Action	Responsibility
	<p>d. Water supply will be tested for portability, and other sanitary services resumed after suitable inspection. Water accumulated due to wave hit will be drained and area dried, sprayed with disinfectant, etc.</p> <p>e. Status of Terminal will be communicated to the District Crisis Group Centre by the Terminal In-charge through the hotline</p>	<p>Communications and Medical Coordinator</p> <p>Terminal In-charge</p>
2.	<p>After the Terminal housekeeping has been brought to order, all machineries will be sequentially tested. Port operations will be resumed after starting the unloading and stacking equipment.</p>	Terminal In-charge.
3.	<p>Port medical, logistics, communication and personnel facilities will be suitably extended to the Crisis Group Centre Team the leadership of the Distt. Collector for any further relief work as desired by the local and distt. administration.</p>	Terminal In-charge.

6.5.2 Medical Emergency Plan

The proposed development plan is to implement a medical emergency plan. A medical emergency is an injury or illness from pre-existing conditions or from any operational cause that poses an immediate threat to a person's life or long term health. These emergencies may require assistance from another person, who should ideally be suitably qualified to do so, although some of these emergencies can be dealt with by the victim themselves. Dependent on the severity of the emergency, and the quality of any treatment given, it may require the involvement of multiple levels of care, from a first-aider to an emergency physician through to specialist surgeons.

Purpose of the Plan

The primary objective of the medical response plan is to:

- Establish the coordinating mechanism necessary to respond to a health situation and to implement basic first aid treatment where applicable.

- Develop and implement a coordinating mechanism necessary to secure appropriate emergency transportation to a recognized health institution.

Basic First Aid

The basic first aid treatment in the event of a medical emergency should be made available. First Aid is the provision of limited care for an illness or injury, which is provided, usually by a certified person, to a sick or injured patient until definitive medical treatment can be accessed. It generally consists of series of simple, sometimes lifesaving, medical techniques, that an individual, either with or without formal medical training, can be trained to perform with minimal equipment. This equipment usually involves the medical supplies commonly found in a first aid kit.

Transportation of Patient

Assessing the condition of the person/s, the person/s must be transported to a recognized health institution for further treatment as quickly as possible to the nearest health institution at Vasco or Panaji where professional doctors and nurses are available for 24 hours.

6.6 TRAINING AND DEVELOPMENT

Risks and hazards abound in our society and therefore the proposed development is no exception. The Emergency Committee will develop a training and development program. This program will cover basic areas designed to minimize and prevent injury and illness where possible. This program will not be required to divulge in general or in details about the many risks and hazards that exist or affect the project.

Training is the field concerned with workplace learning to improve performance. Such training can be generally categorized as *on-the-job* or *off-the-job*. On-the-job describes training that is given in a normal working situation, using the actual tools, equipment, documents or materials that they will use when fully trained. On-the-job training is usually most effective for vocational work. Off-the-job training takes place away from normal work situation which means that the

employee is not regarded as productive worker when training is taking place. An advantage of off-the-job training is that it allows people to get away from work and totally concentrate on the training being given. This is most effective for training concepts and ideas.

(a) Storm Preparedness Plan

Storms caused by heavy rains/Cyclone can cause severe property damage and flooding, especially considering the project environment. Moreover, the restoration time is virtually unknown with these types of sustained damages. With this in mind, the EM Cell of the Terminal will carry out training in the form of drills to fine-tune and sort out the preparation process. These drills are important in accessing the integrity and functionality of the preparedness plan.

(b) Fire Prevention and Response Plan

Fire outbreaks are dangerous if not contained and extinguished in time. Time is of the essence when dealing with fires. The EM Cell will ensure that the several persons chosen from all departments are trained to fight a fire. These employees will be termed as essential employees. Firefighting trained employees will be termed as essential employees. A list of firefighters will be displayed on Terminal gate. It will be ensured that three Firefighting trained essential employees are rostered in every shift of Terminal operation

(c) Medical Emergency

Effective life-saving first aid requires hands-on training by experts, especially where it relates to potentially fatal illnesses and injuries, such as those that require Cardiopulmonary Resuscitation (CPR), as the procedures may be invasive, and carry a risk of further injury to the patient. First aid training will be provided to the selected employees from every department including security. These employees will be termed as essential employees. A list of first aiders will be displayed on Terminal gate. It will be ensured that one First Aid trained essential employee is rostered in every shift of Terminal operation.

6.7 COMPONENTS OF DISASTER MANAGEMENT PLAN (DMP)

An onsite emergency is one, which is having negligible effects outside the Terminal premises and can primarily be controlled by internal facilities and resources available. Some help may be required from external agencies or local authorities. Absence of any storage of hazardous commodities within the Terminal will ensure that hazard consequences will be well within the boundary, which can be easily mitigated by following the Onsite DMP. The existing Terminal has an onsite emergency plan which has been reviewed for the proposed capacity enhancement.

Offsite emergency affecting the neighboring areas and population outside the Terminal premises, requiring substantial contribution from local authorities and institutions like police, civil defense, state hospital and civil administration in addition to state fire services, etc. is not required for the type and magnitude of operation of the Terminal. The Terminal will take part in the overall emergency preparedness plan of the MPT for natural disaster of large magnitude such as tsunami and cyclone as instructed by MPT and the local civil administration.

6.7.1 Onsite Disaster Management Plan (DMP)

The section gives an outline of the DMP in implementation at the Terminal. Details that are part of the Onsite DMP are:

- Name and address of the person furnishing the information.
- Key personnel of the Organization and responsibilities assigned to them in case of an emergency.
- Outside Organization if involved in assisting during an onsite emergency:
 - Type of accidents
 - Responsibility assigned.
- Details of liaison arrangement between the Organizations.
- Information on the preliminary hazard analysis:
 - Type of accidents.
 - System elements or events that can lead to a major accident.
 - Hazards.

- Safety relevant components.
- Details about the site:
 - Location of dangerous substances.
 - Seat of key personnel.
 - Emergency control room.
- Likely dangers to the Terminal
- Enumerate effects of
 - Stress and strain caused during normal operation.
- Details regarding
 - Warning, alarm, safety and security systems.
 - Alarm and hazard control plans in the line with disaster control and hazard control planning, ensuring the necessary technical and organizational precautions.
 - Reliable measuring instruments, control units and servicing of such equipments.
 - Precautions in designing of the foundations and load bearing parts of the building.
 - Continuous surveillance of operations.
 - Maintenance and repair work according to the generally recognized rules of good engineering practices.
- Details of communication facilities available during emergency and those required for an offsite emergency.
- Details of firefighting and other facilities available and those required for an offsite emergency.
- Details of first aid and hospital services available and its adequacy.

6.7.2 Key Personnel and Responsibilities in Event of Emergency

It is to be understood that the first few minutes after the start of an incident are most vital in prevention of escalation. Therefore, the personnel available at the site on round-the-clock will play an important role. Some of them will be the identified “Key Persons”. Since the Terminal facilities are to be operated by highly skilled officers/operators with the help of “Terminal In-Charge/Dy. Terminal

Manager”, in the emergency he will also act as “Chief Controller” for incidence and he will nominate different “Emergency Coordinators” to control emergency situation.

The role of various coordinators is to assess the situation from time-to-time, take appropriate decisions in consultation with the “Chief Controller” and to provide timely resources to the “Key Persons” to fight the emergency. “Key Persons” as far as is possible are available during shift on a round the clock basis. An organogram of the officers at the liquid cargo operations during emergency is presented as Figure 6.1.

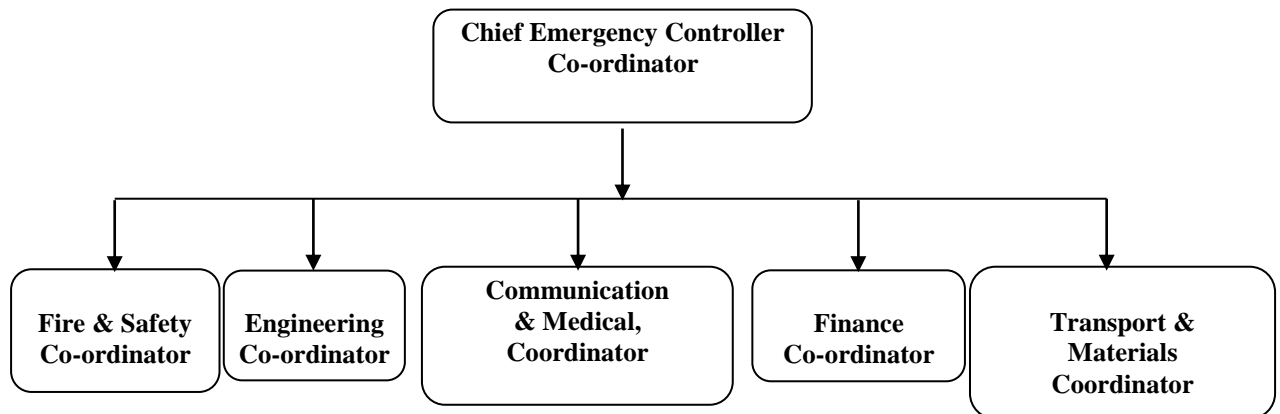


Figure 6.1: Organization Chart of Onsite Emergency Management Team

Key Personnel

The senior most officer present in the Terminal at the time of the incident will be the designated the “Chief Emergency Controller”.

Duties and Responsibilities of Key Persons and Coordinators

a. Chief Emergency Controller

He will report at the “Emergency Control Centre” and will assume overall responsibility of the works and its personnel. His duties will be:

- To assess the magnitude of the situation and decide whether a major emergency exists or is likely to develop, requiring external assistance.
- To inform district emergency chief (i.e. District Collector).

- To exercise direct operational control over areas other than those affected.
- Assess the magnitude of the situation and decide if staff needs to be evacuated from the assembly points to identified safe places.
- To continuously review and direct shutting down of Port sections and operations in consultation with the other key personnel.
- To liaise with senior officials of Police, Fire Brigade, Medical and local administration, and pass on information on possible effects on the surrounding areas, outside the factory premises.
- To liaise with various coordinators to ensure casualties are receiving adequate attention and traffic control movement within the work is well regulated.
- To arrange for a log of the emergency to be maintained in the Emergency Control Centre.
- To release authorized information to press through the Media Coordinator.
- To control rehabilitation of the affected persons and the affected areas after the emergency.

b. Fire and Safety Coordinator

The main responsibilities of Fire and Safety Coordinator will be:

- To immediately take charge of all firefighting operations upon sounding of the alarm.
- To guide the firefighting team and provide logistics support for effectively combating the fire.
- To barricade the area at appropriate locations in order to prevent the movement of vehicular traffic.
- To operate the mutual aid scheme and call for additional external help in firefighting.
- To organize relieving groups for firefighting.
- To inform the Chief Controller and give “All Clear” signal when the fire emergency is over.

c. Engineering Coordinator

Responsibilities of Engineering Coordinator will be:

- To liaise with chief controller and various other Coordinators
- To stop/regulate all operations within the jetty
- To switch off main Instrument Control Panel
- To stop all engineering works and instruct contractors and their employees to leave the area
- To assess the water level in the fire water reservoir and supply engineering tools, fire-fighting materials and equipments to various Coordinators
- To start all pumps to replenish water and switch on the fire engine for hot standby.
- To liaise with transport coordinator to arrange for external water supply and fuel for generators/engines.
- To attend mechanical fault/failure of fire water pump and facilities.
- To assess situation in consultation with chief controller and if required, start/provide electric supply to certain areas/points.

d. Communication and Medical Coordinator

Duties and responsibilities of the Communication and Medical Coordinator will be:

- To liaise with Chief Controller and various other Coordinator.
- To take over entire communication system (external as well as internal).
- To arrange to distribute Walkie-Talkie/ VHF sets to various other coordinators.
- To inform police, fire brigade, civil authorities, hospitals & request for speedy help.
- To arrange for vehicles/ambulance for evacuation and casualties.
- To set and activate first aid center and arrange to mobilize medical team
- Arrange to procure required drugs and appliances.
- Arrange to transfer casualties to other hospitals/first aid center.
- To maintain a register for casualties (type of injury, number, hospitalization)

- To inform families of the casualties.

e. Finance Coordinator

The Asst. Manager (Finance) or his nominee:

- Release finances (cash/cheques etc.) as directed by the Chief Controller.
- Assist Material Coordinator in enactment of emergency procurement procedures and by deputing his staff.
- To liaise with Insurance Company personnel.

f. Transport and Materials Coordinator

Duties and responsibilities of Transport and Materials Coordinator will be:

- To liaise with Chief Controller and other Coordinators.
- To arrange issue of materials from warehouse round-the-clock during the emergency period.
- To arrange emergency procurements from local dealers or from neighboring industries.
- To arrange transportation of materials from warehouse to the site in consultation with other Coordinators.
- To arrange for police, help for control of traffic & public outside the affected area of the jetty premises.
- To arrange for entry for authorized personnel/vehicles only.
- To mobilize necessary vehicles as required by various Coordinators
- To arrange for regulating the traffic inside the Port area.
- To arrange to evacuate all unnecessary personnel from the Port and arrange for vehicles/ambulance for evacuation and casualties.
- To control and disperse crowd from the scene of fire.
- To mobilize all the firefighting spare equipment/ refills/hosepipes/trolleys etc. form the neighboring units, if required.
- To monitor stock of all firefighting equipments and replenish them as and when required.

6.7.3 Communication Facilities for Emergency

The following are the communication facilities are provided at the Terminal for emergency;

- One 3.0 km range Electric Siren to announce nature of emergency.
- For inter-location communications requisite number of P&T telephones will be provided including tie lines and hot lines for communication with district emergency services, authorities, hospitals, etc.
- The inter-terminal paging and public address system will have the following features:
 - All call with answer back
 - Group call with answer back
 - Interfacing with walkie-talkies
 - Field call stations
- Walkie-Talkies and mobile phones will be deployed for mobile-to-mobile and mobile-to-stationary communication.
- A broad communication diagram outlining interactions between various role players will be set up and rehearsed.

6.7.4 Details of First Aid and Hospital Services

Fully stocked first aid boxes shall be placed at strategic locations. A visiting medical practitioner from Vasco will be made available on call in case of emergency duty. The onsite medical center will be equipped with facilities for treatment of mechanical injuries, burn injuries and electric shock. An ambulance will be available in the port round-the-clock.

Personal Protective Equipment (PPE)

The following PPEs and other emergency handling equipment are stocked to be issued to the trained key personnel during an emergency.

- Fire proximity suit
- Fire entry suit
- Self-contained Breathing Apparatus with one spare cylinder (30 minutes)
- Water gel blanket

- Safety helmet
- Rubber hand gloves for use in electrical jobs
- Power tool

The quantities available will be sufficient to meet the needs of emergency handling personnel.

6.7.5 Rehearsal and Testing

'Fire Drills' are carried out periodically to test out the laid down system and facilities. The emergency handlers also "act out" their individual roles in accordance with the emergency procedures laid down to demonstrate that the entire emergency response system can perform efficiently and accurately. Mock drills for emergency are conducted twice a year.

6.7.6 Offsite Action in Event of Emergency

SWPL participates in the offsite DMP coordinated by the MPT and following external agencies, whose responsibilities are listed as follows:

- Police
- Fire Brigade of Directorate of Fire and Emergency Services, Goa
- Medical Services
- Technical Agencies
- Rehabilitation Agencies
- Electricity Board

Responsibilities of the Services

1. Police

- Control traffic & mob by cordoning off the area.
- Arrange for evacuation of people on advice from the Site Controller/District Collector.
- Broadcast/communicate through public address systems to the community on advice from the District/Sub Collector.
- Inform relatives about details of injured and casualties.

2. Fire Brigade

- Fighting fire & preventing its spread.
- Rescue & salvage operation.

3. Medical/Ambulance

- First Aid to the injured persons.
- Shifting critically injured patients to the hospitals at Vasco, Chicalim and Panaji
- Providing medical treatment.

4. Technical/Statutory Bodies

The body constitutes Factory Inspectorate, Pollution Control Board, and Technical Experts from large industries, such as Zuari Agro, etc.

- Provide all technical information to the emergency services, as required.
- Investigate the cause of the disaster.

5. Rehabilitation

- Arrange for evacuation of persons to nominated rescue center and arrange for their food, medical and hygienic requirements.
- Coordinating with the Insurance Companies for prompt disbursement of compensation to the affected persons.
- Maintain communication channels of nearby industries like telephone; telex etc. in perfect working condition.

6. Electricity Board

- To regulate/re-connect the power supply to the Terminal if specifically asked for by the Terminal.