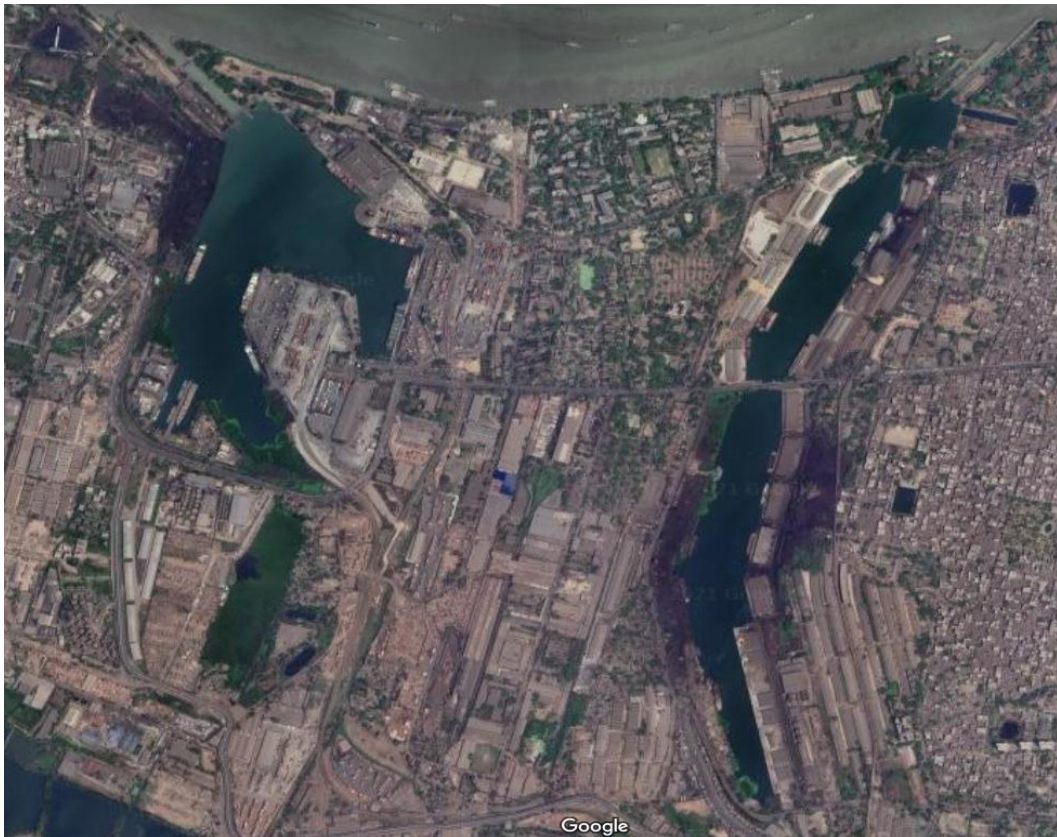


SYAMA PRASAD MOOKERJEE PORT KOLKATA DOCK SYSTEM



DISASTER MANAGEMENT PLAN (DMP)

**By
(Report No: R&D-24019-RR)**

IRCLASS
Indian Register of Shipping

June - 2025

This is to state that at the request of Syama Prasad Mookerjee Port (SMP), the undersigned surveyors have prepared Disaster Management Plan.

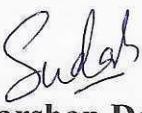
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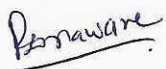
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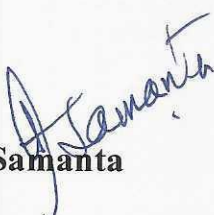

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01	Final report issued to SMP-KDS	26.06.2025
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ABBREVIATIONS

CBRN	Chemical, Biological, Radiological and Nuclear
CEC	Chief Emergency Controller
CMO	Chief Medical Officer
CIC	Chief Incident Controller
CISF	Central Industry Security Force
CMG	Crisis Management Group
CWC	Cyclone Warning Centers
DCA	District Coordinating Authority
DDMA	District Disaster Management Authority
DISH	Director of Industrial Safety and Health
DMP	Disaster Management Plan
EAP	Emergency Action Plan
EOC	Emergency Operation Centre
ERDMP	Emergency Response Disaster Management Plan
HDC	Haldia Dock Complex
IDRN	Indian Disaster Resource Network
INCOIS	Indian National Centre for Ocean Information Services
IMD	India Meteorological Department
IMO	International Maritime Organization
IRT	Incident Response Team
MMD	Mercantile Marine Department
MoEF & CC	Ministry of Environment & Forest & Climate Change
MRCC	Maritime Rescue Coordination Centre
MSDS	Materials Safety Data Sheet
NDMA	National Disaster Management Authority
NIDM	National Institute of Disaster Management
NOSDCP	National Oil Spill Disaster Contingency Plan
OH&S	Occupational Health and Safety
OSRO	Oil Spill Response Organization
PESO	Petroleum and Explosives Safety Organisation
PNGRB	Petroleum and Natural Gas Regulatory Board
PRO	Public Relation Officer
RMC	Regional Meteorological Centre
SEC	State Executive Committee
SIC	Site Incident Controller
SMP	Syama Prasad Mookerjee Port
SDMA	State Disaster Management Authority
WBPCB	West Bengal Pollution Control Board
WBSDMA	West Bengal State Disaster Management Authority

1. EXECUTIVE SUMMARY

INTRODUCTION

The Disaster Management Plan (DMP) for Kolkata Dock System (KDS) of Syama Prasad Mookerjee Port (SMP), Kolkata, developed by the Indian Register of Shipping (IRS), provides a comprehensive strategy for managing Natural and Man-made disasters. It ensures the safety of personnel, environmental preservation, asset protection, and business continuity. The DMP aligns with the National Disaster Management Plan (NDMP) 2019 and Guidelines for Preparation of Disaster Management Plan by NDMA (2024).

Key Objectives

The primary objectives of this DMP are:

- Enable rapid emergency response to minimize disaster impact.
- Protect human lives, port assets, and the surrounding environment.
- Ensure early restoration of normal port operations.
- Facilitate effective coordination with civic administrations during off-site emergencies.
- Build a safer, disaster-resilient port through proactive, technology-driven strategies involving all stakeholders.

PORT PROFILE AND RISK ASSESSMENT

KDS is a riverine port located on the bank of the Hooghly River. KDS consists of Kidderpore Dock (KPD), Netaji Subhash Dock (NSD) and Budge-Budge Oil jetties. It handles multipurpose cargoes and serves as a vital economic gateway for the northeastern region of India, leveraging its advantageous location and connectivity.

The port's risk profile includes vulnerability to both natural disasters such as cyclone, flood, earthquake and tsunami, and man-made incidents like oil/chemical spills, fire and terrorist attacks. Disasters are classified as:

- **Level (0)** – Normal
- **Level (1)** – Incident manageable at the port level with internal resources.
- **Level (2)** – Incident requires external assistance.
- **Level (3)** – Major disaster requiring national-level intervention.

Cyclone, flood and chemical disasters are high-priority risks based on the Risk Assessment.

ROLES AND RESPONSIBILITIES

The DMP delineates a clear organizational structure for disaster management:

- **Crisis Management Group (CMG):** Provides strategic guidance, ensures preparedness, and coordinates with external agencies.
- **Incident Response Team (IRT):** Executes on-ground emergency actions such as rescue, evacuation, containment, and incident recovery.

Their defined roles ensure clarity in execution and rapid actions during emergencies.

Both teams work in coordination with key agencies like WBSDMA, DDMA–Kolkata/South-24 Parganas, Indian Coast Guard, Indian Navy, CISF, PESO, local administration, police, and environmental bodies like WBPCB.

PREPAREDNESS MEASURES

- **Emergency Operation Centre (EOC):** Serves as the central hub for command, control and communication during emergencies.
- **Training:** Conducts regular training programs for personnel in First Aid, Firefighting, and Oil Spill response.
- **Mock Drill:** Executes periodic mock drills to test emergency preparedness. These drills ensure personnel familiarity with roles, identify gaps, and drive plan improvements.
- **Communication Strategy:** Effective communication systems for coordination (VHF, SATCOM, Public Address Systems, Emergency sirens).

RESPONSE STRATEGIES

Activation of Emergency Operation centre and Mobilization of resources.

Potential accidental scenarios have been identified in accordance with the risk assessment of the port. The action flowchart and action plan for each scenario has been prepared in accordance with the Incident Response System of NDMA.

DISASTER RISK REDUCTION (DRR) AND MITIGATION

Thematic Areas and Hazard-Specific Measures

This section emphasizes on DRR across key themes: Hazard Mapping, Inter-agency Coordination, Structural & Non-structural Measures, Capacity Development, and Climate Change Adaptation. Detailed hazard-specific prevention and mitigation measures include:

- **Chemical Disaster Preparedness:** Procedures for chemical handling, availability of MSDS, regular inspection of pipelines and firefighting equipment, gas detection systems, decontamination units, chemical suits, and liaison with PESO and WBPCB.
- **Oil and Chemical Spill Control:** Trained teams ready to activate the Oil Spill Contingency Plan (OSCP), deployment of spill response kits, containment booms, and skimmers.
- **Fire Hazard Mitigation:** Fire detection and suppression systems, fire audits, hydrants, extinguishers, designated zones, and trained personnel.
- **Cyclone and Wind:** Cyclone tracking, shelter identification, securing movable assets, training programs on cyclone specific emergencies, and structural reinforcements.
- **Flood Management:** Tide monitoring, drainage maintenance, dewatering arrangements, flood warnings, and resource essential stockpiling (food, water, medicine).
- **Earthquake Preparedness:** Compliance with seismic codes, retrofitting of infrastructure, rescue training, and emergency resource allocation.
- **Tsunami Readiness:** Alerts via INCOIS, designated shelters, evacuation plans, and coordination with coastal authorities.

- **Bomb Threat:** Surveillance System (CCTV), access controls, CISF Coordination, local police, ISPS compliance for security response
- **War and Terrorism:** Ensure Strict compliance to ISPS, strengthen wall perimeter and access control system, Coordinate with State and national security agencies establish procedure for blackout activation.

Mainstreaming Disaster Risk Reduction (DRR)

Structural Measures: Focus on building resilient infrastructure:

- **Infrastructure Strengthening:** Seismically safe design/retrofitting of jetties, office buildings; reinforcement of jetties, berths, seawalls, tsunamis, flooding; elevation of critical equipment above flood levels.
- **Evacuation and Support:** Identification of evacuation routes and assembly points; establishment of temporary shelters with water, food, sanitation, and first aid.
- **Fire Safety:** Installation/maintenance of advanced firefighting systems (water curtains, foam monitors, hydrants, tenders).
- **Drainage:** Upgrading drainage/stormwater systems; availability of dewatering pumps.
- **Navigational Safety:** Dredging; VTMS, maintaining buoys, fenders and electronic aids to prevent collisions.
- **Pollution Control:** Deployment of oil spill equipment (booms, skimmers); decontamination facilities.
- **Utility Resilience:** Strengthening substations/pump houses; installing backup generators.
- **Environmental Safeguards:** Mangrove plantation/green belts for erosion/flood control; green port initiatives, renewable energy, pollution monitoring.
- **Hazardous Storage:** Safe storage with containment; neutralizing agents and chemical suits.
- **Emergency Communications:** Reliable systems (Satellite phones, VHF, PA systems).

Non-Structural Measures: Focus on policies, procedures, and capacity:

- **Regulatory Framework:** Compliance with safety standards, codes, environmental regulations; periodic audits (fire, structural, environmental).
- **Risk Transfer:** Comprehensive insurance (assets, personnel, operations - Workmen compensation, public liability); financial planning for recovery.
- **Policies and Procedures:** Development/updating of SOPs (emergency response, evacuation, HAZMAT); preparation/testing of Emergency Action Plans.
- **Capacity Building:** Regular training; mock drills/simulations.
- **Communication and Coordination:** EOC; Early warning systems; storm signals; SATCOM, VHF, PA.
- **Social Inclusion:** Addressing needs of vulnerable groups (women, disabled, disadvantaged) during emergencies; equitable access to evacuation/medical care.

- **Preparedness:** Stockpiling essential resources (first aid kits, fire equipment, emergency supplies).
- **Documentation and Knowledge Sharing:** Maintaining records of incidents/near-misses; sharing lessons learned.
- **Community Engagement:** Collaboration with local communities/NGOs for rescue/relief; public awareness campaigns.
- **Monitoring and Evaluation:** Conducting Hazard, Risk, Vulnerability & Capacity Analysis (HRVCA); regular DMP review/updates based on emerging risks.

Training and Capacity Building

The port carries out extensive training programs ensuring personnel competency such as

- **Basic Training:** First aid, firefighting, Safety trainings, communication systems.
- **Advanced Training:** Oil spill handling (IMO Level), toxic cargo (HAZMAT), confined space and high-angle rescue.
- **Specialized Modules:** CBRN emergencies, use of breathing apparatus (SCABA).
- **Standards-Based:** ISO, OHSAS awareness, and compliance.

RECOVERY AND BUSINESS CONTINUITY

The plan emphasizes:

- Immediate post-disaster assessment and relief deployment.
- Restoration strategies for infrastructure and services.
- Processing of insurance claims and emergency financial planning.
- Resumption of operations through phased restoration and alternate arrangements.
- Documentation of lessons learned and improvements based on post-incident reviews.

RESOURCE INVENTORY AND PLAN MAINTENANCE

Resource inventory includes firefighting equipment, pollution response equipment, emergency control room equipment, navigational aid, shelter location for port crafts, Oil spill trained personnel and annual mock drill schedule.

Plan maintenance includes regular review and revision of the DMP to incorporate new risks and best practices.

2. INTRODUCTION

2.1 RATIONALE – KEY LEGISLATION MEASURES

2.1.1 Disaster Management Act, 2005;

The Disaster Management Act, 2005 (DM Act, 2005) lays down institutional and coordination mechanisms for effective Disaster Management at the national, state, district and local levels.

The Disaster Management Act 2005, Section 36;

This section of the act lays down the primary responsibility of ministries in the GoI and departments with respect to institutional framework for prevention, mitigation, preparedness and capacity building of disasters, allocating sufficient funds and other resources to the National and State government agencies. Enactments and review of its policies, rules and regulations for prevention of disasters, mitigation or preparedness.

The Disaster Management Act 2005, Section 37;

This section of the act lay down the primary responsibility of ministries in the GoI and departments with respect to preparation of Disaster Management Plan, their review, updation and its approvals. Measures for financing the activities within the plan are also required to be spelled out in the plan.

The Disaster Management Act 2005, Section 41;

This Act specifies the function of local authorities with regards to Disaster Management.

It includes the following functions:

- Ensure that its officers and employees are trained for disaster management;
- Ensure that the resources relating to DM are so maintained as to be readily available for use in the event of any threatening disaster situation or disaster;
- Ensure all construction projects under it or within its jurisdiction conform to the standards and specifications laid down for prevention of disasters and mitigation by National Authority, State Authority and District Authority;
- Carry out relief, rehabilitation and reconstruction activities in the affected area in accordance with the State Plan and District Plan.

2.1.2 Guidelines for Preparation of DMP for Ministries/Dept. issued by National Disaster Management Authority (NDMA), 2024

The guidelines provide a framework in accordance with National Disaster Management Plan - 2019 and provides direction to the port and its stakeholders for all phases of the disaster management cycle.

2.1.3 Prime Minister of India – Ten-Point Agenda for Disaster Risk Reduction

1. All development sectors must imbibe the principles of disaster risk management
2. Risk coverage must include all, starting from poor households to SMEs to multi-national corporations to nation states
3. Women's leadership and greater involvement should be central to disaster risk management
4. Invest in risk mapping globally to improve global understanding of Nature and disaster risks

5. Leverage technology to enhance the efficiency of disaster risk management efforts
6. Develop a network of universities to work on disaster-related issues
7. Utilize the opportunities provided by social media and mobile technologies for disaster risk reduction
8. Build on local capacity and initiative to enhance disaster risk reduction
9. Make use of every opportunity to learn from disasters and, to achieve that, there must be studies on the lessons after every disaster
10. Bring about greater cohesion in international response to disasters.

2.1.4 Sendai International framework for Disaster Risk Reduction (SFDRR-2015-2030)

The post-2015 goals and agenda are set forth in the three landmark global agreements reached in 2015 – the Sendai Framework for Disaster Risk Reduction (Sendai, Japan, March 2015), Sustainable Development Goals (UN General Assembly, New York, September 2015) and Climate Change Agreement (Conference of Parties, COP21, Paris, December 2015). The four priorities for action under the Sendai Framework are:



Figure 2.1: Sendai Framework

2.1.5 Safety initiatives to address Natural Disasters

NDMA guidelines on Disasters like Wind and Cyclone, Tsunami, Earthquake and Floods Management are relevant and these have been prepared to provide the directions to ministries, departments and state authorities for the preparation of their detailed Disaster Management Plan.

2.2 OBJECTIVE AND SCOPE OF THE PLAN

The objectives of the DMP are to:

- a. Contain and control the emergency incidents,
- b. Proactively safeguard the lives of the port employees, contractors, stakeholders, visitors and neighboring population,
- c. Mitigate the effect and minimize the damage to the environment,
- d. Limit damages of port assets,
- e. Ensure that the port responds according to the priorities set by the Chief Incident Controller (CIC) during response operation,
- f. Safely restore operations back to normal as quickly as possible after occurrence of any accident, to enable business to be resumed at the earliest,
- g. Initiate off-site emergency plan in case of necessity as and when required.

The scope covers –

- a. The existing preventive and mitigation measures;

- b. Identification of potential scenarios that are likely to occur considering risk profile of port;
- c. The preparedness to develop plans for actions when disaster or emergencies occur;
- d. The responses that mobilize the necessary emergency services including responders like fire service, police service, medical service including ambulance, government as well as non-governmental agencies;
- e. The initiation of off-site emergency plan, should the situation escalate to call for support of civic administrations (district and/or state) and their resources;
- f. The post disaster recovery with aim to restore the affected area to its original condition.

3. PROFILE OF THE PORT

3.1 PROFILE

Syama Prasad Mookerjee Port (SMP) established in 1870, the oldest Major Port in India, is located on the east coast of India. Kolkata dock consists of three sub-components i.e., Kidderpore Dock (KPD), Netaji Subhash Dock (NSD) and Budge-Budge Oil jetties. The Kolkata port is about 145 km from the Sagar Island and 232 km from Sand head. River anchorages of KDS are located at Garden reach and Diamond harbor.

3.2 LOCATION OF THE PORT

The port lies in the city of Kolkata of West Bengal 104 km downstream from Kolkata;

Table 3.1: Location of Port

Latitude	22° 32' N	Longitude	88° 18' E
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3.3 NAVIGATIONAL AND ANCHORAGE FACILITIES

3.3.1 Pilotage

The pilotage distance to KDS is 223 km comprising 148 km of river and 75 km of sea pilotage. Remote pilotage assistance is provided through VTMS during the sea passage of the vessels in both the channels.

The channels are well marked with nearly 125 light vessels / lighted buoys and 500 shore marks. The Centre Pilot Control Station is located on Sagar Island. In addition to the pilot station, SMP maintains a pilot vessel at around Sagar in foul weather. The pilot transfer is undertaken for the pilot station / pilot vessel through dedicated pilot launches. The pilots for KDS vessels board at middle point south of Sagar. For the outward passage the same process is used in a reverse order.

Being a riverine port with numerous sand bars (shoals), the advantage of rise of tide is utilized to obtain the maximum draft for shipping. Because of the sharp bends in the river the length of the vessel is restricted to 172 m at Kolkata and 189 m at Budge-Budge. Due to the nature of river and the shifting of sand taking place regularly inside the channels regular hydrographic surveys are done to confirm the depth and width of the channel.

3.3.2 Anchorage Points

There are three anchorage points (Inner Sand heads anchorages – NX1, NX2 and NX3)

Table 3.2: Anchorage points Co-ordinates

Anchorage	Position	Permissible Draft
NX1	Latitude: 21°18'15" N Longitude: 88°13'45" E	9.5 meters
NX2	Latitude: 21°16'45" N Longitude: 88°14'00" E	10.0 meters
NX3	Latitude: 21°15'30" N Longitude: 88°14'00" E	10.5 meters

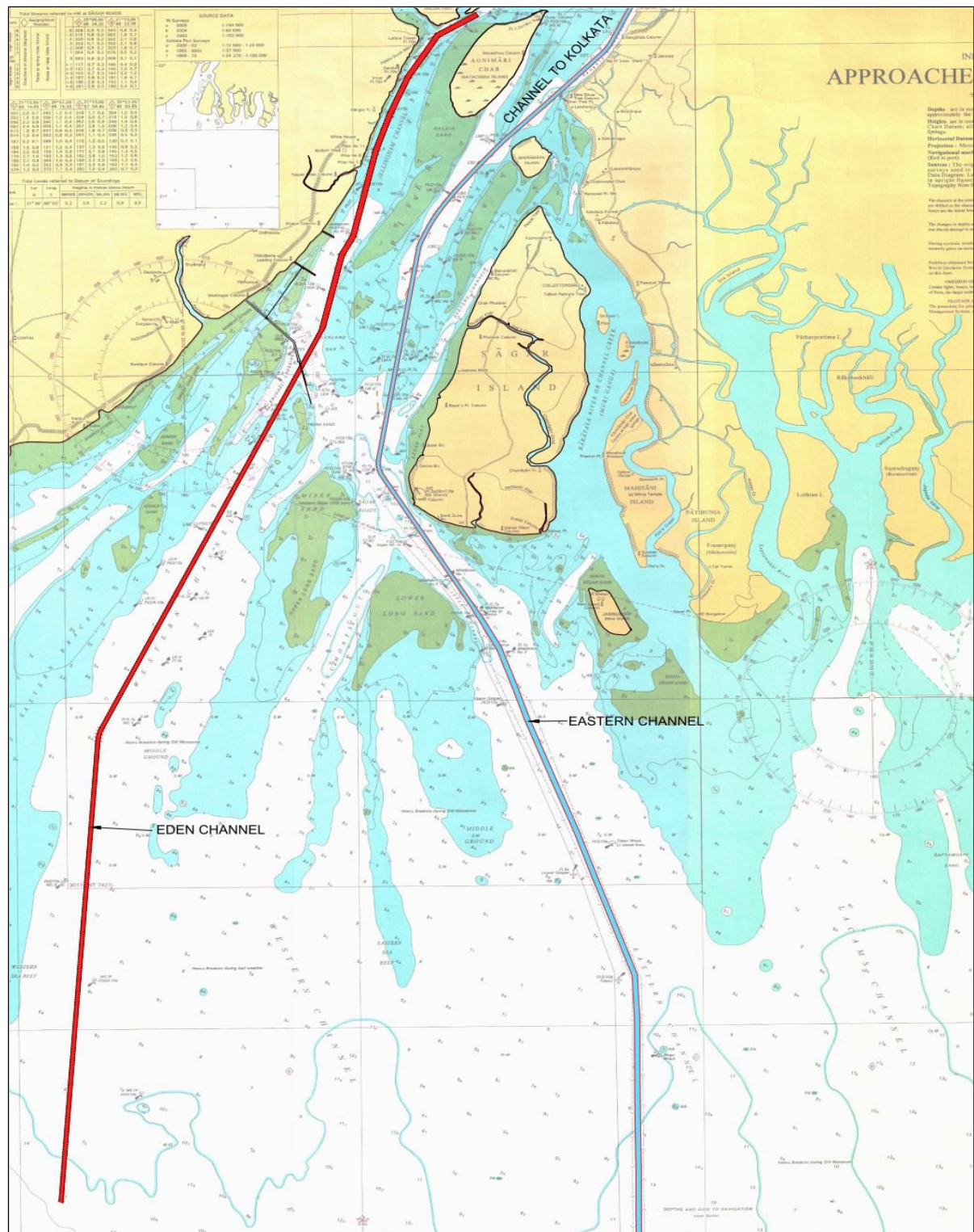


Figure 3.1: Navigational Channel layout

3.3.3 Navigational Aids

3.3.3.1 Light House:

- Sagar Lighthouse (21°39'N 88°03'E) is situated at Middleton Point on the Sagar Island which is about 1.5 km inshore. It is visible from a distance of 28 km in clear weather.
- Dariapur Lighthouse (21°47'N, 87°52'E) is situated on the right bank of Hooghly River south of Rasulpur River and is about 2.7 km inshore. It is visible from a distance of 35 km in clear weather.

3.3.3.2 Light Vessels:

There are five unmanned light vessels to aid in navigation and these are located at following locations:

- U.G.L.F. at 21°29'57"N, 88°06'37.5"E;
- L.G.L.F. at 21°21'57"N, 88°10'05"E;
- Talent WK Light vessel at 21°17'21"N, 88°11'17"E;
- Eastern Channel Light vessel at 21°04'19"N, 88°11'07"E;
- Western Channel Light vessel at 21°05'002"N, 87°50'24.8"E.

3.3.3.3 Port Flotilla and Other Crafts

There are nine tugs of different capacity with the port (**Table 3.3**). Apart from tugs, port has one grab dredger, one anti-pollution vessel, one multipurpose despatch vessel and two multi-purpose launches. Port also engages private dredgers on contract basis for dredging the channel.

Table 3.3: Details of Port Tugs

No. of Tugs	Type
1	22 T Bollard Pull
1	32 T Bollard Pull
3	30 T Bollard Pull
2	45 T Bollard Pull
2	35 T Bollard Pull

3.3.3.4 River Marks and Buoys

Over 500 (of which 140 are lighted). There are 82 nos. of lighted buoys marking the navigational channel from Sand heads to Kolkata.

3.3.3.5 Vessel Traffic Management System (VTMS)

SMP is having VTMS console at Haldia with four X band RADAR and AIS stations at Haldia, Frasergaunj, Dadanpatra and Sagar with communication system, meteorological system, microwave communication link etc.

3.3.3.6 Port Channel and turning circle

Table 3.4: Port Channel and turning circle

Entrance Channel			Turning Circle	
Distance from Harbor entrance (in km)	Minimum depth (in m)	Minimum width (in m)	Number	Diameter (in m)
232	2.5	45	2	KPD - 190/ NSD - 228

3.3.4 PORT LAYOUT

3.3.4.1 Kidderpore Dock (KPD)

The KPD comprises of two Dock basins – separated by a bascule bridge. KPD – I have 12 berths, KPD – II has 8 berths (**Figure 3.2**) and KPD has 3 Dry Docks. The entrance to the Dock Systems is through Lock Gates, having outer and inner lock Gates.



Figure 3.2: KPD Layout

3.3.4.2 Netaji Subhash Dock (NSD)

The NSD comprises of dock basin with a single lock entrance and has 10 berths and 2 dry docks (Figure 3.3).

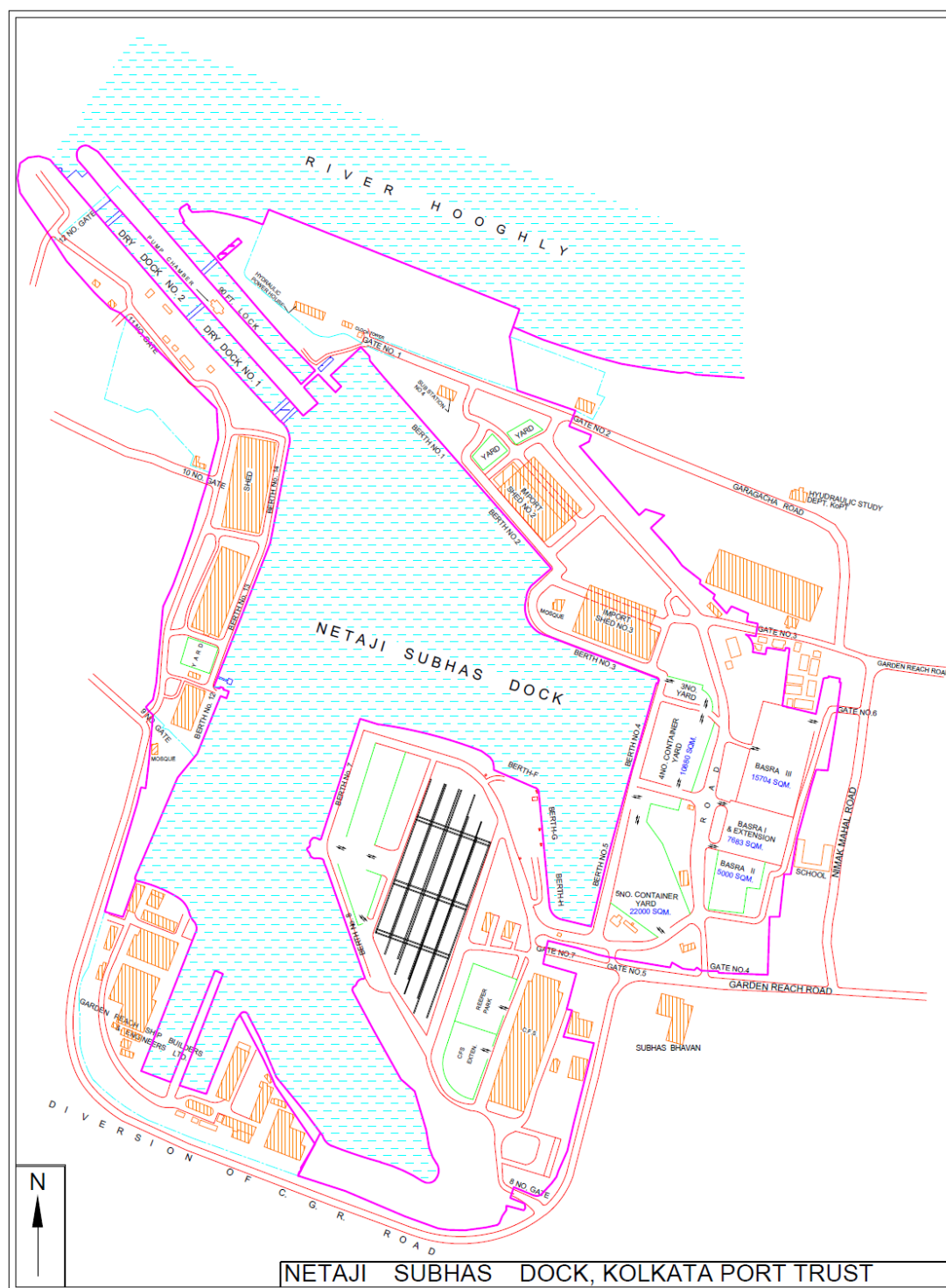


Figure 3.3: NSD Layout

3.3.4.3 Budge-Budge Oil Jetties

Budge-Budge is located about 25 km downstream of Kolkata. There are 6 jetties of different sizes with associated storage facilities as shown in **Figure 3.4**.



Figure 3.4: Layout of Budge-Budge Oil Jetties

4. RISK ASSESSMENT

4.1 LEVEL OF DISASTERS

The different levels of disaster to facilitate the responses and assistance to ports are as follows

Level 0 – denotes *normal times* which will be utilized for close monitoring, documentation, prevention, and preparatory activities. Training on search and rescue, drills, evaluation, and inventory updating for response activities will be carried out during this time

Level 1 – specifies disaster that can be *managed at Port level*; however, the neighboring industries and district will remain in the state of readiness.

Level 2 – disaster situations are those which *require assistance and active participation of the port, the neighboring industries and district/State*.

Level 3 – disaster situation in case of large-scale disaster where the *state and district authorities have been overwhelmed* and *require assistance from the Central Government* for rescue, relief, and other response and recovery measures. In most cases, the scale and intensity of the disaster as determined by the concerned technical agency like IMD, INCOIS etc. are sufficient for the declaration of Level 3 disaster.

4.2 POTENTIAL RISK – A detailed study was carried out for risk ranking of potential hazards in the port and this data is contained in Annex A- HAZARD Analysis for the above identified potential risk. In brief the following hazards are relevant with regard to port operations and are discussed as follows.

4.2.1 Navigational Disasters occurring inside port involving Vessel Collisions, Grounding, consequent Oil Spills and fire on vessels.

4.2.2 Chemical Disasters (Fire/ Explosion/ Toxic gas) occurring during transfer operations due to loss of containment (leakages) of hazardous Cargo (MS, Toluene, Xylene, Naphtha, ATF, MTBE etc.) handled at a Port – Budge-Budge Oil Jetties. Refer Annex D – Consequence analysis.

4.2.3 Fire Disasters involving Class A (solid combustible) and E (electrical) can occur in areas such as the electrical substations, office building, Signal Station, SBM, Jetty, Warehouse etc.

4.2.4 Natural Disasters

- Wind and Cyclone: In accordance with national and regional hazard map available with BMTPC the South 24 Parganas district falls under *very high damage risk zone (max. wind speed of 50 m/s)*.
- Flood: Due to its geographical situation, the South 24 Parganas district is *Fall under areas liable to Flood*.
- Earthquake: the South 24 Parganas district fall under *High earthquake damage Risk zone (zone category IV)*.
- Tsunami is rare but port is vulnerable.

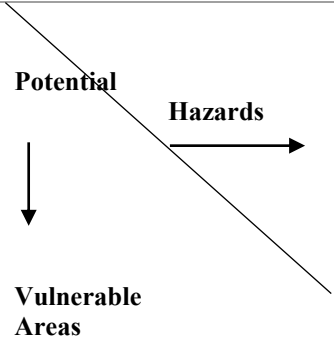
4.2.5 Terrorism and Security related Disasters

These are situations that develop mostly without warning and need specialized handling.

4.3 VULNERABILITY ASSESSMENT

A vulnerability assessment has been carried out considering vulnerable areas vis-a-vis potential hazards is prepared depicting low, moderate, and high vulnerability categories.

Table 4.1: Vulnerability Assessment

	Fire Explosion on board ship/ ashore in port area	Oil/ Chemical / Gas Pollution	Vessel accident - Collision/ Grounding	Cyclone/ Floods/ Tsunami/ Earthquake	War / Terrorism / Bomb Threat
Riverine Channel	xxx	xx	xx	xx	x
Berths –KPD	x	x	xx	xx	x
Berths – NSD	x	xx	xx	xx	x
Oil Jetties - Budge-Budge	xx	xx	xx	xx	x
Lock Gate, bridge	x	x	x	xx	xx
Container Storage Yard	x	x	-	xx	x
Coal stack yards, warehouse	x	x	-	xx	x
Pipelines	xxx	xx	-	xx	x
Mobile Trucks & equipment (Mobile harbor cranes and RTG cranes)	x	-	-	xx	xx
Railway infrastructure	x	x	-	x	xx
Control gates for personnel and vehicular movement	x	-	-	x	xx
Electric Substations	xx	-	-	x	xx
Dry Dock	xxx	-	-	x	x
Port tugs, crafts, dredger, launchers	x	-	x	xx	x
Office Buildings/Fire Station/Control room/Fire station	x	-	-	xx	xx

Note: x=slightly vulnerable; xx=moderately vulnerable; xxx=highly vulnerable

5. ROLES AND RESPONSIBILITIES

5.1 HUMAN RESOURCE PLANNING

Disaster management efforts for the organization will require considerable training and motivation in an organized manner in line with the National Disaster Management Guideline - Incident Response System (NDMA- IRS). This requires formation of the Crisis Management Group (CMG) and Incident Response Team (IRT).

Table 5.1: Responsibility of Port Authority and Terminal/Berth Operators

Responsibility	Port Authority	Terminal/Berth Operators
Prevention	• Prepare DMP and OSCP • Train own staff, • Conduct and participate emergency drills and exercises • Guideline to encourage all Port Facility Operators to have Emergency Management Plans / ERDMP.	• Prepare, revise, test and exercise own facility EAP / ERDMP and OSCP , • Train own staff, • Conduct and participate emergency drills and exercises.
During Response	Undertake following: • Monitor • Make Strategic decisions regarding: ○ Shipping movements ○ Threats to Port facility operators and effects on their business operations • Advice and assist affected Port facility Operators on matters where qualified to do so. • Escalate response level by obtaining assistance from Local Crisis Groups. • Media Briefing, if required. • Provide Medical Support	Undertake following: • First Aid, • Advise staff, • Contain (if possible), • Evacuation (as appropriate), • Partial or Full Shutdown (as appropriate), • Security. When external emergency services arrive : • Provide specialist advise/liaison, • Provide Medical Support
Recovery and reconstruction	• Assist Port facility operators and/or shipping to resume operations. • Establish business continuity.	• Establish business continuity of terminal.

5.1.1 Composition of the Crisis Management Group

The Crisis Management Group is headed by the Chairman/Dy. Chairman (Chief Emergency Controller - CEC) and comprises of following key personnel:

1. Director – Marine department (Chief Incident Controller -CIC);
2. Traffic Manager;
3. Chief Mechanical Engineer;
4. Chief Engineer (Civil);
5. Chief Medical Officer;
6. Port Fire Officer;
7. Sr. Comdt. CISF and PSO – Security Advisor;
8. Chief Law Officer;
9. FA & CAO;
10. Secretary – Administration;
11. Material Manager;
12. Chief Hydraulic Engineer.

5.1.2 Action Group (Incident Response Team)

The action group carries out the actions as per the decisions made by CMG. It shall be formed at the time of disaster with Dy. Director – I/II -Marine department or Asst. Mooring Master (Budge-Budge) as Site Incident Controller (SIC) and will comprise of

1. Harbour Master (River & Port);
2. Dock Master/Dy. Dock Master;
3. Assistant Fire Officer, KDS;
4. Safety Officer;
5. Safety and Anti-pollution officer;
6. Commandant – CISF;
7. A.S- Port Security;
8. Dy. Traffic Manager (SH & CH, Railway, Cont.);
9. Dy. Chief Engineer and Dy. Chief Mechanical Engineer;
10. Commander Sagar Pilot station;
11. Sr. Dy. Chief Medical Officer;
12. Terminal/berth operators- In-Charge.

Refer **Figure 5.1** and **5.2** for Onsite and Offsite Emergency Organization chart respectively.

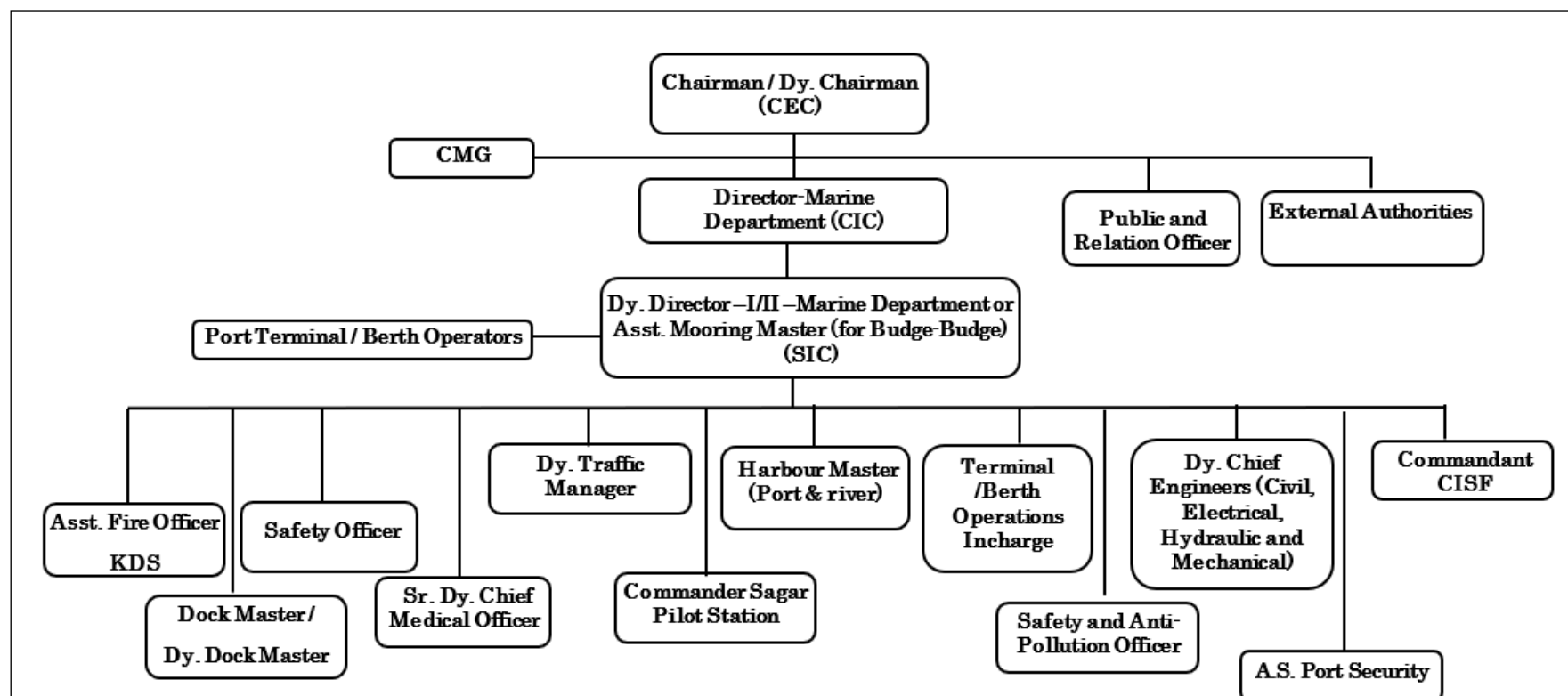


Figure 5.1: Onsite Emergency Organization Chart

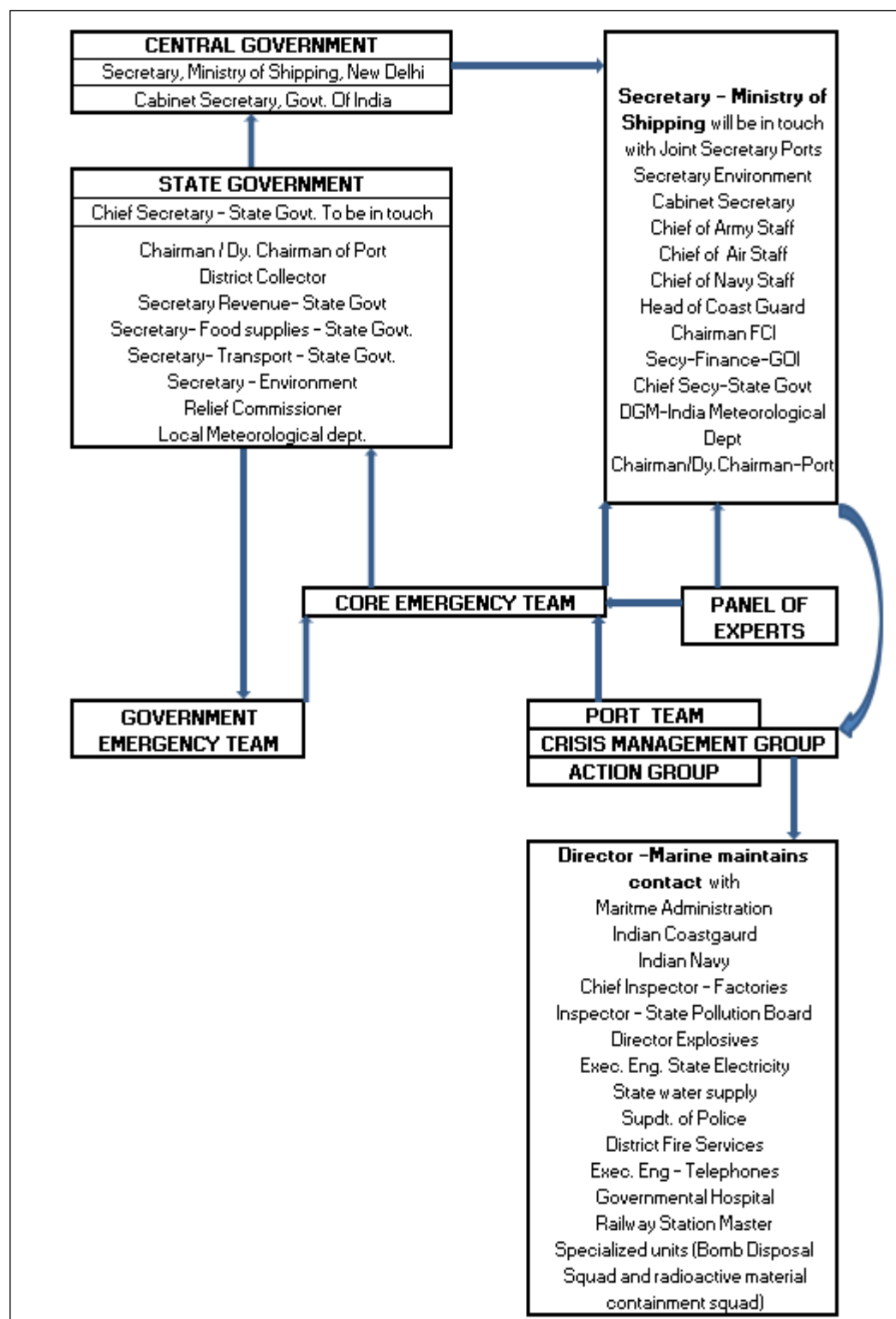


Figure 5.2: Off-Site Emergency Organization Chart – Level 2 and 3

5.1.3 Roles of key personnel

CHIEF EMERGENCY CONTROLLER (CEC) CHAIRMAN/DY. CHAIRMAN			
Phase		Action	
Mobilization /Activation	1	Obtain details of incident and of any mitigative actions taken from CIC.	
	2	Communicate with and coordinate with	
		a.	Crisis Management Group (CMG)
		b.	Chief Incident Controller (CIC)
		c.	D.G. Shipping
		d.	Local, District, State and National Authorities
Establishing Control	3	Nominate alternate person if any functionary is not available.	
	4	Establish radio or telephone contact with CIC and CMG.	
Planning	5	Advice and provide approval to CIC on	
		a.	Propriety of response level
		b.	Location of EOC
		c.	Additional Human Resource, materials, equipment, and information.
		d.	Authorizes the release of required funds for the necessary arrangements for evacuation, transportation, food and supplies.
Ongoing Response	6	Advice on activation of Off-site Emergency Plan, if necessary.	
	7	To issue Media briefings when required.	
Response Termination	8	Advice CIC on Terminating response if conditions are met.	
	9	Receive incident reports from CIC/ nominated alternate person.	
	10	Advise on further course of action in consultation with CIC, nominated alternate person.	

CHIEF INCIDENT CONTROLLER (CIC) DIRECTOR-MARINE		
Phase	Action	
Mobilization / Activation	1	Obtain details of incident and of any mitigative actions taken.
	2	Start recording of events in the Personal Log.
	3	Activate DMP, OSCP as required.
	4	Communicate and coordinate with
		a. CEC
		b. IRT and CMG
		c. CISF-Security, PSO
		d. ICG, Indian Navy and Marine Police
		e. Local Authorities and Neighboring industries, District, State, National Authorities
		f. Respective Terminal Manager/ Berth Operator
		g. Relevant Competent agencies for Natural Disasters
		h. Salvage Companies.
Establishing Control	5	Assess the level of incident, nature, location, severity, casualties and resource requirement.
	6	Proceed to the EOC and conduct briefing meeting.
	7	Authorize any immediate action required by on site staff and contract agencies.
Evaluation	8	Determine resources at risk and the level of disaster.
	9	Evaluate the assessment of the incident, in consultation with the SIC.
Planning	10	Arrange for monitoring of the event/incident.
	11	Convene planning meeting.
	12	Instruct Material Manager to make a list of required needs: Personnel, equipment, transport etc. Authorize acquisition.
Ongoing Response	13	Implement response actions as per OSCP and DMP.
	14	Continue to monitor incident.
	15	Monitor the response by scheduling and undertaking regular briefings/debriefings of IRT.
	16	Ensure that all IRT is supplied with necessary personal needs such as tugs, walkie-talkies, PPE, food etc.
	17	Monitor casualties and vessel traffic movements.
Response Termination	18	Advise the SIC and inform CEC.
	19	Amend the SOP and action plan as required.
	20	Ensure that all IRT members, combat and support agencies are informed of termination of response.
	21	Monitor to ensure safe and complete demobilization.
	22	Debrief CMG.
	23	Terminate response if conditions are met.
	24	Ensure that all records are collated and stored.

SITE INCIDENT CONTROLLER (SIC) DEPUTY DIRECTOR I/II – MARINE DEPARTMENT (KPD AND NSD) or ASST. MOORING MASTER (BUDGE - BUDGE)		
Phase	Action	
Mobilization /Activation	1	Obtain details of incident and of any mitigative actions taken.
	2	Start recording of events in the Personal Log.
	3	Initiate
	a.	DMP, OSCP as required.
	4	Communicate and coordinate with
		a. CIC
		b. IRT, CMG
		c. Master of the vessel
		d. Terminal Manager and Berth Operator
	e.	OSRO.
Establishing Control	5	Assess the level of incident, nature, location, severity, casualties and resource requirement.
	6	Conduct initial briefing.
	7	Authorize any immediate action required by on site staff and contract agencies.
Planning	8	Arrange for
		a. Deployment of Pollution and Fire- extinguishing response equipment.
		b. Crafts, Vehicles.
	c.	Ensure evacuation of personnel to assembly areas.
Ongoing Response	9	Assist Material Manager to compile a list of needs: Personnel, equipment, transport etc.
	10	Implement response actions as per OSCP and DMP.
	11	Continue to monitor incident.
	12	Monitor the response and undertake regular briefings/debriefings.
	13	Coordinate Search and Rescue operations.
	14	If necessary, call for additional resources.
	15	Coordinate with the salvage Companies.
	16	Arrange relief for IRT members, Monitor OH&S performance.
Response Termination	17	Monitor waste volumes, if any.
	18	Terminate response if conditions are met on permission of CIC.
	19	Ensure that all IRT members, Contract Agencies and CIC are informed of termination of response.
	20	Monitor to ensure safe and complete demobilization.
	21	Ensure that all records are collated and stored.

HARBOUR MASTER (PORT and RIVER) / DOCK MASTER		
Phase		Action
Mobilization / Activation	1	Start recording of events in the Personal Log.
	2	Obtain details of incident and of any mitigative actions taken.
	3	Communicate and coordinate with
		a. CIC, SIC
		b. Commander (VTS)
		c. Pilot and Marine Engineers
		d. Chief Hydraulic Engineer
		e. Salvage Companies
		f. Master of the vessel
		g. Meteorological department
Initial Action	4	Ensure arrangement of tugs.
	5	On receipt of instructions from SIC, notify the fire brigade/Police/Hospitals/District Collector/ Mutual Aid Partners.
Ongoing Response	6	Coordinate with SIC and provide necessary information.
Response Termination	7	Terminate response on instructions of CIC, SIC.
	8	Ensure that all records are collated and stored.

TERMINAL/BERTH MANAGER		
Phase		Action
Mobilization / Activation	1	Start recording of events in the Personal Log.
	2	Communicate and coordinate with
		a. CIC, SIC
		b. Port Control Room
		c. Ship owners / Agents / stevedores.
		d. Terminal Managers
Establishing Control	3	Prepares vessels to vacate from berth.
Initial Action	4	Stop Cargo transfer operations as per SOP.
	5	Arranges to protect cargo from damage.
	6	Arrange to segregate and shift cargo in sheds.
Ongoing Response	7	Coordinate with ship owners, agents, stevedores.
	8	Ensure safe evacuation of the personnel during the emergency.
	9	Provide necessary advice and supports with manpower and equipment.
Response Termination	10	Terminate response if conditions are met on permission of CIC.
	11	Ensure that all records are collated and stored.

SENIOR PILOT		
Phase	Action	
Mobilization / Activation	1	Upon callout, report to CIC, SIC.
	2	Start recording of events in the Personal Log.
	3	Attend Initial Briefing.
Assessment	4	Assist and coordinate with SIC, Commander (VTS), Harbour Master, Dock Master to obtain and collate available data such as
		a. Weather,
		b. Tides, currents,
		c. Latest update on action taken.
Planning	5	Determine field response equipment, labor, transport requirements and provide to CIC, SIC.
Ongoing Response	6	Direct and coordinate marine response activities.
	7	Prepare all tugs/crafts for mobilization at the earliest.
	8	Ensure that field response teams receive required
		a. Information i.e. Briefings/Inductions/Weather.
		b. Personal protective equipment (PPE).
		c. Essential supplies (e.g. food, first aid etc.).
	9	Coordinate dispersant operations when permitted.
Response Termination	10	Seek for necessary means for aerial observation, containment and recovery actions and vessel dispersant spraying operations.
	11	Inform in-charge of Pollution response cell (OSRO) anticipated waste quantity and type.
	12	Advise for termination of response operation.
	13	Ensure safe return of response personnel.
	14	Ensure that all equipment is cleaned and returned to stores.
	15	Attend debriefing.
	16	Ensure that all records are collated and stored.

CHIEF MECHANICAL ENGINEER (CME)			
Phase		Action	
Mobilization / Activation	1	Start recording of events in the Personal Log.	
	2	Communicate and coordinate with	
		a.	CIC, SIC
		b.	Port Electrical, Workshop divisions
		c.	Engineering and Maintenance Department
		d.	Material Management Department
		e.	State Electricity Board
Establishing Control	3	Depute engineers on-site.	

Initial Action	4	Implements elaborate plans for providing continuity of emergency supplies and services such as, electric power, emergency lighting, communication system, bridges and lock gates, dry docks, vehicles, floating crafts etc.
	5	Suggests optimal strategies for conducting emergency isolation operations of damaged equipment, the emergency transfer of materials and all other process related emergency operations
	6	Maintain sufficient stock of required equipment/materials.
	7	Coordinate with CIC, SIC, CISF, PSO, Material Manager.
	8	Ensure water supply to the hydrants.
Ongoing Response	9	Provide necessary advice and supports.
	10	Arrange for Bulldozers, mobile cranes, forklifts or any other specialized equipment.
Response Termination	11	Terminate response if conditions are met in Consultation with CIC.
	12	Ensure that all records are collated and stored.

CHIEF ENGINEER (CE) – (Civil)		
Phase		Action
Mobilization / Activation	1	Start recording of events in the Personal Log.
	2	Communicate and coordinate with
		a. CIC, SIC
		b. Engineering and Maintenance Department
		c. Material Management Department
Establishing Control	3	d. Workshop
		Depute engineers on-site.
Initial Action	4	Arrange sand bags, Diesel pumps, sufficient quantities of bleaching powder etc., for the event of Cyclone, flood.
	5	Will look after navigational aids, fenders, sea wall, transit shed doors, roofs etc.
	6	Ensure availability of local contractors and keep them as standby to meet emergency requirements such as manpower, equipment etc.
	7	Render and Monitor assistance for extricating trapped personnel by cutting structures etc.
	8	To ensure that adequate clean water is available in the reservoirs.
Ongoing Response	9	Instruct the contractors to carry out urgency civil works if required.
	10	Coordinate with IRT to conduct the actual cleanup work during and after the emergency including clearing of debris.
Response Termination	11	Terminate response if conditions are met on permission of CIC.
	12	Undertake strengthening of shore line, buildings and other civil works.
	13	Ensure that all records are collated and stored.

SAFETY AND ANTI-POLLUTION OFFICER			
Phase		Action	
Mobilization / Activation	1	Start recording of events in the Personal Log.	
	2	Communicate with	
		a	CIC, SIC
		b	Ship owners / Agents / stevedores.
		c	Terminal Manager and Berth Operator.
Establishing Control	3	Inform WBPCB and other environmental agencies about the incident for getting necessary guidance.	
Initial Action	4	Prepare consolidated list of dangerous goods including tankers in port.	
	5	To collect necessary evidences required for detailed investigation of any accidents	
	6	Coordinate with WBPCB approved waste/sludge disposal agencies.	
Ongoing Response	7	Assist in the safe evacuation of personnel.	
Response Termination	8	Terminate response if conditions are met on permission of SIC.	
	9	Submit detailed report regarding the response to CIC, SIC.	
	10	Ensure that all records are collated and stored.	

SAFETY OFFICER			
Phase		Action	
Mobilization / Activation	1	Start recording of events in the Personal Log.	
	2	Communicate and coordinate with	
		a.	CIC, SIC
		b.	Ship owners / Agents / stevedores.
		c.	Terminal Manager and Berth Operator.
Establishing Control	3	Furnish information to the SIC with regards to the safety.	
Initial Action	4	Coordinate and consolidate list of dangerous goods including tanker in port.	
	5	To collect necessary evidences required for detailed investigation of any accidents.	
Ongoing Response	6	Ensure safety and evacuation of the personnel.	
Response Termination	7	Terminate response if conditions are met on permission of SIC.	
	8	Submit detailed report regarding the accidents to CIC,SIC.	
	9	Ensure that all records are collated and stored.	

COMMANDER (VTS) – SAGAR SIGNAL STATION		
Phase		Action
Mobilization / Activation	1	Communicate with
		a CIC, SIC
		b Haldia VTMS
		c Master of the vessel
		d Harbour Master / Dock Master / Pilots
		e Terminal Manager and Berth Operator.
		f Meteorological department
Initial Action	2	Gather detailed information about the incident.
	3	On receipt of instructions from SIC, notify the Master of the Vessel, craft, security boat
Ongoing Response	4	Coordinate with SIC and provide necessary information.
Response Termination	5	Terminate response on instructions of CIC, SIC
	6	Ensure that all records are collated and stored.

MATERIAL MANAGER		
Phase		Action
Mobilization / Activation	1	Communicate with
		a CIC, SIC
		b Engineering and Maintenance Department
Initial Action	2	Arrange for material and equipment
	3	Ensure stock of emergency equipment such as diesel, petrol and such other oils, fire-fighting items such as foam, damage control stores such as cement and other stores required to keep plants, machinery road vehicles and water-craft running.
	4	Liaise with suppliers of all items mentioned above,
Response Termination	5	Terminate response if conditions are met on permission of SIC.
	6	Ensure that all records are collated and stored.

COMMANDANT - CISF (SECURITY) AND PORT SECURITY OFFICER (PSO)		
Phase	Action	
Mobilization / Activation	1	Obtain details of incident and of any mitigative actions taken.
	2	Start recording of pertinent facts and figures in the Personal Log.
	3	Communicate and coordinate with
		a. CIC, SIC
		b. District Police and other relevant authorities
		c. State Relief and Rehabilitation department
		d. Bomb detection and disposal squad (BDDS)
Establishing Control	4	Take control of security threat until external assistance arrived.
	5	Authorize any immediate action required by on site staff.
	6	Cordon of the affected area.
	7	Establish a special task force for the rescue operation.
Initial Action	8	Act as per instructions from CIC, SIC, if required
Ongoing Response	9	Keep vigilance on the location or sites which are likely to be affected by cyclone for e.g. store, workshop, cargo berth, transit shed, warehouse, dry dock, administration building etc.
	10	Control entry of authorized and unauthorized persons.
	11	Assistance to BDDS team.
	12	Facilitate entry of emergency vehicles such as ambulance etc.
	13	Assist in Search and Rescue operation.
	14	Ensures that residents near port area are notified about disaster and instructions to evacuate if necessary.
Response Termination	15	Reconfirm before declaring the same as evacuated.
	16	Terminate response if conditions are met on permission of CIC, SIC.
	17	Ensure that all records are collated and stored.

CHIEF MEDICAL OFFICER		
Phase	Action	
Mobilization / Activation	1	Start recording of events in the Personal Log.
	2	Communicate and coordinate with
		a. CIC, SIC
		b. Tie-up Hospitals, Medical department of Govt. of West Bengal and Health care professionals.
		c. Port Control Room.
		d. CISF, PSO.
Establishing Control	3	Activate Hospital Emergency Action Plan and depute doctors on-site to give first aid to the injured.
	4	Advise CIC, SIC on industrial hygiene and make sure that the frontline personnel are not exposed to unacceptable levels of toxic substances.

Disaster Management Plan

	5	Inform hospitals of the situation in case of a toxic release and apprise them of the antidotes necessary for the treatment
	6	Coordinate with District Administration and health care professionals,
Initial Action	7	Maintain sufficient stock of medicines, antidotes, oxygen, stretchers etc. and arrange for ambulance.
	8	Suggest and provide an antidote in the event of toxic release
	9	Coordinate with nearby hospitals, doctors and ambulance.
Ongoing Response	10	Provide necessary advice and supports for appropriate treatment of the injured persons.
Response Termination	11	Terminate response if conditions are met on permission of CIC, SIC.
	12	Ensure that all records are collated and stored.

TRAFFIC MANAGER		
Phase	Action	
Mobilization / Activation	1	Start recording of events in the Personal Log.
	2	Communicate and coordinate with
		a. CIC, SIC
		b. Shipping and Cargo Handling Division
		c. Port Railways
Establishing Control	3	Liaise with Ship owners, Agents, stevedores.
Initial Action	4	Prepare consolidated list of Cargoes in port and provide details to SIC.
	5	Ensure to protect cargo in vicinity from damage.
	6	Coordinate with ship owners/agents /stevedores
Response Termination	7	Terminate response if conditions are met on permission of CIC.
	8	Ensure that all records are collated and stored.

SECRETARY (ADMINISTRATION)		
Phase	Action	
Mobilization / Activation	1	Communicate and coordinate with
		a. CEC
		b. CIC
		c. Media (preparing brief)
		d. Legal and Finance Department
Initial Action	2	In the event of evacuation, assist CMG to co-ordinate with State Transport Authority and the local Police authority for evacuation. Arrange for food, water and accommodation.
	3	Liaise with NGOs, Municipal Corporation and the Civil Defence Organisation for necessary arrangements.

	4	Liaise with the evacuating authority and collect all details regarding the evacuated people.
	5	Mobilise all vehicles for the transportation needs of the Management Team, the Action Team and support services.
	6	Keep the Legal Advisor of the Port informed of the situation at all times and obtain his advice for legalising all the port's actions.
	7	Draw lists of Port Personnel affected and involved in an incident, and keep their families informed correctly through Information Centre.
	8	Make proper arrangements for the Port's personnel engaged in combating an emergency for their food and rest.
Response Termination	9	Liaises with media under guidelines provided by the CEC.

CHIEF LAW OFFICER		
Phase		Action
Mobilization / Activation	1	Communicate and coordinate with
		a. CEC
		b. CIC
		c. Secretary Administration
		d. Maritime Administration
Initial Action	2	Gather relevant information
Ongoing Response	3	To assist in issuing notice under applicable relevant Acts and Port Policies.
Response Termination	4	Arrange for settlement of related claims.
	5	Liaises with media under guidelines provided by the CEC.

FINANCIAL ADVISOR AND CHIEF ACCOUNT OFFICER		
Phase		Action
Mobilization / Activation	1	Communicate and coordinate with
		a. CEC
		b. CIC, SIC
		c. Secretary Administration
Initial Action	2	Gather relevant information
Ongoing Response	3	Process agreements and/or arrange payments for leasing/immediate procuring of equipment.
	4	Monitor the expenditure, and services rendered by outside agencies to the Port and vice versa.
Response Termination	5	Ensure that all records are collated and stored.

5.2 COORDINATION - HORIZONTAL AND VERTICAL LINKAGES

Coordination with the following external agencies would be required and the Emergency Operation Centre (EOC) will function as the focal point of coordination.

- West Bengal State Disaster Management Authority (WBSDMA),
- District Disaster Management Authority (DDMA) – Kolkata/South-24 Parganas,
- District Level Committee on Natural Calamity (DLCNC) - Kolkata/South-24 Parganas,
- Indian Coast Guards, Indian Navy, Marine Police,
- DG Shipping, MMD,
- WBPCB, PESO,
- State Electricity Board, State transport Corporation,
- Regional Meteorological Centre – IMD Kolkata,
- NGOs and aid agencies,
- P & I Club,
- Salvage Companies,
- Enlist services of GOI laboratories and expert institutions for Specialized services (contact nos.) e.g., BARC emergency response centre in case of radiological emergencies, DRDO for CBRN emergencies.
- Public Health Organization.

5.2.1 State and District Level Coordination Mechanism

The SDMA is headed by the Chief Minister of the State.

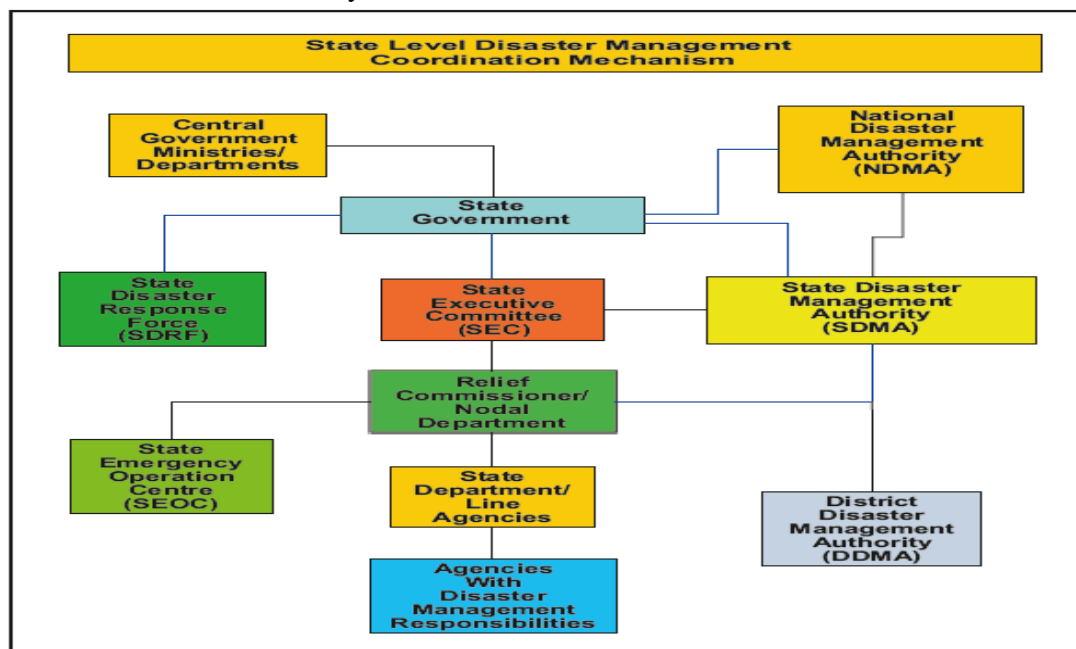


Figure 5.3: State –level disaster management – basic institutional framework

5.2.2 District Level

The DDMA is headed by the District Collector or Deputy Commissioner as the case may be, with the elected representative of the local authority as the Co-Chairperson.

6. PREPAREDNESS MEASURES

6.1 EMERGENCY OPERATION CENTRE (EOC)

The EOC will be located in the Port Control room or as directed by the CEC, CIC.

6.2 CAPACITY DEVELOPMENT

The capacity development covers all aspects of disaster management. The broad thematic areas for capacity development are summarized in **Table 6.1**.

Table 6.1: Capacity Development Themes

Key Aspect	Thematic Areas
Prevention or mitigation for Disaster Risk Reduction	Hazards, Risk, and Vulnerability Assessment • Preparing DMP, regular updation and mock drills, • Institutional arrangements, policies, legal support, and regulatory framework, • Safety awareness and training, • Mainstreaming of DRR into development plans and programs, • Training and skill development, • Documenting lessons from previous disasters and ensuring their wide dissemination, • Developing appropriate risk transfer instruments by collaborating with insurance companies and financial institutions, • Integrate DRR into business models and practices, • Preparedness and response plans at all levels, • Disaster resilience by maintaining list of nearby hospitals and health care centers, • Business resilience of productive assets by strengthening the supply chains and service providers, ensuring continuity of services.
Effective preparedness and response	Emergency response capabilities – EOCs, infrastructure, equipment upgrades and adoption of best available technologies • Effective coordination with external agencies and relevant stakeholders, • Adoption and adaptation of emerging global good practices, • Early warnings, maps/ satellite data/ effective dissemination of information, • Table-top exercises, simulations, and mock drills to improve operational readiness of the plans, • Strengthening of the Fire and Emergency Service through revamping and modernization, • Transportation systems and network, • Power and fuel supply management,
Recovery and Build Back Better	• Port infrastructure damage assessment mechanism and award of reconstruction projects, contracting including revised specifications for resilient infrastructure, • Studies on past disasters and recovery to draw useful lessons.

6.3 TRAINING

Regular trainings are provided to all personnel who have a role in planning and operational response to an emergency. A well-coordinated programme of training exercises includes activities of varying degrees of interaction and complexity.

6.4 DRILLS and EXERCISES

Emergency drills and integrated exercises have the following objectives:

1. To ensure that the emergency organization personnel are familiar with their duties and responsibilities,
2. Provide hands-on experience with the procedures to be implemented during emergency,
3. To test the adequacy of the effectiveness, timing, and content of the plan and implementing procedures.

The frequency of the drills depends on the severity of the hazard. However, drills should be conducted at least once a year.

6.5 COMMUNICATION

Communication technology is an integral part of disaster management. It plays an important role in all the four distinct phases of disaster management namely mitigation, preparedness, response, and recovery.

The following table provides information on the communication equipment available with the services and authorities.

Table 6.2: Equipment

Services and Authorities	Network Element
CMG and IRT	VHF, Telephone, Walkie Talkie, Mobile, Satcom
Fire – fighting Service	VHF, Telephone, Walkie Talkie, Mobile, Satcom
Personal and internal Medical services	Telephone, Mobile
Fire-fighting craft and Rescue launches	VHF, telephones
Ships at Berth	VHF, Walkie Talkie.
Civil authorities Including fire services, Police and medical services	VHF, telephone, Mobile
Harbour authorities, Pilots, tugs and other harbor craft	VHF, telephone, SATCOM
District Collector or State Secretary	Telephone, Mobile, SATCOM
Jt. Secretary-Ministry of Ports, Shipping and Waterways, New Delhi	Telephone, Mobile, SATCOM

6.6 TEMPORARY MULTIPURPOSE SHELTER

In the event of an impending disaster the affected population would have to be transported to intermediate evacuation shelter. The evacuation shelters may be schools and colleges located in the City or as instructed by district authorities.

Help from the voluntary organizations i.e. NGO may be taken for the rescue and relief operation.

6.7 TRANSPORTATION

All Port vehicles (owned or hired) will be used during emergency. If required stakeholder vehicles can also be used.

6.8 GENERATOR SETS

Wherever generator sets are required, the engineering department will be contacted, who will immediately hire/procure.

6.9 DECONTAMINATION

Decontamination is done to remove hazardous materials from people and equipment. The various types are as below:

- **Clinical decontamination** - treatment by health professionals of patients affected by or contaminated with hazardous materials;
- **Personnel decontamination**, meaning the decontamination of uninjured exposed persons;
- **Equipment decontamination** is the procedure used to clean the specialist equipment/protective suits which personnel use in dealing with hazardous material incidents.

6.10 MEDICAL FACILITIES

Depending on the nature of the emergency, it may be necessary to alert medical facilities . Port hospital and tied up hospitals can be utilized.

First Aid treatments are provided at the port. Port ambulances and vehicles can be used to transfer Injured persons to medical facility.

6.11 RESOURCE MANAGEMENT

Resources available with the port for the preparedness program can be found in **Chapter 10 and Annex C**.

The various equipment and systems should always be maintained, inspected, and tested periodically.

6.12 LOGISTICS/SERVICE DELIVERY MECHANISM

The required/necessary equipment and assistance during various types of emergencies can be requested from the Local Industry crisis groups, District crisis groups, neighboring industries. Additional resources available for disaster relief with the various departments in the Kolkata/South-24 Parganas District can be found from IDRN (<https://idrn.nidm.gov.in/>).

7. RESPONSE STRATEGIES

7.1 EARLY WARNING OR ALERT SYSTEM

7.1.1 Receiving and managing alerts

Information of the occurrence of incidents in and around the port area may come from a variety of sources. On receipt of information designated personnel must carry out investigation to confirm the incident and gather as many details as possible and:

- Prepare an incident report.
- Immediately forward the report to CIC.

7.1.2 Activation of Emergency Operation Centre (EOC) and initial resource coordination (Refer Table 7.1)

7.1.3 Resource mobilization

The CIC, SIC will ensure mobilization of sufficient equipment and personnel resources required to manage the response.

7.1.4 Direction, control and coordination –amongst IRT

The overall responsibility of the Emergency management lies with the CIC.

Table 7.1: Procedure for Establishing EOC

ESTABLISHING THE EMERGENCY OPERATION CENTRE (EOC)			
Task	Action		Status
1.0	Obtain and/or assign EOC equipment.		
1.1	Communications		
	a	Email and Internet connectivity	
	b	Satellite phone.	
	c	Telephone lines/ Mobile	
	d	Radio frequency (VHF Channel as required).	
1.2	Information Display.		
	a	Set of forms (minimum of 5 sets).	
	b	Regional Maps and Charts:	
		i Nautical charts.	
		ii Topographic maps	
	c	Overhead projector (in nominated briefing room).	
	d	Whiteboards.	
1.3	Copy(s) of the DMP, CMP and OSCP.		
1.4	Computer / Laptop and Printer.		
1.5	Stationary: Markers, Pens, Pencils and A4 white paper.		
1.6	Tables and chairs		
1.7	Order and obtain any items needed (1.1-1.6)		
1.8	Advise reception to direct incoming calls to the EOC.		

7.1.5 Competent Agencies

The competent agencies are responsible for keeping track of developments in respect of specific hazards assigned to them and inform the designated authorities/agencies at National, State and District levels about the impending disasters.

Table 7.2: Competent agencies for issuing warnings

Agencies	Disaster
IMD, Ministry of Earth Science	Earthquake
Central Water Commission, State Irrigation department	Flood
Cyclone warning center, IMD – Kolkata	Cyclone, Heavy rainfall
INCOIS	Tsunami and Storm Surge

7.1.6 Communication Flowchart

Communication flowcharts between the key agencies and key personnel of the CMG/IRT for various hazards are as follows

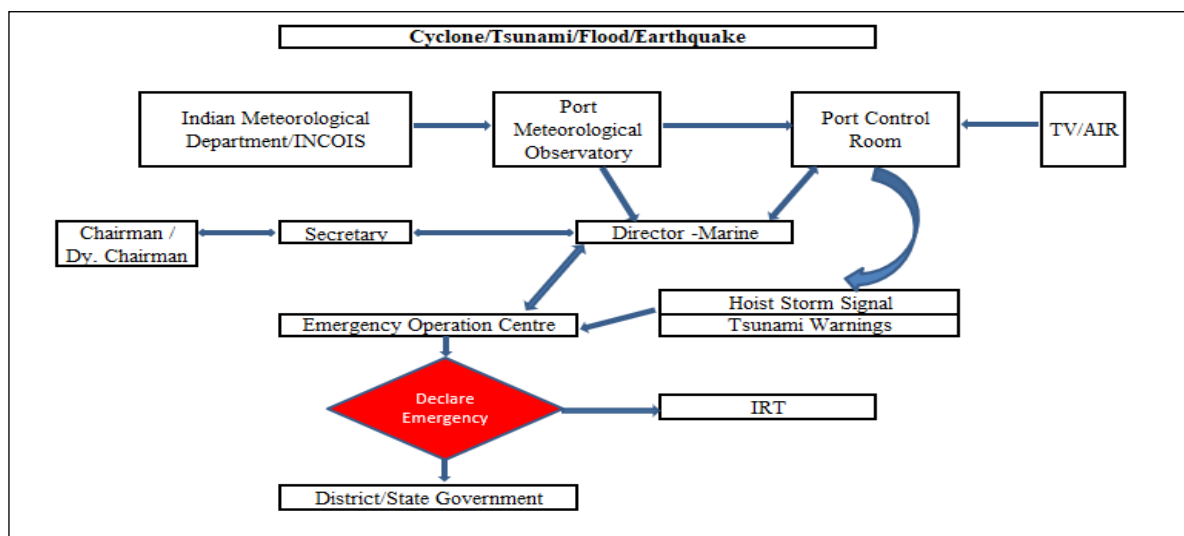


Figure 7.1: Cyclone /Tsunami/Flood/Earthquake

Note: For Level of disaster refer paragraph 4.1.

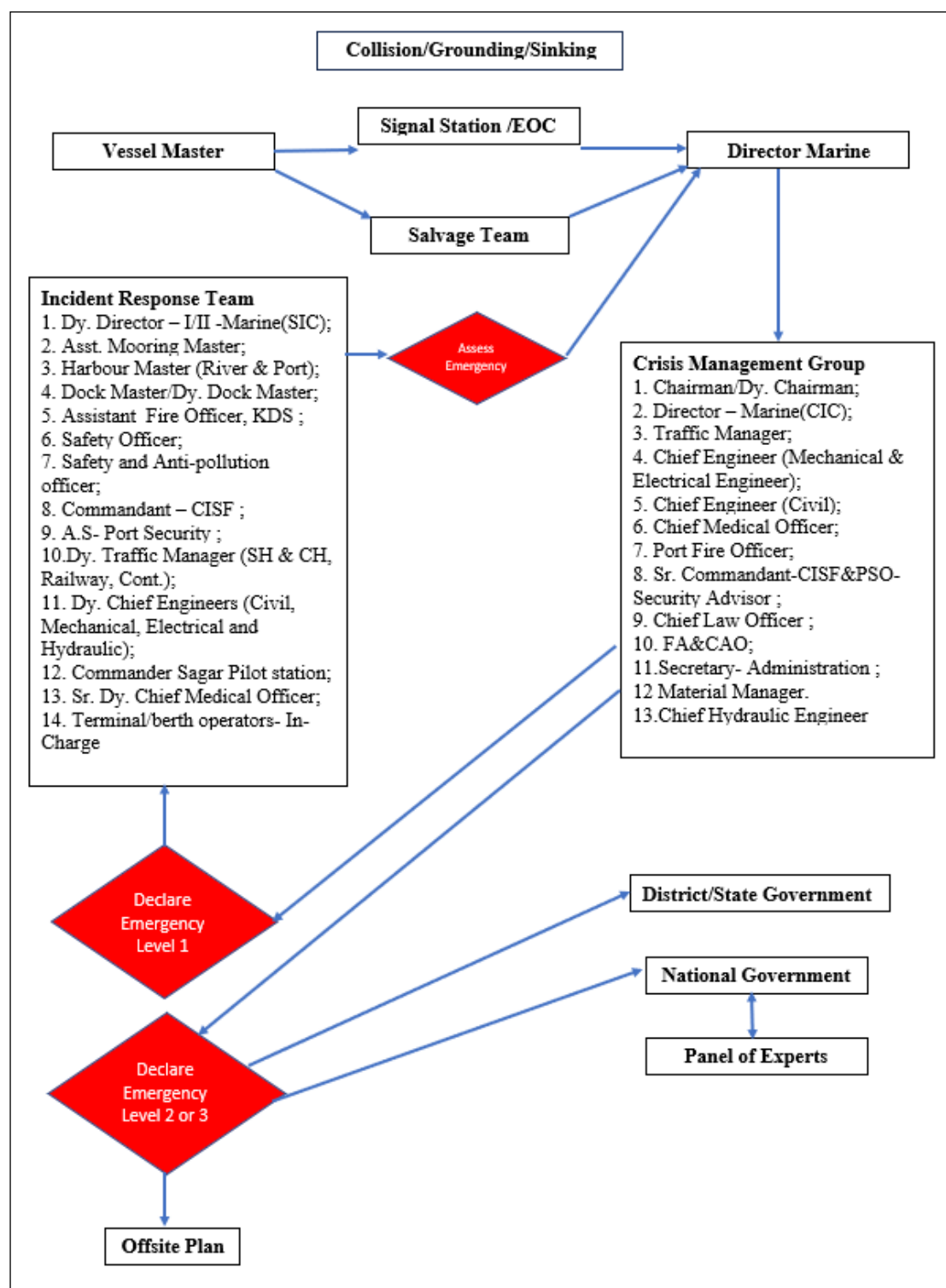


Figure 7.2: Collision/Grounding/Sinking

Note: For Level of disaster refer paragraph 4.1.

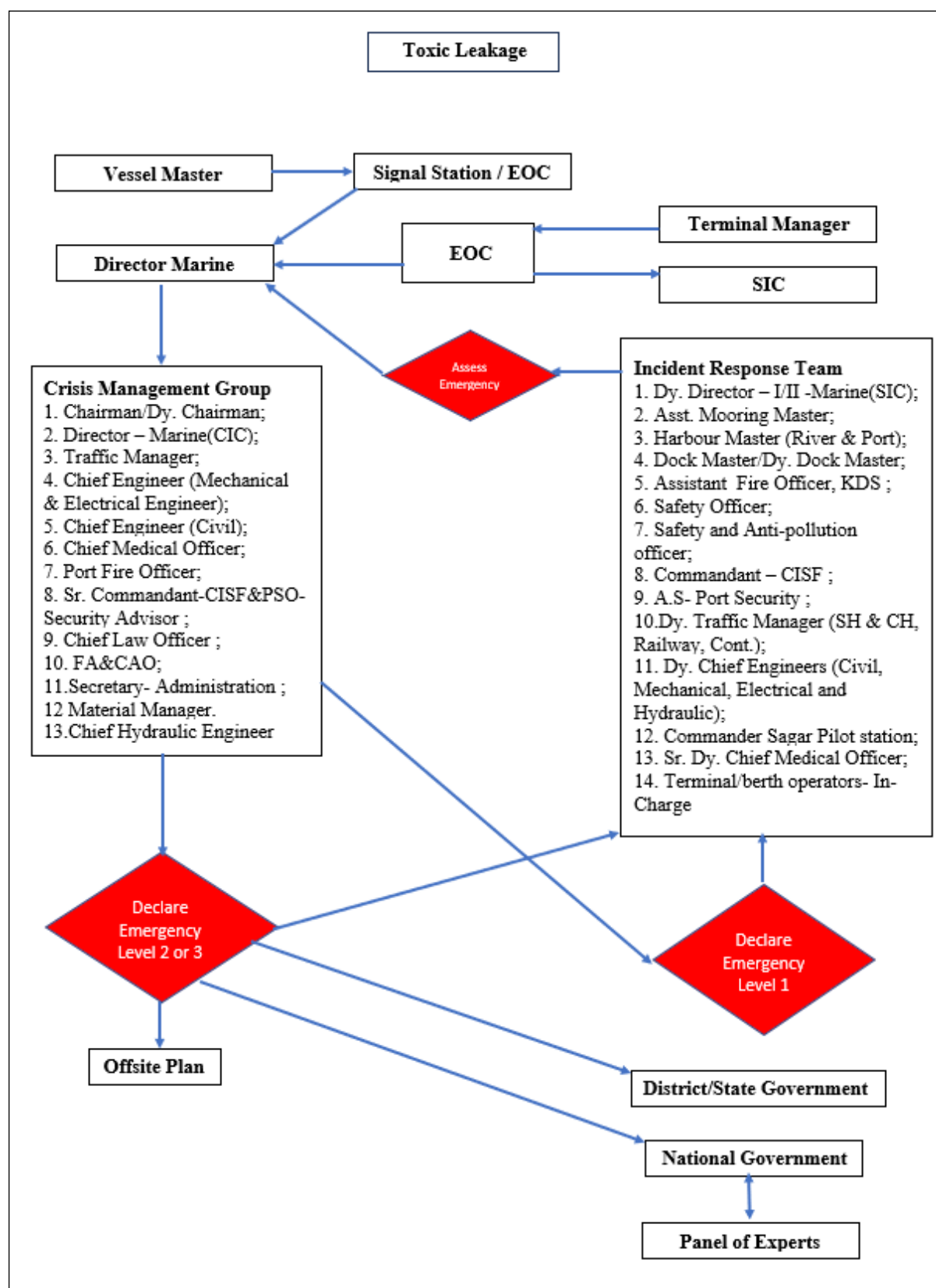
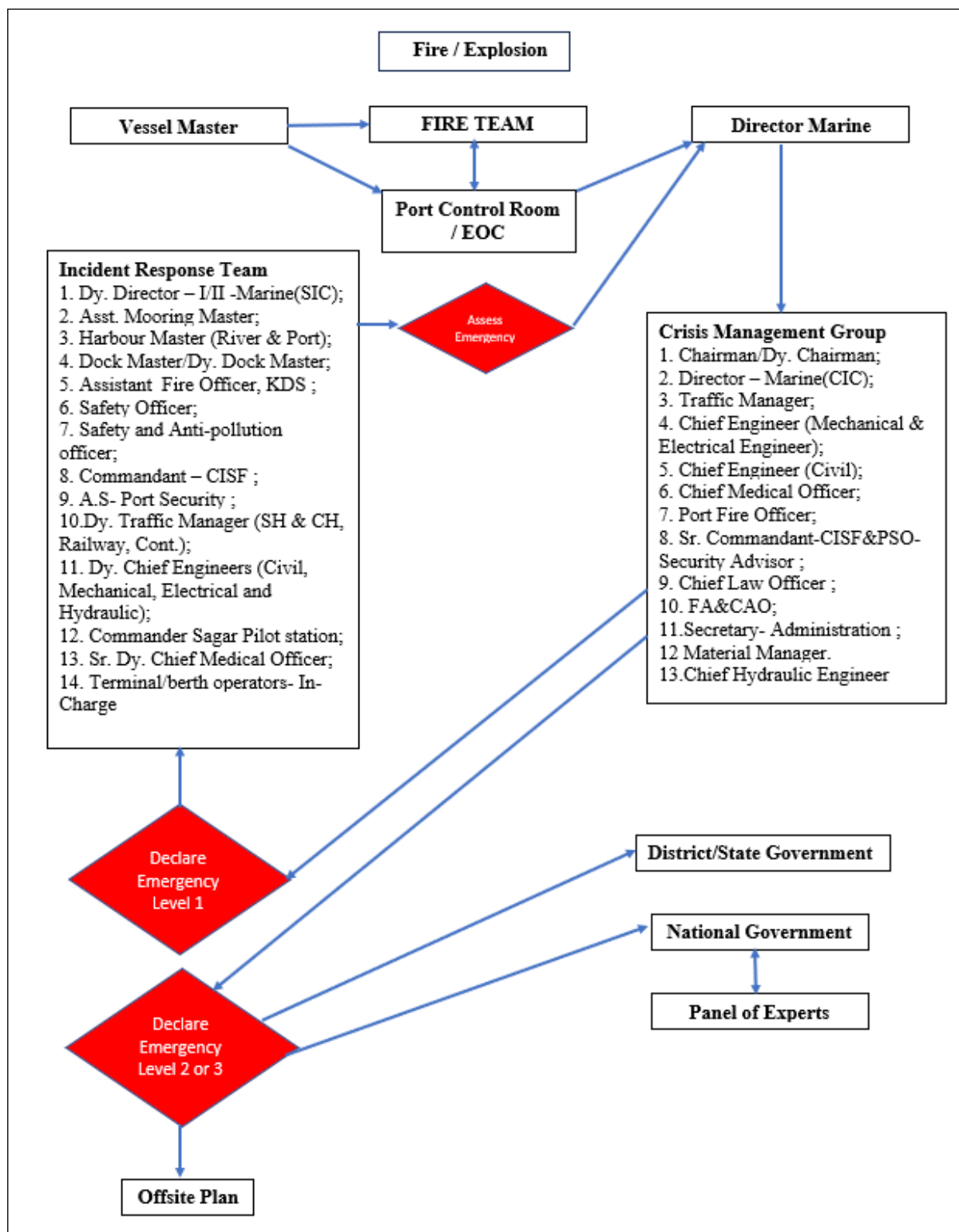


Figure 7.3: Toxic Leakage

Note: For Level of disaster refer paragraph 4.1.

**Figure 7.4: Fire/Explosion**

Note: For level of disaster refer paragraph 4.1.

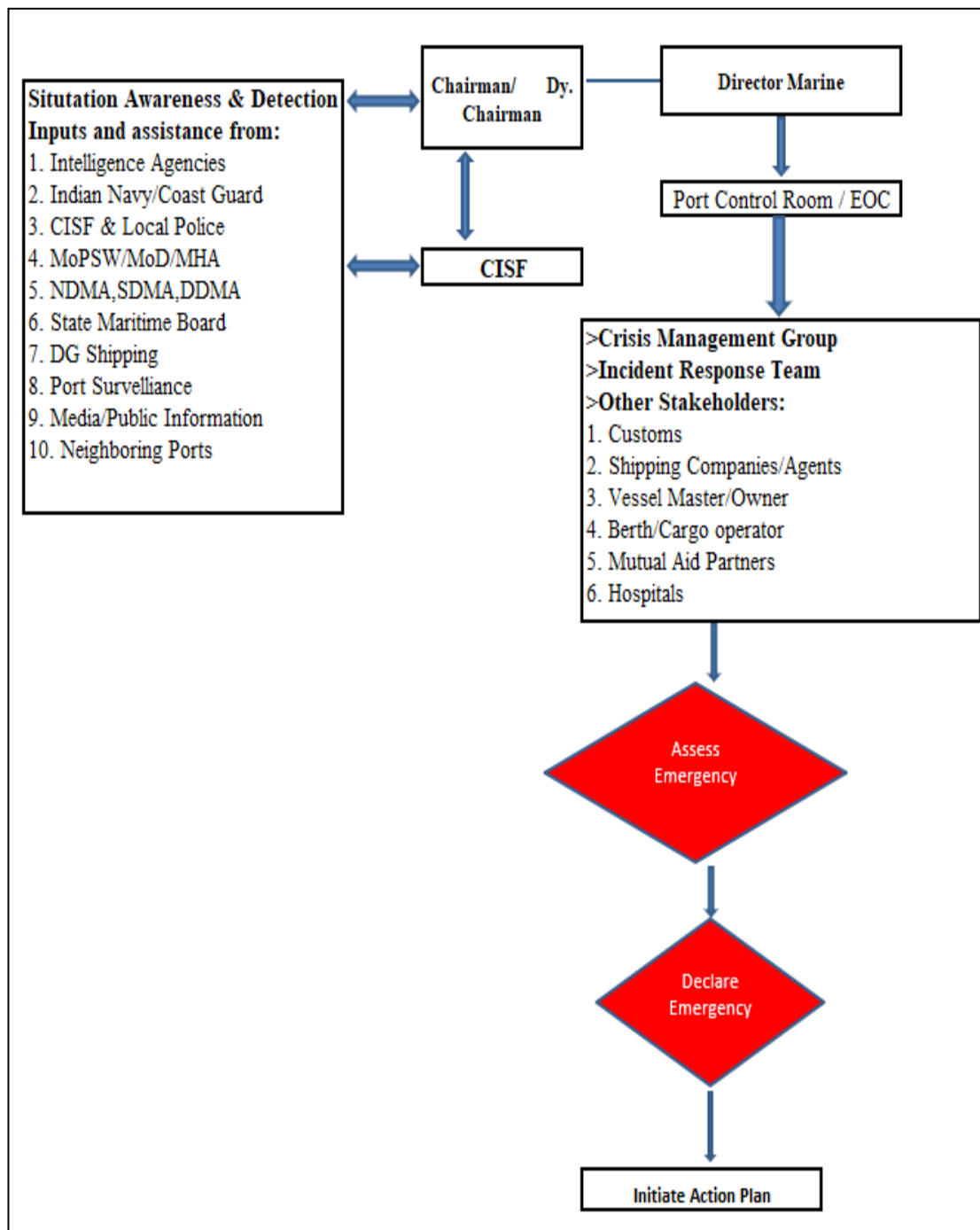


Figure 7.5: War like situation

Note: For level of disaster refer paragraph 4.1.

7.2 ACTIVATION OF RESPONSE PLAN

7.2.1 Action implementation plan

The observer, noticing an unusual occurrence like a fire / oil spillage/ gas release / collapse of structure etc., should immediately notify Port Control Room / Security Control room / Fire Station with available means of communication and also contact the concerned officer of the area.

He should:

1. Raise alarm
2. Call Port Control Room / Security Control room / Fire Station and pass on following information:
 - Introduce himself
 - Briefly state the type of emergency
 - Give the location of the incident.
3. Proceed to a safe place. However, he would return to the location of the incident and place himself in a safe area and standby to give assistance if he is part of the action group.
4. After receiving information from the observer, the Port Control Room / Security Control room / Fire Station would notify all the key personnel of the Port.
5. All concerned personnel would move to their respective positions and will begin actions as documented in the action plan.

7.2.2 Site Control Procedure

Table 7.3: Site Control Procedure

SITE CONTROL PROCEDURE		
Site Control should be established for every site where access is to be controlled. This includes the EOC, sites of shoreline cleanup, waste storage, response vessel mooring areas or any site containing hazards or hazardous materials.		
Task	Action	Status
1	Identify perimeter of the “Hot” (secure or prohibited) zone. This may be:	
	i Area around the incident (e.g., Fire and Explosion).	
	ii Jetty or Berth area	
	iii Oiled shoreline. (Note: This zone should contain all hazards and sensitive areas where access should be restricted).	
2	Identify the “Hot” zone perimeter by cordoning.	
3	Identify the “Warm” (exclusion, controlled or support) zone. (Note: This is a non-contaminated/ non-hazardous zone). For e.g.: Shelter, canteen, car parking, etc.	
4	Identify the “Warm” zone perimeter by cordoning.	
5	Establish any required “Hot” zone perimeter facilities. For e.g. (i) and (ii):	
	i Decontamination facility.	
	ii Temporary waste storage.	
6	Establish “Warm” zone perimeter facilities.	
7	Establish support facilities within Warm zone as required.	

Note 1 Entry to a Hot Zone should be restricted to:

- Personnel involved in the on-site work.
- Personnel equipped with appropriate protective gear.
- Personnel who have undergone correct training and induction.

Note 2 The Warm Zone surrounds the Hot Zone and is generally:

- The area from which personnel and equipment are deployed.
- The perimeter where site control is exercised i.e. the entry points to the Hot Zone.
- Restricted to those people who operate in the Hot Zone and those who support them.

Note 3 The Cold Zone is all public or otherwise unrestricted areas, i.e. those areas outside of the controlled site.

7.2.3 Mechanism for access control and isolation of the Dangerous area

1. All gates and jetties should be guarded,
2. Unauthorized person should not be allowed to the restricted area,
3. Authorized person will be entering the zone with all the necessary PPEs,
4. The area should be cordoned off during operation,
5. Proper signage board and warning should be displayed at the place of the operation,
6. Fire-fighting facilities and other required resources should be available till the operation is terminated,
7. The restricted areas should be under surveillance at all times.

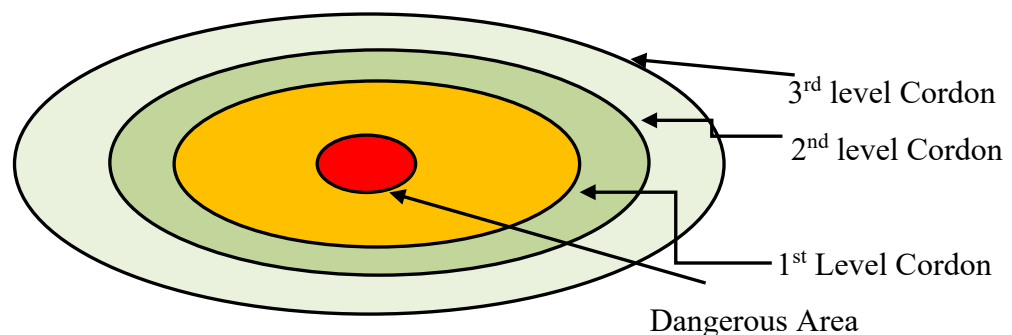


Figure 7.6: Isolation of Dangerous area

- Dangerous area
- 1st Level Cordon off
- 2nd Level Cordon off
 - Site Control point
 - Ambulance
 - Casualty Clearing point
- 3rd Level Cordon off
 - Traffic Control

Note: Positions will depend on the wind directions.

7.2.4 Search and rescue operation

Search and Rescue shall start as soon as the public warning signal has been issued and should be carried out as per the instructions of CIC/SIC.

7.2.5 Evacuation

On blast of siren, the workers will assemble at the respective assembly points to be transported to the refuge centers.

A list of foreign nationals working on ships and ashore will be maintained by CISF. Their agents and employers will be required to register such foreign nationals prior to their calling inside port. They will be handed over the checklist of do's and don'ts, evacuation routes, emergency contact details whenever they enter the work premises. In the event of an emergency evacuation, they will be required to report to the security gates of the facility or assembly areas.

a. Assembly Points: The port has following assembly points.

Table 7.4: Assembly Points

Sr. no.	Disaster	Assembly points
1.	Natural Calamities	Proceed to the Relief Centers or to other shelters (Coordinated by CISF-Port Security)
2.	Fire at KPD	Gather at Berth No 11 KPD (passenger Terminal) to proceed out from Gate as directed (Coordinated by Port Fire Service, CISF-Security)
3.	Fire at NSD	Gather near Container Terminal Building to proceed out as directed (Coordinated by Port Fire Service., CISF, PSO)
4.	Fire at Budge Budge	Gather near Port Office, Budge-Budge Petroleum Wharves
5.	Toxic gas Release	The route decision will be determined depending upon the wind direction at the time of the incident. It will be in the up-wind direction of the outflow source direction. (Coordinated by Port Fire Service. and CISF-Security)
6.	Fire at General Cargo berths	Gather at the Assembly points at KPD/ NSD (Coordinated by Port Fire Service, CISF, PSO)
7.	Fire in office buildings	Gather near office building (Coordinated by Port Fire dept., CISF, PSO - Security)

b. Evacuation Routes

The toxic gas release is most significant risk affecting the port personnel and neighboring industries. The duty of the CIC, SIC is to alert relevant authorities and advise them about the actions that should be taken to protect the public, if any.

The evacuation route could be by two ways

- a. Land;
- b. Sea, River.

The vehicle-carrying casualty should be given priority in traffic movement. While assessing the evacuation route, constant communication link should be maintained with the EOC as well as with the individual assembly point station from where the evacuation is to be undertaken.

7.3 HAZARD SPECIFIC RESPONSE PLAN

Following potential accidental scenarios have been identified in accordance with the risk assessment for the port. The action flowchart and action plan for each scenario has been prepared in accordance with the Incident Response System (IRS-NDMA).

SR. NO.	SCENARIOS	PAGE NO.
DISASTER DURING CARGO STORAGE /TRANSFER		
1.	Fire due to leakage or rupture of POL/Chemical from pipeline/hose at NSD oil jetty (berth no. 12)– on vessel or ashore	54
2.	Fire or Explosion at budge-budge wharf– on vessel or ashore due to leakage or rupture of POL/Chemical from pipeline/hose.	60
3.	Toxic product (e.g. Toluene) leak from pipeline/hose at budge-budge wharf during operation – on Vessel or Ashore.	66
4.	Corrosive Acid - Leakage (e.g. Sulphuric acid) from pipeline/hose at budge-budge wharf during operation – on Vessel or Ashore	72
5.	Fire or leakage due to Crane Accidents (Container drop/crane fall) at container berth/yard NSD – secondary event.	77
6.	Fire on vessel (non-tankers) at KPD/ NSD berth.	82
7.	Fire in coal stack yard at KPD	88
NAVIGATIONAL DISASTERS		
8.	Ship Collision or Grounding within port limit.	92
DISASTER IN SERVICE AND ADMINISTRATION FACILITIES		
9.	Fire in Office buildings, Hospital, Electrical substations, Pump houses and control rooms at Lock gate and bridges, Dry docks, Warehouses.	99
HUMAN RELATED DISASTERS		
10.	War and Terrorism like Situation	104
11.	Bomb Threat- information received via email, SMS, on social media.	109
12.	Hijacking	113
13.	Labour Dispute	118
NATURAL DISASTERS		
14.	Cyclone	122
15.	Flood due to high tide and/or heavy rains	129
16.	Earthquake	136
17.	Tsunami	141
BIOLOGICAL DISASTERS		
18.	Pandemic	148

S1: Scenario 1: Fire due to leakage or rupture of POL/Chemical from pipeline/hose at NSD oil jetty (berth no. 12)– on vessel or ashore.

Part A- Action Plan

- 1. Precautions:** MSDS, procedure of transfer operations, berthing and un-berthing procedure, Periodic inspection and maintenance of hoses and pipelines.
- 2. Impact Zone:** Oil Jetty, transfer pipeline and surrounding area.
- 3. Resources required:** Action Group enumerated in Figure S1.2 and material and equipment resources as given in **Chapter 10**.

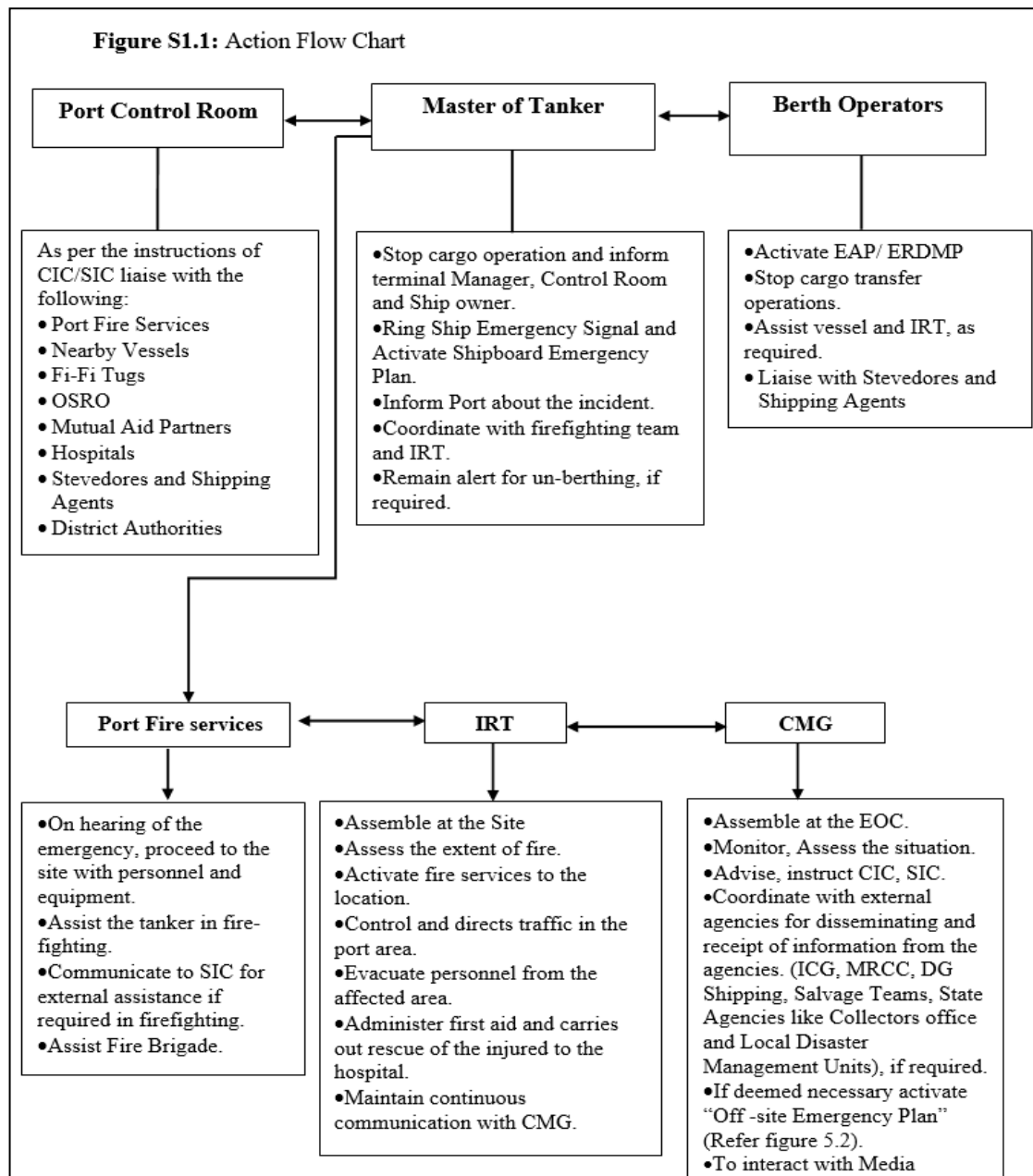
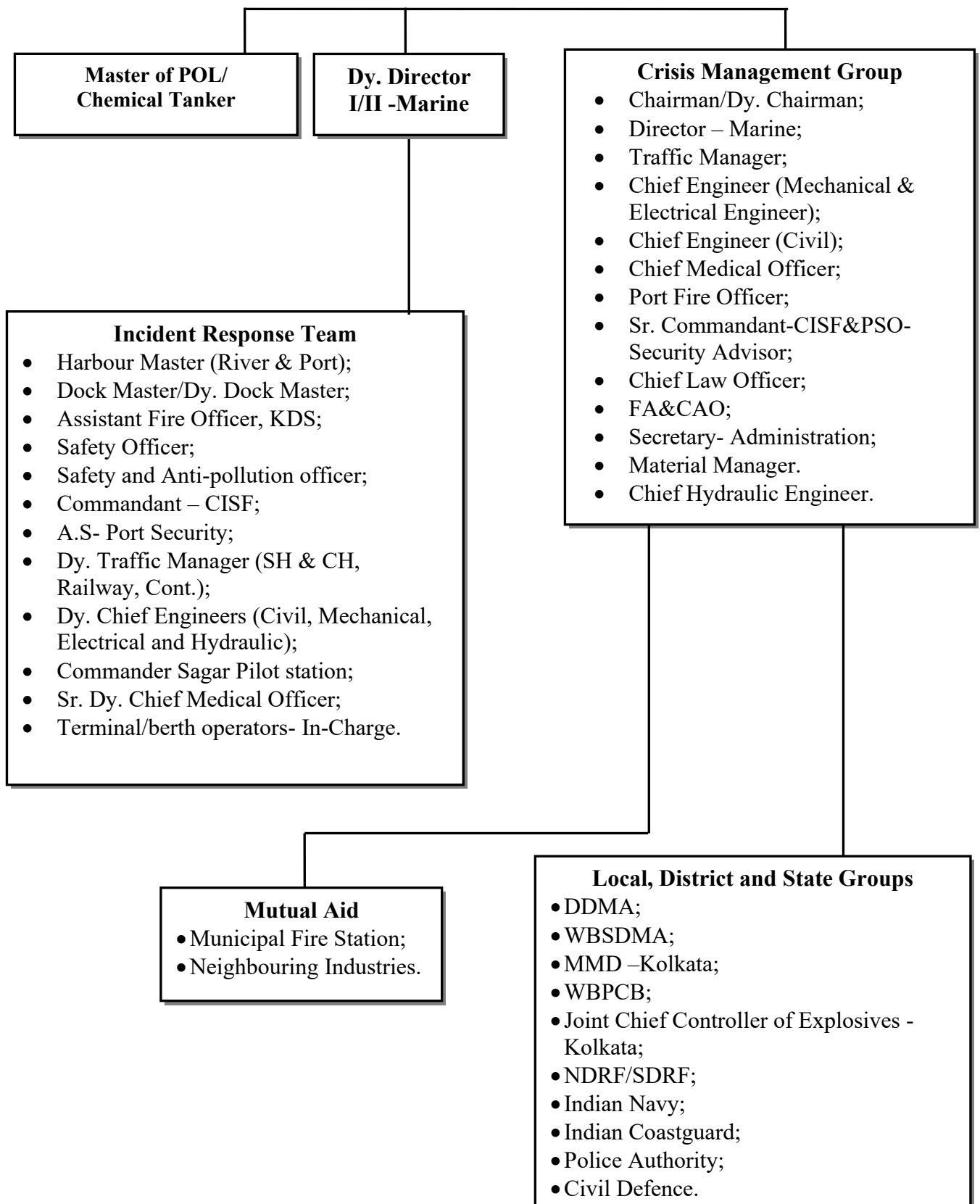


Figure S1.2: Action group

Part B: Roles and Responsibilities

The vessel upon berthing, berth operator will follow standard procedures. However, in a less likely scenario a leak from the pipeline system may occur at the jetty or from the jetty along the route to the terminal (within the port area) leading to self-detection by vessel personnel or by the terminal/operator automatic alarm system. Further in a more unlikely situation due to a possible ignition the leakage might catch fire. The following action will be required:

1. The Master of the Tanker (Alternate: Chief Officer)

Response Action
a. Raise vessels emergency alarm and activate vessel emergency action plan.
b. Coordinate with Berth Operator to stop Cargo transfer operation (as per SOP).
c. Vessel in the vicinity and Port should be informed of incident without any delay.
d. Personnel to remain stand by to disconnect hoses.
e. Fight the fire with ships own resources as well as with the available support from IRT.
f. Remain prepared to un-berth the vessel to the safe area.
g. Inform vessel owner/agents about the incident.
h. The siren should be continued till the vessel is taken to a safe location as per CIC instructions.

2. The berth operator tasked with POL/Chemical cargo operations at the Jetty

Response Action
a. Activate EAP and inform Port.
b. Shut off isolation valve on POL/Chemical pipeline at the Jetty (action as per SOP).
c. Area should be cordoned off.
d. Coordinate with Port and rendering necessary assistance to the SIC by providing additional fire - fighting and emergency equipment as required.
e. Pour foam/dry chemical powder on POL/Chemical spillage to reduce rate of vaporization as per MSDS.
f. Coordinate with the Master of the ship, stevedores.

3. Chief Incident Controller (CIC)-Director -Marine (Alternate: Dy. Director I/II - Marine)

Response Action
a. Assess the level of disaster and activate the DMP.
b. Establish EOC and be stationed to review and assess possible developments to determine the most necessary course of action.
c. Give necessary instructions to SIC, Port Control Room and arrange for external aid as necessary.
d. Review the situation and accordingly inform to the CEC.
e. Assess the condition of site and of potential affected area and take decision on evacuation in consultation with SIC.

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| f. Authorize use of Ambulance for evacuation along with medical staff to identified hospital/dispensary. |
| g. Discuss and coordinate with functional heads. |
| h. Be in constant touch with District and Local Administration for rescue and relief operation. |
| i. Terminate the response and debrief before allowing normal operation. |

4. The Port Control Room

Response Action
a. Gather information related to the weather conditions and accordingly convey the message to CIC, SIC, Fire team, Port Security, CISF and Berth Operator.
b. Liaise with Master of the Vessel or Pilot.
c. Listening watch to be maintained on VHF channel-16, 68.
d. Notify CIC, SIC about vessels movements. Keep CIC, SIC informed of all the messages received through communication medium.
e. Organize tugs and Pilots for combating the fire and rescue.
f. Notify the relevant Authorities and stakeholders as per instructions of CIC, SIC.

5. The Fire-fighting personnel

a. Raise Alarm (siren).
b. Ensures availability of the fire tenders.
c. In case of fire onboard assist Master in fighting fire as per Masters Instructions.
d. If the fire is under control and extinguished, give all clear signal.

6. Duties of IRT

Designated Officer	Role	Duties
Dy. Director I – Marine (Alternate Dy. Director II – Marine)	Site Incident Controller	During Emergency shall proceed to the scene, communicate and collect all information from the Master of the Tanker and berth operator.
		Conduct initial briefing and report the situation to the CIC.
		Assess the condition of site and of potential affected area and take decision on evacuation in consultation with CIC.
		Alert vessels within the vicinity.
		In case of fire onboard assist Master for firefighting
		Instruct the Port Fire Services to keep the fire-fighting installation and tenders in a state of readiness and activate if required.
		Instruct pilot(s) to keep tugs ready for fire-fighting.
		Coordinate with all functional heads.

Disaster Management Plan

Harbour Master (River) (Alternate Dock Master/Pilots)	Port Control Room Coordinator	Shall monitor the communication on VHF or any other communication medium, convey and relay messages on the advice from CIC, SIC.
		Prepare vessels to vacate berth as per instructions.
		Responsible for organizing tugs, mooring boats and pilots for combating the fire and rescue.
		Maintain Log of events.
Asst. Port Fire Officer (Alternate Officer)	Fire, Search and Rescue Coordinator	Shall take orders from the SIC.
		Lead the fire-fighting team and mobilize fire tenders, manpower, fire-fighting equipment to the scene and extend all necessary support to the Master of the vessel/berth operator for fire-fighting.
		Assist CISF in evacuation of workers to the assembly points.
		Inform SIC for requirement of any additional equipment.
Commandant-CISF (Alternate Dy. Commandant-CISF)	Security and Evacuation	Cordon off the area as per instructions from SIC.
		Controls and Directs gate security and traffic in the area.
		Facilitate evacuation, transport, first aid and rescue of personnel from the scene at the time of emergency.
		Control the entry of authorized and unauthorized persons and vehicles.
		Liaise with the Police authorities.
		Responsible the head count of the personnel.
Dy. Traffic Manager (Alternate Officer)	Traffic Coordinator	Arranges to protect the cargo from any damages from the incident.
		Coordinates with Ship owners, agents and stevedores to arrange and ensure evacuation.
Safety & Anti-Pollution Officer (Alternate Officer)	Pollution Control Coordinator	Determine the level of contamination of the site as a result of incident.
		Ensure cleanup work during and after the emergency to be conducted by the OSRO team.
		Inform and coordinate with WBPCB and approved waste disposal agencies for waste disposal.
Executive Engineer (Alternate Engineer)	Civil Coordinator	Instruct the workers to carry out urgent civil works as required.
		Shall mobilize and dispatch sufficient number of vehicles to the site of emergency.
Executive Engineer	M & E Coordinator	Shall be responsible for uninterrupted electrical supply to vital equipment and utility at the berth.

Disaster Management Plan

(Alternate Engineer)		Shall remain alert on duty for any electrical isolation of equipment during emergency.
Sr. Dy. CMO (Alternate Medical Officer)	First Aid and Medical Coordinator	Responsible for organizing and keeping first aid team with ambulance as required.
		Make arrangements for transportation and treatment of injured persons.
		Coordinate with the local hospitals.
Duty Pilot (Alternate Standby Pilot)	In Charge of Pilotage	Shall be ready for taking the vessel out of berth and be ready for providing any assistance on site.

S2: Scenario 2: Fire or Explosion at budge-budge wharf– on vessel or ashore due to leakage or rupture of POL/Chemical from pipeline/hose.

Part A: Action Plan

1. **Precautions:** MSDS, procedure of transfer operation, berthing and un-berthing procedure, Periodic inspection and maintenance of hoses and pipelines.
2. **Impact Zone:** Consequence analysis indicates that the MTBE leak from transfer pipeline will affect upto 900 meters in case of Vapor cloud explosion (VCE).
3. **Resources required:** Action Group enumerated in Figure S2.2, material and equipment resources as given in **Chapter 10**.

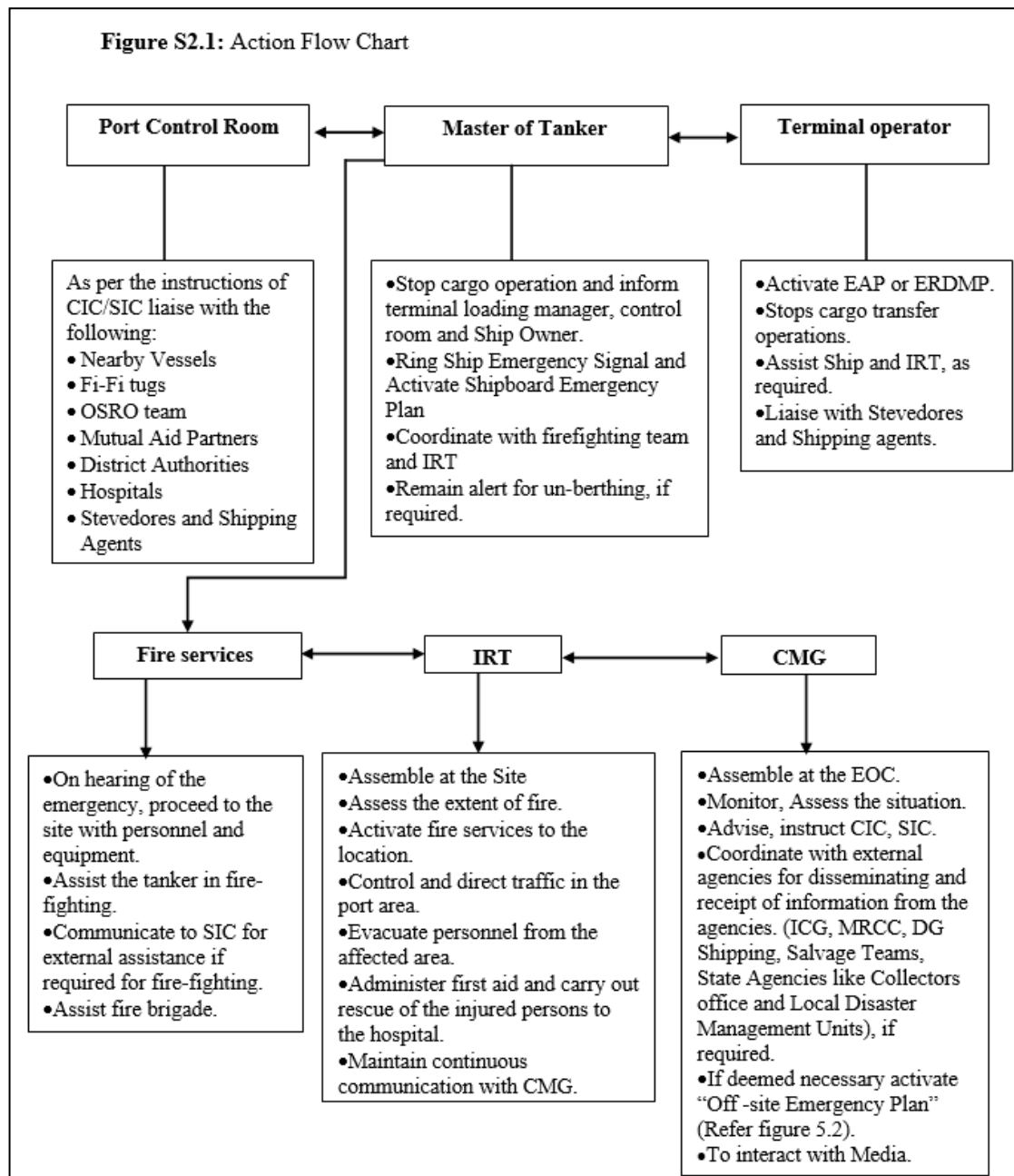
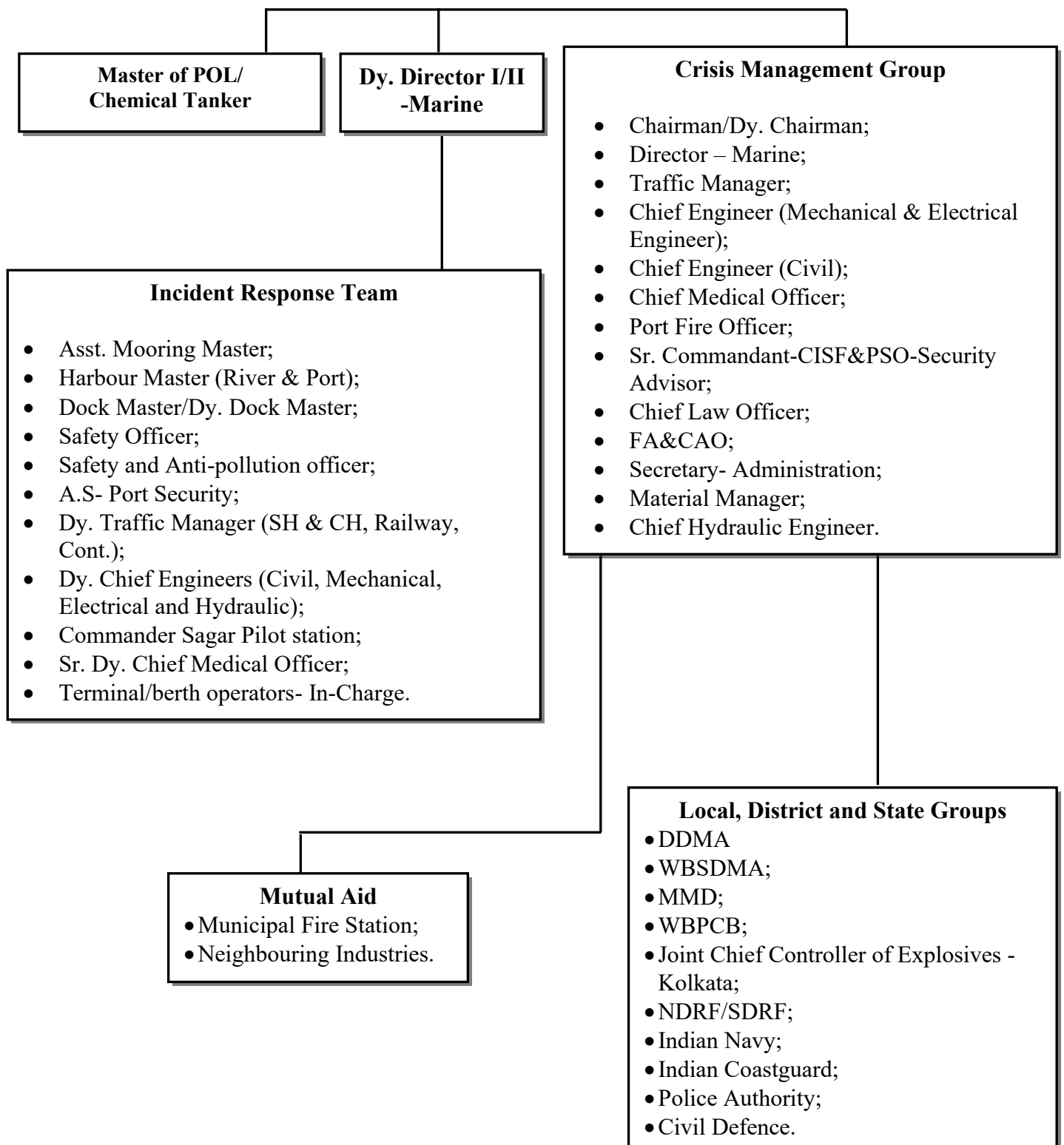


Figure S2.2: Action group

Part B: Roles and Responsibilities

The vessel upon berthing, terminal operator will follow standard procedures. However, in a less likely scenario a leak from the pipeline system may occur at the jetty or from the jetty along the route to the terminal (within the port area) Further in a more unlikely situation due to a possible ignition the leakage might catch fire and can lead to explosion. The following action will be required:

1. The Master of the Tanker (Alternate: Chief Officer)

Response Action
a. Raise ship emergency alarm and activate ship board emergency action plan.
b. Coordinate with Berth Operator to stop POL or Chemical transfer operation (as per SOP).
c. Vessel in the vicinity and Port should be informed of incident without any delay.
d. Personnel to remain stand by to disconnect hoses.
e. Fight the fire with ships own resources as well as with the available support from IRT.
f. Remain prepared to un-berth the vessel to the safe area.
g. Inform vessel owner/vessel manager of the vessel about the incident
h. The siren should be continued till the vessel is taken to a safe location as per CIC instructions.

2. The terminal operator persons tasked with POL/Chemical cargo operations at the Jetty/wharf

Response Action
a. Activate EAP or ERDMP and inform Port.
b. Shut off isolation valve on POL/Chemical pipeline at the berth (action as per SOP).
c. Incident area should be identified and cordoned off.
d. Coordinate with Port and rendering necessary assistance to the SIC by providing additional fire - fighting and emergency equipment as required.
e. Pour foam/dry chemical powder on POL/Chemical spillage to reduce rate of vaporization as per MSDS.
f. Coordinate with the Master of ship /agents /stevedores.

3. Chief Incident Controller (CIC)- Director -Marine (Alternate: Dy. Director I/II - Marine)

Response Action
a. Assess the level of disaster and activate the DMP.
b. Establish EOC and be stationed to review and assess possible developments to determine the most necessary course of action.
c. Give instructions to SIC, Port Control Room and arrange for external aid as necessary.
d. Review the situation and accordingly inform to the CEC.

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| e. Assess the condition of site and of potential affected area and take decision on evacuation in consultation with SIC. |
| f. Authorize use of Ambulance for evacuation along with medical staff to identified hospital/dispensary. |
| g. Discuss and coordinate with functional heads. |
| h. Be in constant touch with District and Local Administration for rescue and relief operation |
| i. Terminate the response and debrief before allowing normal operation |

4. The Port Control Room

Response Action
a. Gather information related to the weather conditions and accordingly convey the message to CIC, SIC, Fire team, PSO and Berth operator.
b. Liaise with Master of the Vessel or Pilot.
c. Listening watch to be maintained on VHF channel-16, 68.
d. Notify CIC, SIC about the vessel's movement. Keep CIC, SIC, informed of all the messages received by Communication Medium.
e. Organize tugs and Pilots for combating the fire and rescue.
f. Notify the ICG, stakeholders as per instructions of CIC, SIC.
g. Notify the owner of the vessel as per the instruction of CIC, SIC, Master of vessel.

5. The Fire-fighting personnel

Response Action
a. Raise Alarm (siren)
b. Start the firefighting pumps as per the requirement.
c. Open the valves of the monitor and direct the jet towards fire.
d. Ensures availability of the fire tenders and fire-fighting tugs.
e. In case of fire onboard assist Master in fighting fire.
f. Ensure all the ignition sources in the vicinity are extinguished if fire has not occurred.
g. If the fire is under control and extinguished, give all clear signal.

6. Duties of IRT

Designated Officer	Role	Duties
Asst. Mooring Master (Alternate Officer)	Site Incident Controller	During Emergency shall proceed to the scene, communicate and collect all information from the Master of the Tanker and berth operator.
		Conduct initial briefing and report the situation to the CIC.
		Assess the condition of site and of potential affected area and take decision on evacuation in consultation with CIC.
		Alert vessels within the vicinity.
		Extend all necessary support to the Master of the vessel to fight the fire.
		Instruct the Fire Team to keep the fire-fighting installation and tenders in a state of readiness and activate, if required.
		Ensure Isolation of electrical equipment.
		Instruct pilot (s) to keep tugs ready for fire-fighting.
Harbour Master (River) (Alternate Dock Master/Pilots)	Port Control Room Coordinator	Coordinate with all functional heads.
		Shall monitor the communication on VHF or any other communication medium, convey and relay messages on the advice from CIC, SIC.
Terminal operator (Alternate Officer)	Cargo Work	Responsible for organizing tugs, mooring boats and pilots for combating the fire and rescue.
		Shall be responsible of shutting down of cargo operation and coordinating with Port and rendering necessary assistance to the SIC, by providing additional fire- fighting and emergency equipment as required.
Fire Team Supervisor	Fire, Search and Rescue Coordinator	Lead the fire-fighting team, mobilize fire tenders, manpower and fire-fighting equipment to the scene and extend all necessary support to the Master of the vessel for fire- fighting.
		Assist PSO in evacuation of workers to the assembly points.
		Inform SIC of the arrangement of any additional equipment as required.
Port Security Officer (Alternate Officer)	Security and	Cordon off the area as per instructions form SIC.

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	Evacuation	Control and direct gate security and traffic in the area.
		Facilitate evacuation, transport, first aid and rescue of personnel from the scene at the time of emergency.
		Control the entry of authorized and unauthorized persons and vehicles.
		Liaise with the Police authorities.
		Responsible for head count of the personnel.
Dy. Traffic Manager (Alternate Officer)	Traffic Coordinator	Prepare ships to vacate berth as per instructions.
		Coordinate with Ship owners/ agents/ stevedores to arrange and ensure evacuation.
Safety & Anti-pollution Officer (Alternate Officer)	Pollution Control Coordinator	Determine the level of contamination of the site as a result of incident
		Inform and coordinate with WBPCB and approved waste disposal handling agencies
		Ensure cleanup work during and after to be conducted by the OSRO team.
Executive Engineer (Alternate Engineer)	Civil Coordinator	Instruct the workers to carry out urgent civil works as required.
		Shall mobilize and dispatch sufficient number of vehicles to the site of emergency.
Executive Engineer (Alternate Engineer)	M & E Coordinator	Shall be responsible for uninterrupted electrical supply to vital equipment and utility at the wharf.
		Shall remain alert on duty for any electrical isolation of equipment during emergency.
Sr. Dy. CMO (Alternate Medical Officer)	First Aid and Medical Coordinator	Contact with Terminal first aid center and shall coordinate with the local hospitals.
		Make arrangements for transportation (ambulance) and treatment of injured persons.
Duty Pilot (Alternate Standby Pilot)	In Charge of Pilotage	Shall be ready on site for taking the vessel out of jetty and be ready for providing any assistance on site.

S3: Scenario 3: Toxic product (e.g. Toluene) leak from pipeline/hose at budge-budge wharf during operation – on Vessel or Ashore.

Part A: Action Plan

- 1. Precautions:** MSDS, procedure of terminal, berthing and un-berthing procedures and Periodic inspection and maintenance of hoses and pipelines.
Stay upwind and wear positive-pressure breathing apparatus and full protective clothing, as necessary.
- 2. Impact Zone:** Consequence analysis indicates that the Toluene leak from transfer pipeline would cover 300 meters for toxic dispersion with IDLH level of 500 ppm.
- 3. Resources required:** Action Group enumerated in Figure S3.2, material and equipment resources as given in **Chapter 10**.

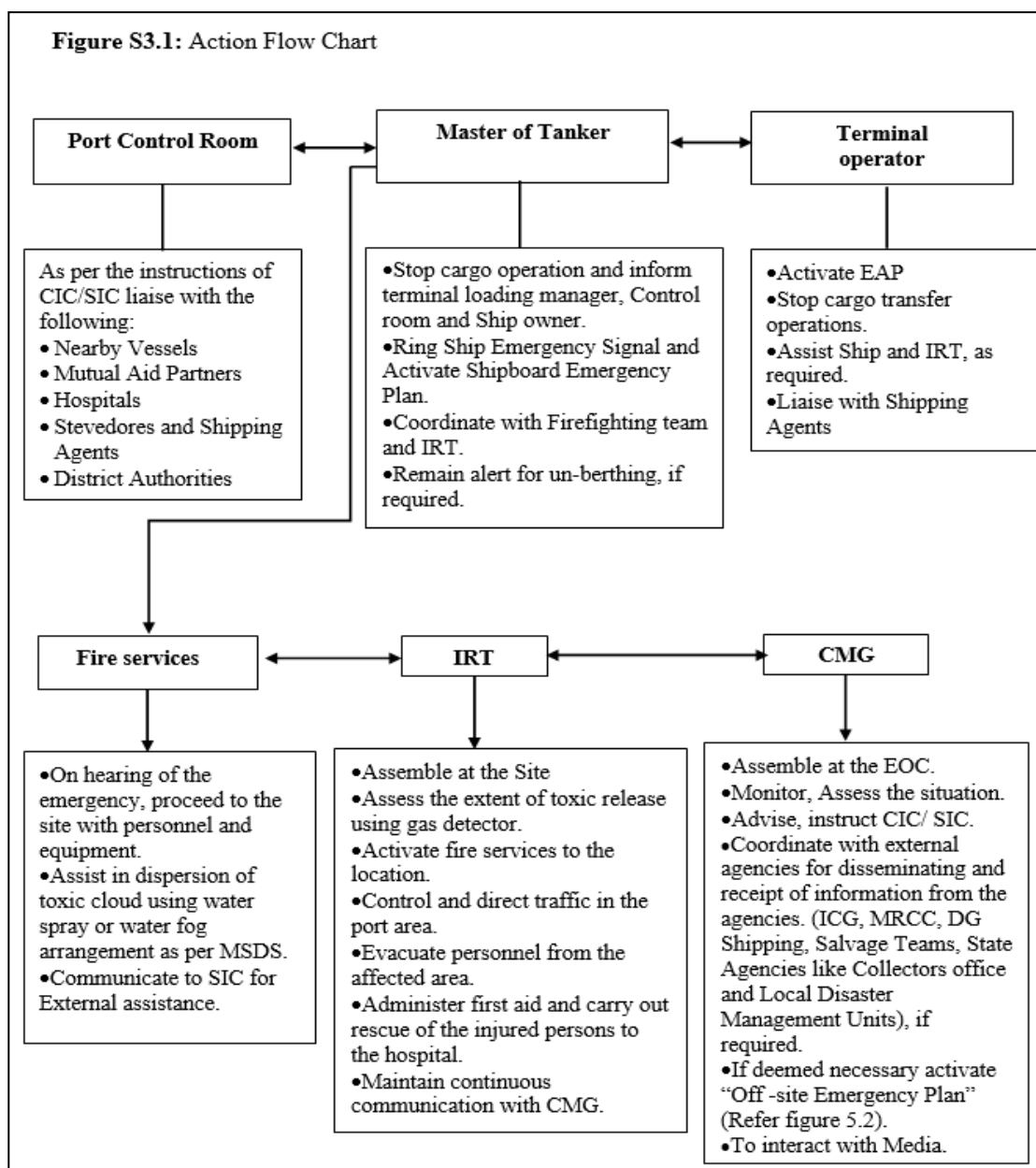
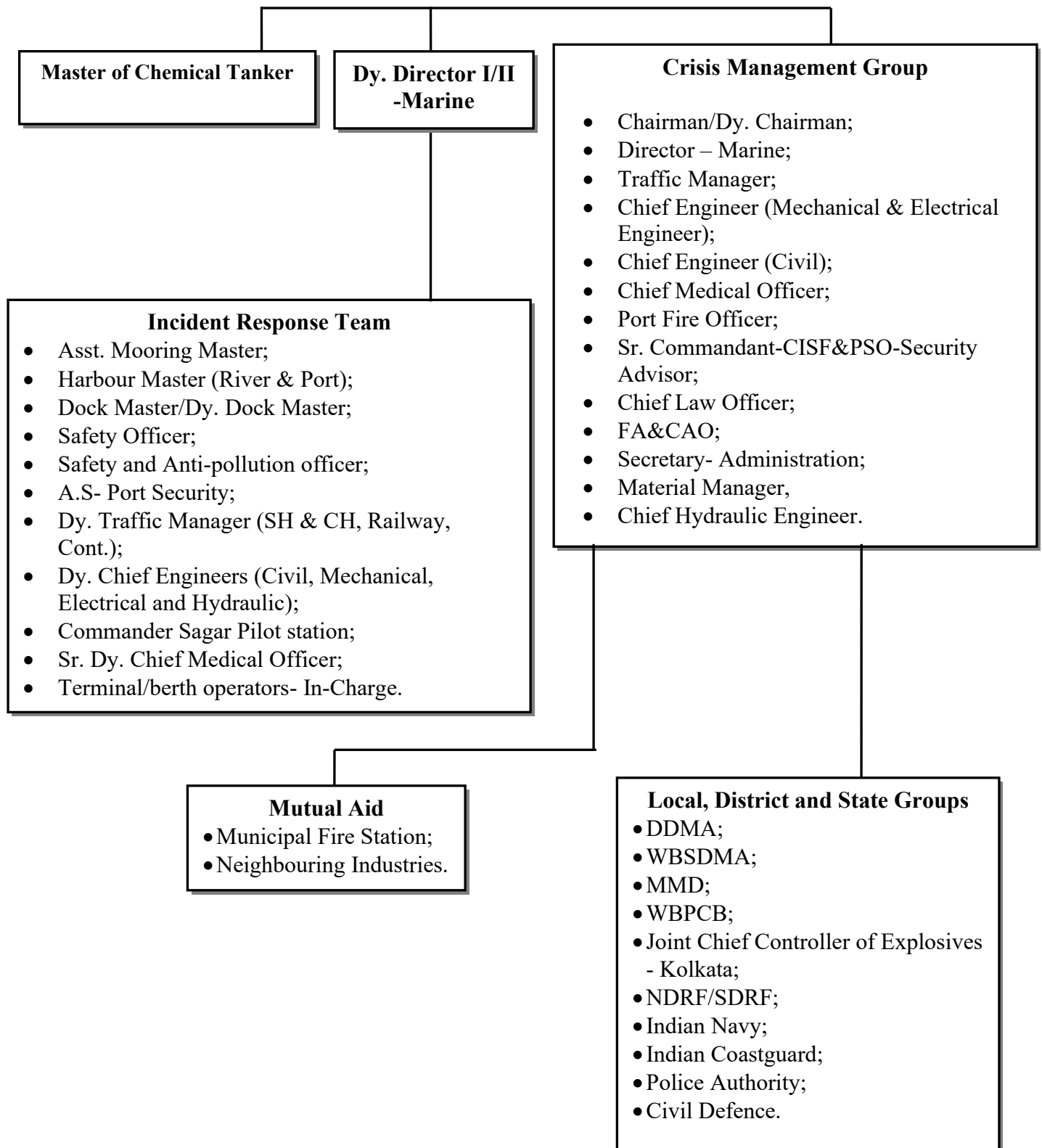


Figure S3.2: Action group

Part B: Roles and Responsibilities

The vessel upon berthing, operator will follow standard procedures. However, in a less likely scenario a leak from the pipeline system may occur at the jetty or from the jetty along the route to the terminal (within port area) leading to self-detection by personnel or by the terminal/operator automatic alarm system. The following action will be required

Spill handling: Evacuate and restrict person's not wearing PPE from area of incident. Stop the flow of gas if it can be done safely. Stay upwind; keep out of low areas. Wear positive pressure breathing apparatus and full protective clothing.

1. The Master of the Tanker (Alternate: Chief Officer)

Response Action
a. Raise Ship emergency alarm and activate Ship board emergency action plan.
b. Coordinate with Berth operator to stop cargo transfer operation (as per SOP).
c. Vessel in the vicinity should be informed of incident without any delay.
d. Personnel to remain stand by to disconnect hoses.
e. Shall be responsible to arrest the leak and for fighting the fire with ships own resources as well as with the available support from IRT.
f. Remain prepared to un-berth the Ship to the safe area.
g. The siren should be continued till the vessel is taken to a safe location as per CIC instructions.

2. The terminal operator tasked with cargo operations

Response Action
a. Activate EAP and inform Port.
b. Shut off isolation valve on pipeline at the jetty (action as per SOP).
c. Area should be cordoned off.
d. Coordinate with Port and rendering necessary assistance to the SIC by providing additional fire-fighting and emergency equipment as required
e. Coordinate with Master of the ship / stevedores.

3. Chief Incident Controller (CIC) - Director - Marine (Alternate: Dy. Director I/II - Marine)

Response Action
a. Assess the level of disaster and activate the DMP.
b. Establish EOC and be stationed to review and assess possible developments to determine the most necessary course of action.
c. Give instructions to SIC, Port Control Room and arrange for external aid as necessary.
d. Review the situation and accordingly inform to the CEC.
e. Assess the condition of site, potential affected area and take decision on evacuation in consultation with SIC.
f. Consult with CEC and decide on clearing of Ship in close proximity to the incident

location or to sail the tanker to the safe area and evacuating the people from the likely affected zone.
g. Authorize use of Ambulance for evacuation along with medical staff to identified hospital/dispensary.
h. Be in constant touch with District and Local Administration for rescue and relief operation.
i. Terminate the response and debrief before allowing normal operation.

4. The Port Control Room

Response Action
a. Gather information related to the weather conditions and accordingly convey the message to Master of the vessel, CIC, SIC, fire team, PSO and berth operator.
b. Liaise with Master of the Vessel or Pilot.
c. Listening watch to be maintained on VHF channel-16, 68.
d. Notify CIC, SIC about vessel movement. Keep CIC, SIC informed of all the messages received by Communication medium.
e. Organize tugs and Pilots for combating the fire and rescue
f. Notify stakeholders as per instructions of CIC, SIC.
g. Notify the owner of the vessel as per the instruction of CIC, SIC, Master of vessel.

5. The Fire-fighting Personnel

Response Action
a. Raise Alarm (siren).
b. Start the pumps as per the requirement.
c. Use water sprays for dispersion and dilution.
d. Open the valves of the monitor and direct the jet on the towards fire, in case of fire.
e. Inform port control room to arrange for tugs, as required.
f. In case of leakage/fire onboard assist Master in arresting the leak/diluting the vapour/ fighting fire as per Masters Instructions.
g. Make use of portable DCP, CO ₂ , Foam extinguisher (alcohol-resistant foam) from upwind position.
h. Announce with PA system to evacuate effecting zone. Ensure complete evacuation and report to the EOC.
i. Ensure all the ignition sources in the vicinity is extinguished if fire has not occurred.
j. If the situation is under control, give all clear signals.

6. Duties of IRT

Designated Officer	Role	Duties
Asst. Mooring Master (Alternate Officer)	Site Incident Controller	During Emergency shall proceed to the scene, communicate and collect all information from the Master of the Tanker and Berth operator.
		Conduct initial briefing and report the situation to the CIC.
		Assess the condition of site and of potential affected area and decide on the evacuation of the personnel considering the direction of wind and dispersion.
		Alert vessels within the vicinity.
		Extend all necessary support to the Master of the ship.
		Instruct the fire team to keep the fire-fighting installation and tenders in a state of readiness and activate if required to fight fire or for dispersing the vapor cloud.
		Instruct Pilots to keep tugs ready, if required.
		Coordinate with all functional heads.
Harbour Master (River) (Alternate Dock Master/ Pilots)	Port Control Room Coordinator	Shall monitor the communication on VHF or any other communication medium, convey and relay messages on the advice from CIC, SIC.
		Responsible for organizing tugs, mooring boats and Pilots for combating the fire and rescue.
Terminal Operator (Alternate officer)	Cargo Work	Shall be responsible of shutting down of cargo operation, coordinating with Port and rendering necessary assistance to the SIC by providing additional emergency equipment as required.
Fire team supervisor	Fire, Search and Rescue Coordinator	Lead the fire-fighting team and mobilize fire tenders, manpower, fire-fighting equipment to the scene and extend all necessary support to the Master of the vessel/Terminal Manager for fire-fighting or Vapour cloud dispersion.
		Assist PSO-Security in evacuation of workers to the assembly point.
		Inform SIC for arrangement of any additional equipment as required.
Port security Officer (Alternate Officer)	Security and Evacuation	Cordon off the affected area as per instructions of SIC.
		Control and direct gate security and traffic in the area.
		Shall facilitate evacuation, transport, first aid and rescue of personnel from the scene at the

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		time of emergency.
		Control the entry of authorized and unauthorized persons and vehicles.
		Liaise with the Police authorities.
		Responsible for the head count of the personnel.
Dy. Traffic Manager (Alternate officer)	Traffic Coordinator	Coordinate with Ship owners/ agents/ stevedores to arrange and ensure evacuation.
Safety & Anti-pollution officer (Alternate Officer)	Pollution Control Coordinator	Coordinate with SIC to determine the level of contamination of the site.
		Inform and coordinate with WBPCB and approved waste disposal handling agencies.
		Ensure cleanup work during and after to be conducted by the OSRO team.
Executive Engineer (Alternate Engineer)	Civil Coordinator	Shall be responsible to carry out urgent civil works as required.
Executive Engineer (Alternate Engineer)	M & E Coordinator	Shall be responsible for uninterrupted electrical supply to vital equipment and utility at the berth.
		Shall remain alert on duty for any electrical isolation of equipment during emergency.
Sr. Dy. CMO (Alternate Medical Officer)	First Aid and Medical Coordinator	Contact with Terminal first aid center and shall coordinate with the local hospitals.
		Make arrangements for transportation (ambulance) and treatment of injured persons.
Duty Pilot (Alternate Standby Pilot)	In Charge of Pilotage	Shall be ready on site for taking the vessel out of berth and be ready for providing any assistance on site.

S4: Scenario 4: Corrosive Acid - Leakage (e.g. sulphuric acid) from pipeline/hose at budge-budge wharf during operation – on Vessel or Ashore

Part A: Action Plan

- 1. Precautions:** MSDS, HAZMAT kit, procedure of Transfer Operation, berthing and un-berthing procedures, periodic inspection and maintenance of hoses and pipelines, PPE and Eye wash station.
- 2. Impact Zone:** Respective Jetty.
- 3. Resources required:** Action Group enumerated in Figure S4.2, material and equipment resources as given in **Chapter 10**.

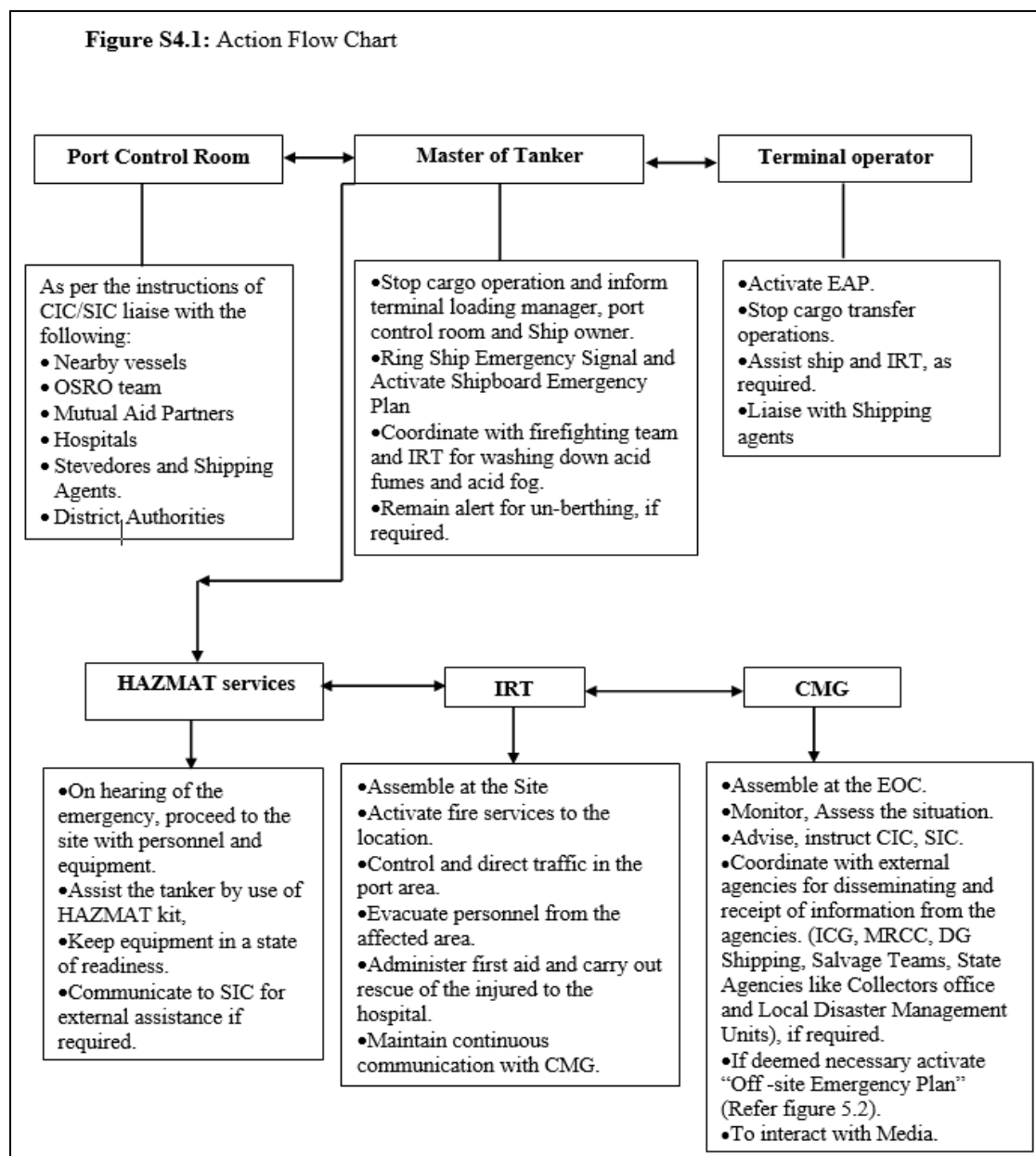
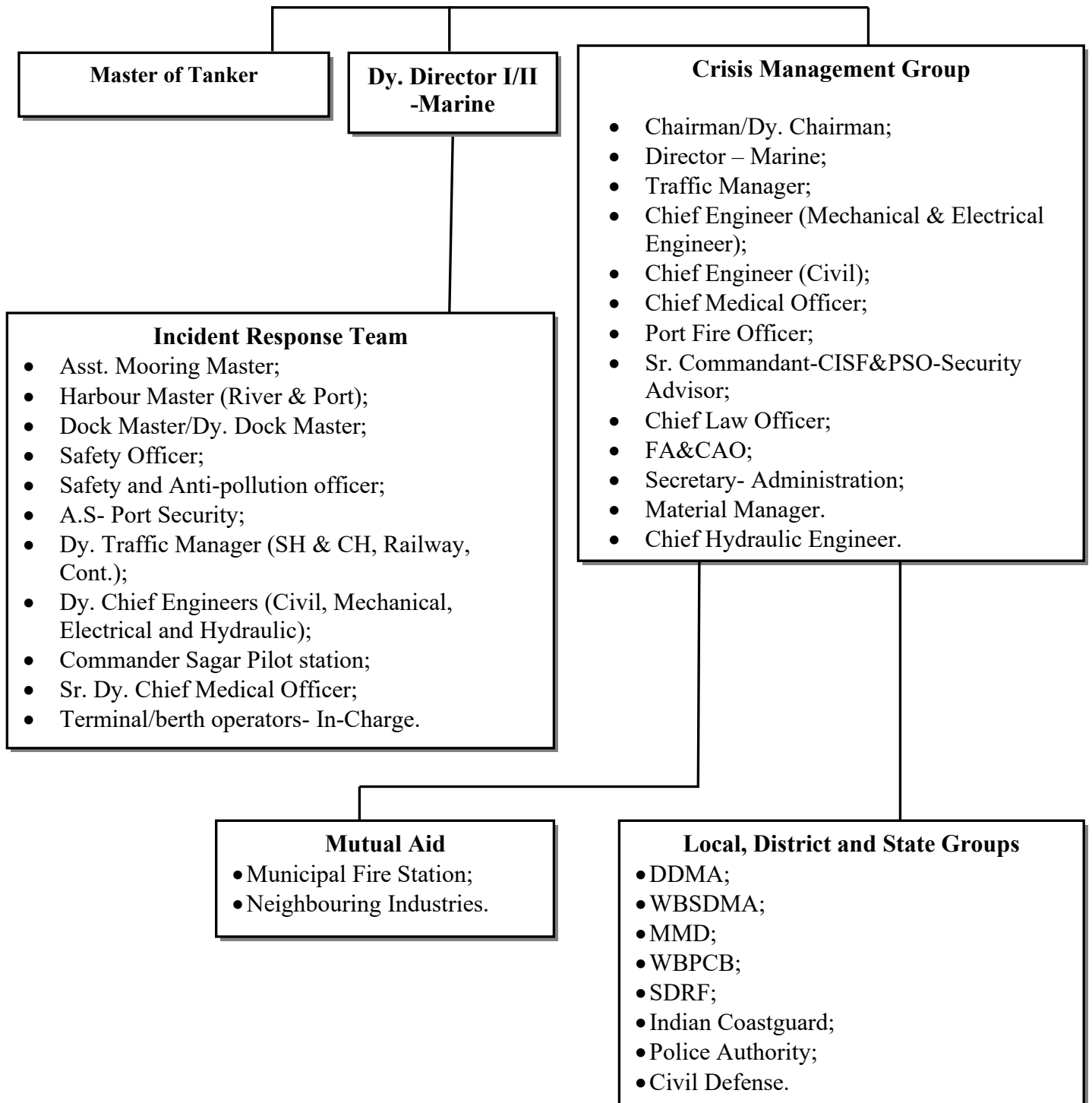


Figure S4.2: Action group

Part B: Roles and Responsibilities

The vessel upon berthing, berth operator will follow standard procedures. However, in a less likely scenario a leak from the pipeline system may occur leading to detection by vessel or terminal personnel. The following action will be required:

1. The Master of the Tanker (Alternate: Chief Officer)

Response Action
a. Should raise Ship emergency alarm and activate Ship board emergency action plan.
b. Coordinate with berth Operator to Stop cargo transfer operation (as per SOP).
c. Vessel in the vicinity and Port should be informed of incident without any delay.
d. Personnel to remain stand by to disconnect hoses;
e. Shall be responsible to arrest the leak with ships own resources as well as with the available support from IRT.
f. Remain prepared to un-berth the vessel to the safe area.
g. The siren should be continued till the vessel is taken to a safe location as per CIC instructions.

2. Terminal operator persons tasked with cargo operations

Response Action
a. Activate EAP and inform Port.
b. Shut off isolation valve on pipeline at the jetty (action as per SOP).
c. Area should be cordoned off.
d. Coordinate with port for rendering necessary assistance to SIC.
e. Responsible for diluting and neutralizing the acids and disposal of the neutralized liquids.
f. Coordinate with the Master of ship / agents / stevedores.

3. Chief Incident Controller (CIC)-Director - Marine (Alternate: Dy. Director I/II - Marine)

Response Action
a. Assess the level of disaster and activate the DMP.
b. Establish EOC and be stationed to review and assess possible developments to determine the most necessary course of action.
c. Give instructions to SIC, Port Control Room and arrange for external aid as necessary.
d. Review the situation and accordingly inform the CEC.
e. Assess the condition of site, of potential affected area and take decision on evacuation in consultation with SIC.
f. Authorize use of ambulance for evacuation along with medical staff to identified hospital / Dispensary
g. Decide on clearing of ships in close proximity to the incident location or to sail the tanker to the safe area and evacuating the people from the likely affected zone.
h. Discuss and coordinate with functional heads.

- i. Be in constant touch with District and Local Administration for rescue and relief operation.
- j. Terminate the response and debrief before allowing normal operation.

4. The Port Control Room

Response Action
a. Gather information related to the vessel type, cargo quantity and position.
b. Gather information related to the weather conditions. Monitor the wind directions and accordingly convey the message to Master of the vessel, SIC.
c. Liaise with Master of the Vessel or Pilot.
d. Listening watch to be maintained on VHF channel-16, 68.
e. Notify CIC, SIC about the vessel movements. Keep CIC, SIC informed of all the messages received by communication medium.
f. Notify stakeholders as per instructions of CIC, SIC.
g. Notify the owner of the vessel as per the instruction of CIC, SIC, Master of vessel.

5. Duties of IRT

Designated Officer	Role	Duties
Asst. Mooring Master) (Alternate Officer)	Site Incident Controller	During Emergency shall proceed to the scene, communicate and collect all information from the Master of the Tanker, Berth Operator.
		Conduct initial briefing.
		Report the situation to the CIC, CMG and assist CIC in assessment of the incident.
		Assess the condition of site and take decision on evacuation in consultation with CIC.
		Alert vessels within the vicinity.
		Extend all necessary help to the Master of the Ship.
		Instruct the fire team to keep fire-fighting installation in a state of readiness and activate if required.
		Instruct Pilot(s) to keep tugs ready for fire-fighting.
Harbour Master (River) (Alternate Dock Master/Pilots)	Port Control Room Coordinator	Coordinate with all functional heads
		Shall monitor the communication on VHF, any other communication medium, convey and relay messages on the advice from CIC, SIC.
		Prepare vessels to vacate berth as per instructions.
Terminal operators (Alternate Officer)	Cargo Work	Responsible for organizing tugs for rescue.
		Shall be responsible of shutting down of cargo operation and coordinating with Port and rendering necessary assistance to the SIC by providing additional emergency equipment as required.
Fire team	Fire, Search	Lead the fire-fighting team and mobilize fire tenders,

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Supervisor (Alternate Officer)	and Rescue Coordinator / HAZMAT Coordinator	manpower, fire-fighting equipment to the scene and extend all necessary support to the Master of the vessel/terminal operator.
		Assist PSO -Security in evacuation of workers to the assembly points.
		Inform SIC for arrangement of any additional equipment as required.
Port Security Officer (Alternate Officer)	Security and Evacuation	Cordon off the area.
		Control and direct gate security and traffic in the area.
		Shall facilitate evacuation, transport, first aid and rescue of personnel from the scene at the time of emergency.
		Control the entry of authorized and unauthorized persons and vehicles. Liaise with the State Police.
		Responsible the head count of the personnel.
Dy. Traffic Manager (Alternate Officer)	Traffic coordinator	Coordinates with Ship owners/ agents/stevedores to arrange and ensure evacuation.
Safety & Antipollution Officer (Alternate Officer)	Pollution control coordinator	Shall mobilize and dispatch vehicles containing HAZMAT kit to the site of emergency.
		Inform and Coordinate with SIC, WBPCB and approved waste disposal agencies.
		Ensure cleanup work during and after the emergency to be conducted by the OSRO team.
Executive Engineer (Alternative Officer)	Civil Coordinator	Shall be responsible to carry out urgent civil works as required.
Executive Engineer (Alternate Officer)	M & E Coordinator	Shall be responsible for uninterrupted electrical supply to vital equipment and utility at the Berth.
		Shall remain alert on duty for any electrical isolation of equipment during emergency.
Sr. Dy. CMO (Alternate Medical Officer)	First Aid and Medical Coordinator	Contact with Terminal first aid center and shall coordinate with the local hospitals.
		Make arrangements for transportation (ambulance) and treatment of injured persons.

S5: Scenario 5: Fire or leakage due to Crane Accidents (Container drop/crane fall) at container berth/yard NSD – secondary event.

Part A: Action Plan

1. **Precautions:** Trained personnel for operation of crane, procedure of the container terminal, HAZMAT training and MSDS.
2. **Impact Zone:** Incident location and surrounding area.
3. **Resources required:** Action Group enumerated in Figure S5.2, material and equipment resources as given in **Chapter 10**.

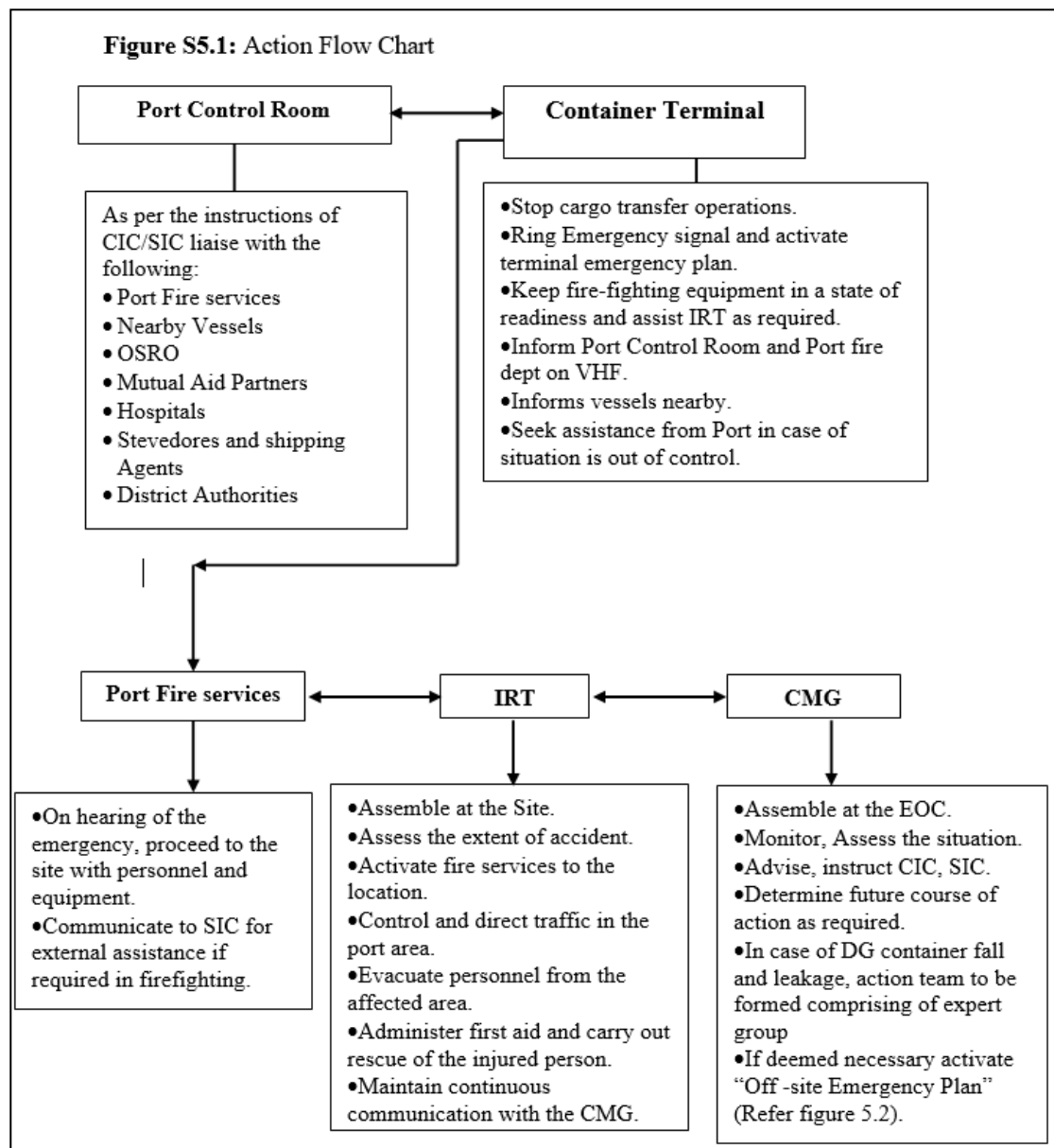
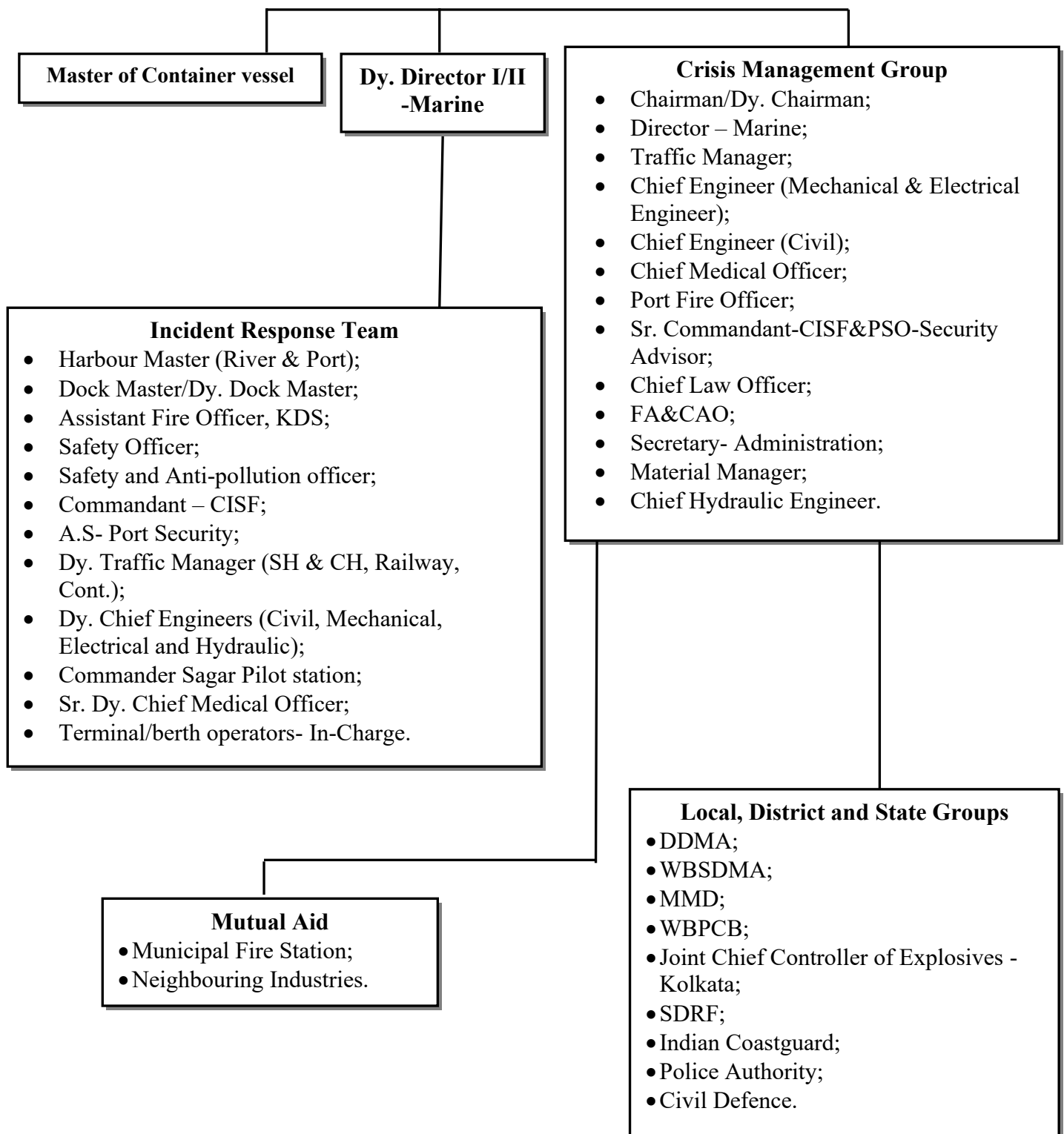


Figure S5.2: Action group

Part B: Roles and Responsibilities

1. The crane operator should raise emergency alarm and inform Terminal Manager and Port Control Room.

2. The terminal person

Response Action
a. Activate EAP and inform Port and ask for assistance.
b. Area should be cordoned off.
c. Stop container transfer operations.
d. Manage Truck movements.
e. Coordinate with Port and render necessary assistance to the SIC, as required
f. Assist IRT, Master of the Ship and provide all necessary equipment
g. Contact expert agency in case of DG container fire/explosion.

3. Chief Incident Controller (CIC)- Director - Marine (Alternate: Dy. Director I/II - Marine)

Response Action
a. Establish EOC and be stationed to review and assess possible developments to determine the necessary course of action
b. Give instructions to SIC and arrange for external aid as necessary.
c. Provide assistance to the Terminal.

4. The Port Control Room

Response Action
a. Gather information related to the weather conditions and accordingly convey the message to CIC, SIC, Port Fire services, CISF and terminal Operator.
b. Liaise with terminal operator and Master of the vessel or pilot.
c. Listening watch to be maintained on VHF channel-16 ,68.
d. Notify CIC, SIC about the vessel movements. Keep CIC, SIC informed of all the messages received by communication medium.
e. Notify stakeholders as per instructions of CIC, SIC.

5. The Fire-fighting personnel

Response Action
a. Raise Alarm (siren)
b. Open the valves of the monitors and direct the jet towards fire.
c. Ensures availability of the fire tenders and fire-fighting tugs.
d. Ensure any hot work and other ignition sources in the vicinity are stopped
e. If the fire is under control and extinguished, give all clear signal.

6. Duties of IRT

Designated Officer	Role	Duties
Dy. Director I -Marine (Alternate Dy. Director II - Marine)	Site Incident Controller	During Emergency shall proceed to the scene, communicate and collect all information from the crane operator, terminal manager and coordinate actions.
		Conduct initial briefing and report the situation to the CIC.
		Alert vessels and trucks within the vicinity.
		Instruct the Port Fire dept. to keep the fire-fighting installation in a state of readiness and activate if required.
Harbour Master (River) (Alternate Dock Master /Pilots)	Port Control Room Coordinator	Shall monitor the communication on VHF or any other communication medium, convey and relay messages on the advice from CIC, SIC.
		Shall prepare vessels to vacate from berth (if required).
		Responsible for organizing tugs for rescue. Instruct Pilots.
Safety & anti-pollution Officer (Alternate officer)	Pollution Control Coordinator	Determine the level of contamination of the site as a result of incident.
		Inform and Coordinate with SIC, WBPCB and approved waste disposal agencies.
		Ensure cleanup work during and after the emergency to be conducted by the OSRO team.
Asst. Port Fire Officer (Alternate Officer)	Fire, Search and Rescue Coordinator	Mobilize fire tenders, manpower, fire- fighting equipment to the scene and extend all necessary support in case of fire.
		Assist the terminal operator and CISF-Security in evacuation.
Commandant-CISF (Alternate Dy. Commandant-CISF)	Security and Evacuation	Cordon off the area.
		Control and direct gate security and traffic in the area.
		Shall facilitate evacuation, transport, first aid and rescue of personnel from the scene at the time of emergency.
		Control the entry of authorized and unauthorized persons and vehicles. Liaise with the State Police.
		Responsible the head count of the personnel.
		Shall supervise evacuation of personnel from the scene at the time of emergency.

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Executive Engineer (Alternate Engineer)	Civil Coordinator	Assist as per instructions of SIC.
Executive Engineer (Alternate Engineer)	M & E Coordinator	Assist as per instructions of SIC.
Sr. Dy. CMO (Alternate Medical Officer)	First Aid and Medical Coordinator	Shall be responsible to organize assistance by keeping first aid team with ambulance as required.
Dy. Traffic Manager (Alternate Officer)	Traffic Coordinator	Shall mobilize and dispatch sufficient number of vehicles to the site of emergency. Coordinates with SIC and Terminal Manager.
Duty Pilot (Alternate Standby Pilot)	In-Charge of Pilotage	Shall be ready on site for providing any assistance.

S6: Scenario 6: Fire on vessel (non-tankers) at KPD/NSD berth.**Part A: Action Plan**

- 1. Precautions:** Vessel fire-fighting system, Port fire station and fire tender, Portable fire Extinguisher, procedure of the berth operator.
- 2. Impact Zone:** Incident location and vicinity of the vessel involved.
- 3. Resources required:** Action Group enumerated in Figure S6.2, material and equipment resources as given in **Chapter 10**.

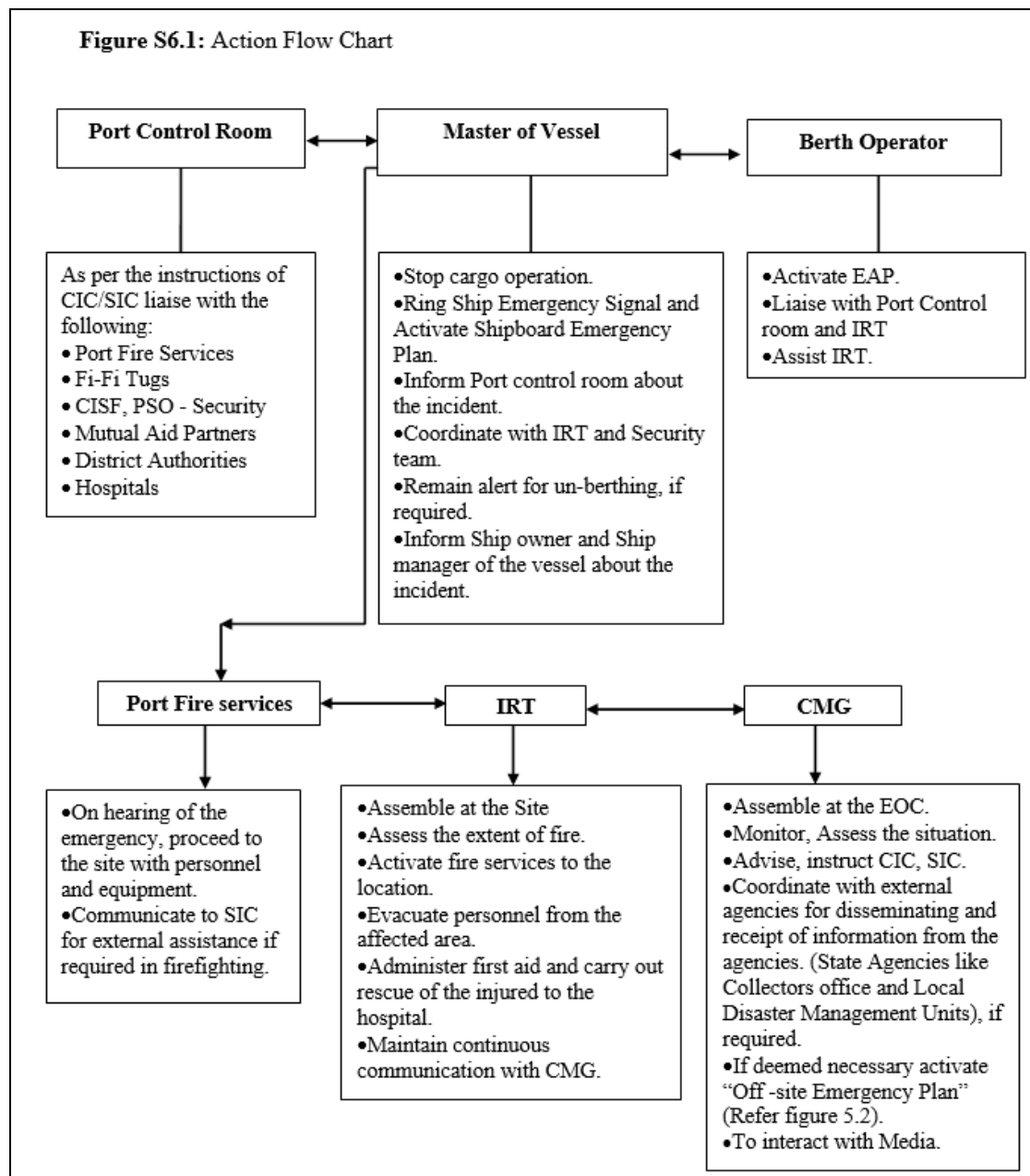
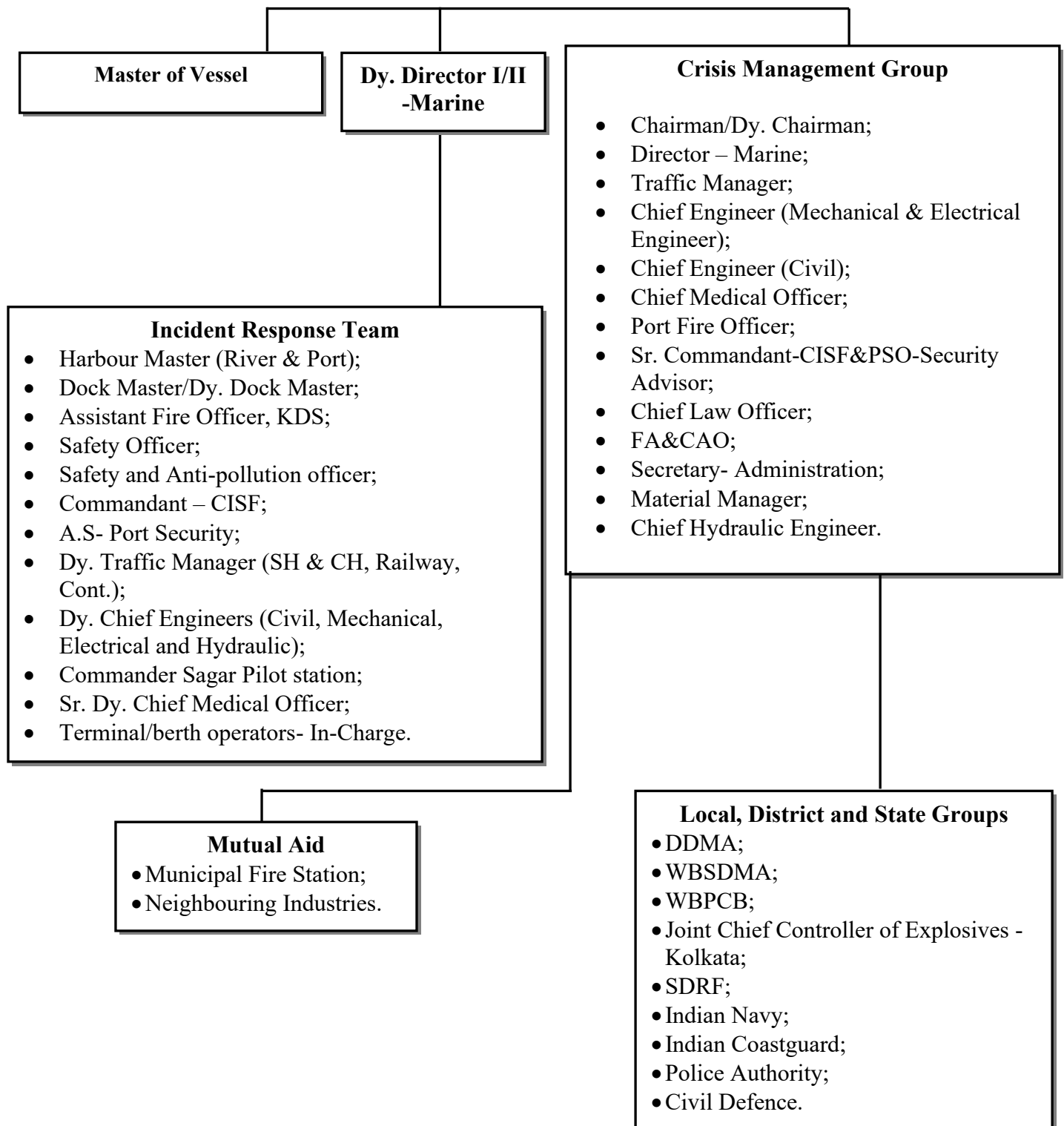


Figure S6.2: Action group

Part B: Roles and Responsibilities

The vessel upon berthing, terminal/berth operator will follow standard procedures. However, in a less likely scenario a fire may occur on the vessel during transfer operation. The following action will be required:

1. The Master of the Vessel (Alternate: Chief Officer)

Response Action
a. Should raise vessel emergency alarm and activate vessel emergency action plan.
b. Coordinate with Berth Operator to stop cargo transfer operation (as per SOP).
c. Vessel in the vicinity and Port should be informed of incident without any delay.
d. Fight the fire with vessels own resources as well as with the available support from IRT.
e. Remain prepared to un-berth the vessel to the safe area.
f. Inform Vessel owner/agents about the incident.
g. The siren should be continued till the vessel is taken to a safe location as per CIC instructions.

2. The berth operator tasked with cargo operations

Response Action
a. Activate EAP and inform Port.
b. Area should be cordoned off.
c. Assist IRT and provide all necessary equipment.
d. Coordinate with the Master of the ship/agents/stevedores

3. Chief Incident Controller (CIC)- Director -Marine (Alternate: Dy. Director I/II - Marine)

Response Action
a. Assess the level of disaster and activate the DMP.
b. Establish EOC and be stationed to review and assess possible developments to determine the necessary course of action.
c. Give necessary instructions to SIC, port control room and arrange for external aid as necessary.
d. Review the situation and accordingly inform to the CEC.
e. Assess the condition of site and of potential affected area and take decision on evacuation in consultation with SIC.
f. Be in constant touch with District and Local Administration for rescue and relief operation.
g. Discuss and coordinate with functional heads.
h. Terminate the response and debrief before allowing normal operation.

4. The Port Control Room

Response Action
a. Gather information related to the weather conditions and accordingly convey the message to CIC, SIC and Port Fire team.
b. Liaise with Master of the Vessel or Pilot.
c. Listening watch to be maintained on VHF channel-16, 68.
d. Notify CIC, SIC about the vessel movement. Keep CIC, SIC informed of all the messages received by Communication medium.
e. Notify the relevant Authorities and stakeholders as per instructions of CIC, SIC.

5. The Fire-fighting personnel

Response Action
a. Raise Alarm (siren)
b. Ensures availability of the fire tenders and fire-fighting tugs.
c. In case of fire onboard assist Master in fighting fire as per Masters Instructions.
d. If the fire is under control and extinguished, give all clear signal.

6. Duties of IRT

Designated Officer	Role	Duties
Dy. Director I – Marine (Alternate Dy. Director II – Marine)	Site Incident Controller	During Emergency shall proceed to the scene, communicate and collect information from the Master of the vessel and berth operator.
		Conduct initial Briefing.
		Report the situation to the CIC and assist in assessing the incident.
		Alert vessels within the vicinity.
		Assess the condition of site and take decision on evacuation in consultation with CIC.
		Extend all necessary help to the Master of the vessel.
		Instruct the Fire Team to keep the water tenders in a state of readiness and activate if required.
		Instruct pilots to keep tugs ready for fire-fighting.
Harbour Master (River) (Alternate Dock Master/Pilots)	Port Control Room Coordinator	Coordinate with all functional heads
		Shall monitor the communication on VHF, any other communication medium and convey and relay messages on the advice from CIC, SIC.
		Responsible for organizing tugs and pilots for combating the fire and rescue.
Berth operator	Cargo Work	Prepare vessels to vacate berth as per instructions.
		Shall be responsible of shutting down of cargo operation, coordinating with Port and rendering

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(Alternate Officer)		necessary assistance to the SIC by providing additional fire-fighting and emergency equipment as required.
Asst. Port Fire Officer (Alternate Officer)	Fire, Search and Rescue Coordinator	Lead the fire-fighting team and mobilize fire tenders, manpower, fire-fighting equipment to the scene and extend all necessary support to the Master of the vessel/berth operator for fire-fighting. Assist CISF, PSO in evacuation of workers to the assembly points. Inform SIC for arrangement of any additional equipment as required.
Commandant-CISF & PSO (Alternate Dy. Commandant-CISF & Officer)	Security and Evacuation	Cordon off area. Control and Direct gate security and traffic in the area. Shall facilitate evacuation, transport, first aid and rescue of personnel from the scene at the time of emergency. Control the entry of authorized and unauthorized persons and vehicles. Liaise with the Police authorities. Responsible for the head count of the personnel.
Dy. Traffic Manager (Alternate Office)	Traffic Coordinator	Coordinates with ship owners, agents and stevedores to arrange and ensure evacuation.
Safety & Anti-pollution Officer (Alternate Officer)	Pollution Control Coordinator	Coordinate with SIC to determine the level of contamination of the site. Inform and coordinate with WBPCB and approved waste disposal handling agencies. Ensure cleanup work during and after to be conducted by the OSRO team
Executive Engineer (Alternate Engineer)	Civil Coordinator	Shall be responsible to carry out urgent civil works as required.
Executive Engineer (Alternate Engineer)	M & E Coordinator	Shall be responsible for uninterrupted electrical supply to vital equipment and utility at the berth. Shall remain alert on duty for any electrical isolation of equipment during emergency.
Sr. Dy. CMO (Alternate Medical Officer)	First Aid and Medical Coordinator	Responsible to organize and keep first aid team with ambulance as required. Setup casualty receiving center and arrange for first aid. Make arrangements for transportation and treatment of injured persons.

Disaster Management Plan

		Shall coordinate with the local hospitals.
Duty Pilot (Alternate Standby Pilot)	In Charge of Pilotage	Shall be ready for taking the vessel out of berth and be ready for providing any assistance on site.

S7: Scenario 7: Fire in coal stack yard at KPD.**Part A: Action Plan**

- 1. Precautions:** Mobile fire-fighting system.
- 2. Impact Zone:** Incident Location and vicinity area.
- 3. Resources required:** Organizational setup enumerated in Figure S7.2, material and equipment resources as given in **Chapter 10**.

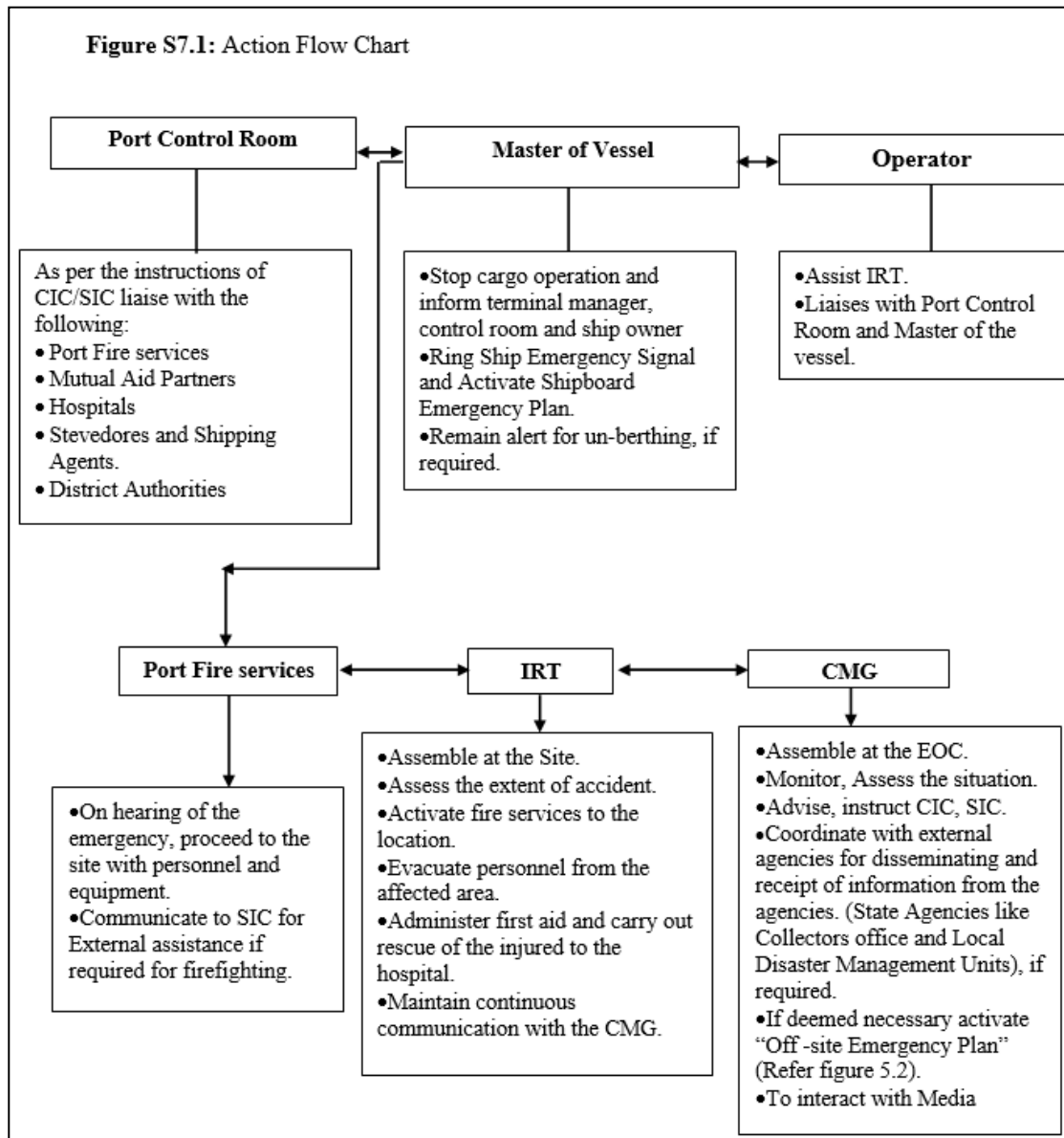
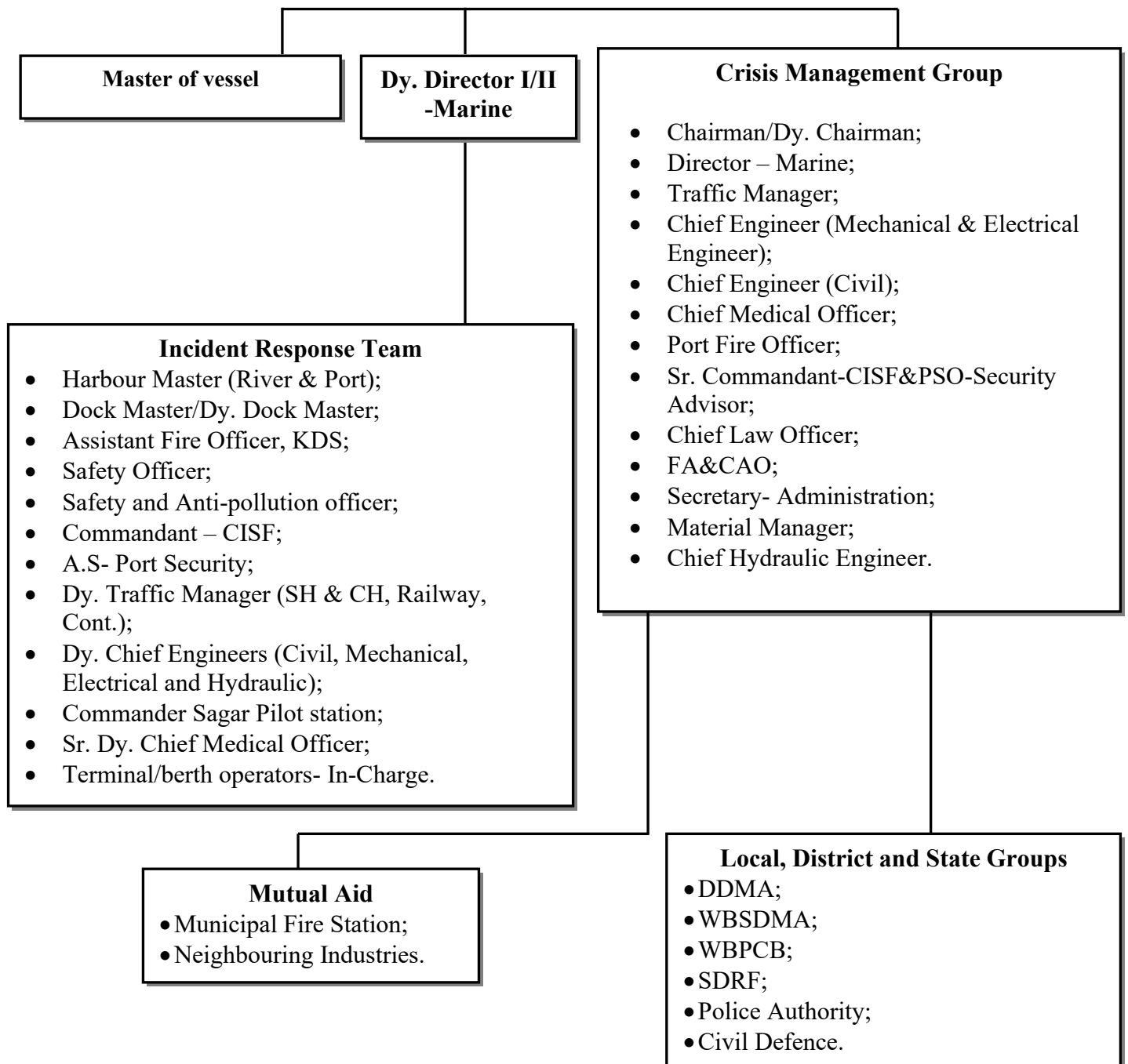


Figure S7.2: Action group

Part B: Roles and Responsibilities**1. Port Control Room**

Response Action
a. Gather information related to the coal stack yard fire and time of incident.
b. Notify CIC, SIC about the vessel movements.
c. Gather information about the weather conditions and accordingly convey the message to CIC, SIC, Port Fire services, CISF, PSO and Coal cargo Operator

2. Chief Incident Controller (CIC) - Director - Marine (Alternate: Dy. Director I/II - Marine)

Response Action
a. Assess the level of disaster and activate the DMP.
b. Establish EOC and be stationed to review and assess possible developments to determine the most necessary course of action.
c. Give instructions to SIC, Port Control Room and arrange for external aid as necessary.
d. Review the situation and accordingly inform to the CEC.
e. Assess the condition of site and of potential affected area and take decision on evacuation in consultation with SIC.
f. Authorize use of Ambulance for evacuation along with medical staff to identified hospital/dispensary.
g. Discuss and coordinate with functional heads.
h. Be in constant touch with District and Local Administration for rescue and relief operation.
i. Terminate the response and debrief before allowing normal operation.

3. The Fire-fighting personnel

Response Action
a. Raise Alarm (siren)
b. Ensures availability of the fire tenders.
c. If the fire is under control and extinguished, give all clear signal.

4. Duties of IRT

Designated Officer	Role	Duties
Dy. Director I -Marine (Alternate Dy. Director II -Marine)	Site Incident Controller	During Emergency shall proceed to the scene, communicate and collect all information.
		Conduct initial briefing and report the situation to the CIC.
		Extend all necessary Support to the operator.
		Coordinate with all functional heads
Harbour Master (River)	Port Control Room	Shall monitor the communication on VHF, any other communication medium, convey and relay messages

Disaster Management Plan

(Alternate Dock Master/ Pilot)	Coordinator	on the advice from CIC, SIC.
		Shall prepare vessels to vacate from berth (if required).
		Responsible for organizing tugs and Pilots.
Safety & anti-pollution Officer (Alternate Officer)	Pollution Control Coordinator	Determine the level of contamination (e.g. PM level) of the site as a result of incident.
		Inform and coordinate with WBPCB and approved waste disposal handling agencies.
		Ensure cleanup work during and after to be conducted.
Asst. Port Fire Officer (Alternate Officer)	Fire, Search and Rescue Coordinator	Mobilize fire tenders, manpower, firefighting equipment to the scene and extend all necessary support to extinguish fire.
		Assist CISF, PSO -Security in evacuation, if required.
Commandant-CISF & PSO (Alternate Dy. Commandant-CISF & Officer)	Security and Evacuation	Control and direct traffic in the area.
		Shall supervise evacuation of personnel from the scene at the time of emergency.
Executive Engineer (Alternate Engineer)	Civil Coordinator	Liaise with SIC.
Executive Engineer (Alternate Engineer)	M & E Coordinator	Arrange for specialized equipment if required as per the instruction of the SIC.
Sr. Dy. CMO (Alternate Medical Officer)	First Aid and Medical Coordinator	Shall be responsible to organize and dispatch first aid team with ambulance as required.
Dy. Traffic Manager (Alternate Officer)	Traffic Coordinator	Coordinates with SIC.
		Stop movement of railway wagons towards coal stackyard in case of fire.
		Shall mobilize and dispatch sufficient number of vehicles to the site of emergency.

S8: Scenario 8: Ship Collision or Grounding within port limit.**Part A: Action Plan**

1. **Precautions:** Navigational Aid, Designated Pilots, Continuous monitoring and communication with the Port Control Room and Pilot.
2. **Impact Zone:** Navigational and river Channel, Anchorage area, Dock basin.
3. **Resources required:** Action Group enumerated in Figure S8.2, material and equipment resources as given in **Chapter 10**.

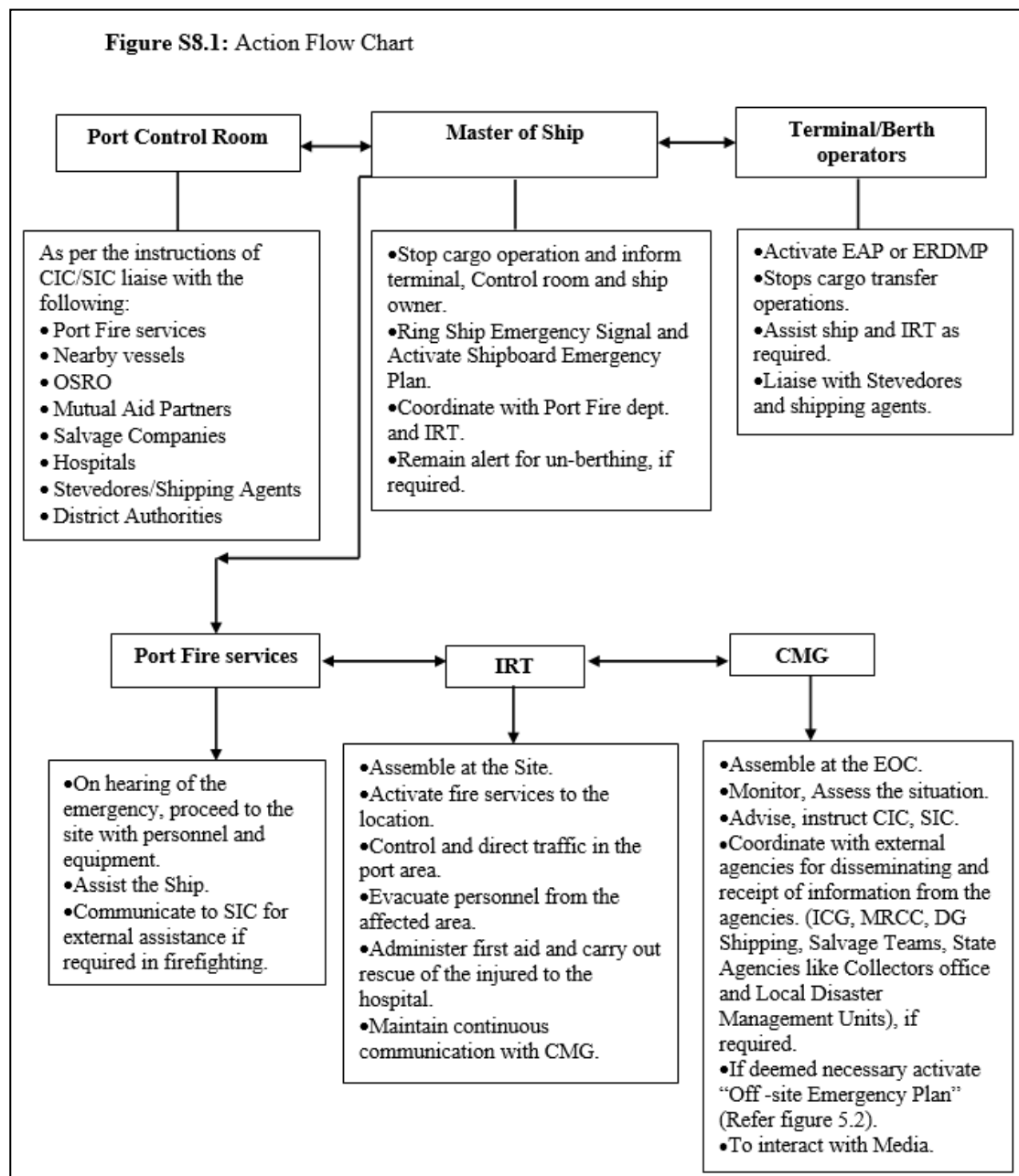
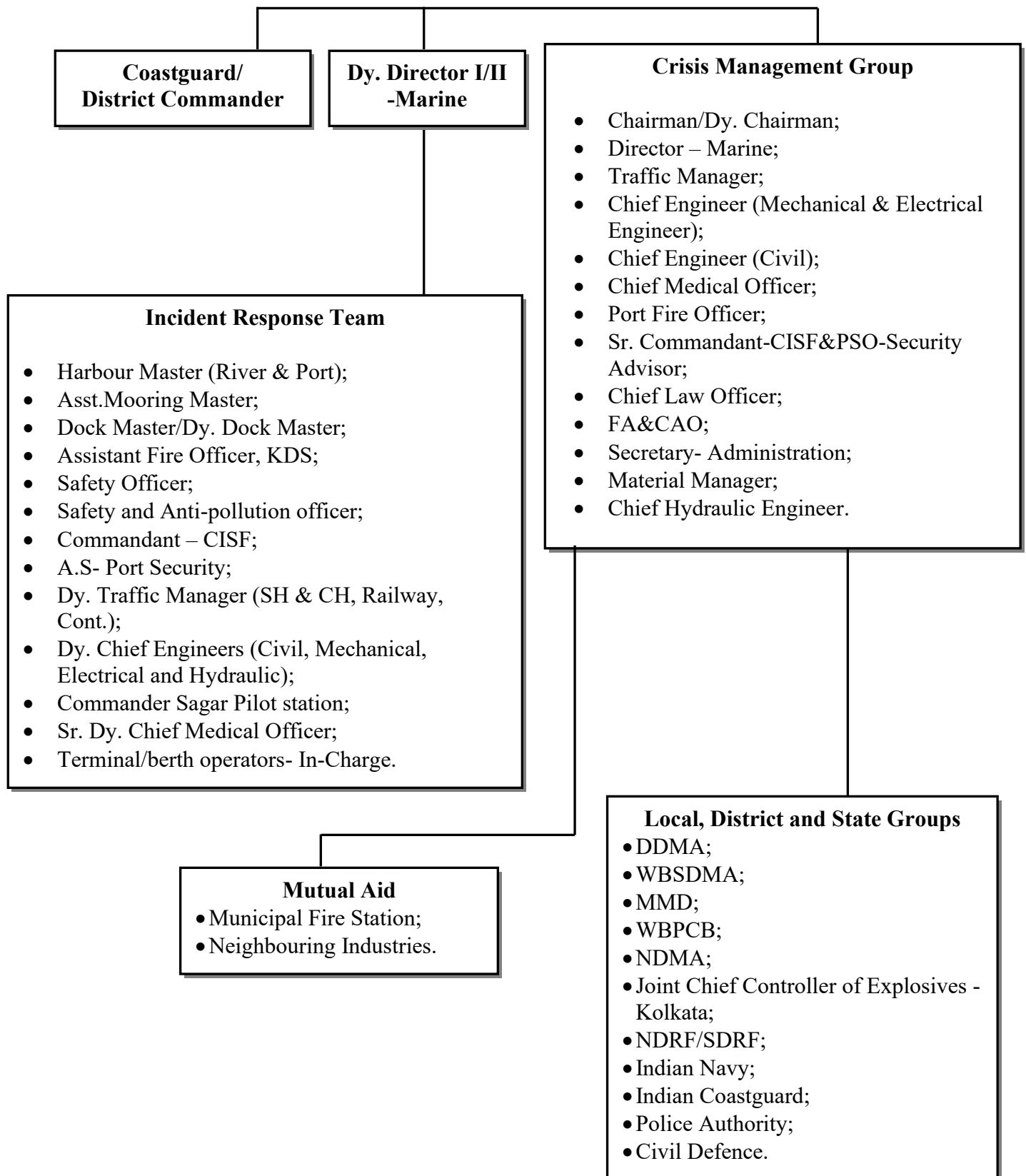


Figure S8.2: Action group

Part B: Roles and Responsibilities**1. The Master of the Vessels (Alternate: Chief Officers)**

Response Action
a. Should raise ship emergency alarm and activate ship board emergency action plan including evacuation of the personnel.
b. Having raised the alarm, the Master will be responsible for taking all immediate steps to safeguard his ship. As soon as possible he is to establish the extent of grounding and damage to the vessel. He is to ascertain whether the hull has been breached and likely risk of pollution and flooding.
c. The Master will provide the Port Authority with details of the incident as quickly as possible and will make regular and frequent reports on the progress of the incident. This is to include position of grounding, damage sustained, pollution or risk of pollution, draft of the vessel prior to grounding and soundings at grounding area, cargo on board and location, and any further information that may be at hand.
d. Vessel in the vicinity, Terminal, berth operator and Port should be informed incident without any delay.
e. Shut down transfer operation (if at berth).
f. Take appropriate damage control measures in case of flooding including leak stoppage and pumping out, vessel list correction etc.
g. Estimate the extent of under water damage, sounding of tanks and actions for the refloating of the vessel.
h. Shall be responsible for fighting the fire (in case of fire) with vessels own resources as well as with the available support from IRT.

2. The Port Control Room KDS, VTMS Sagar Island and HDC

Response Action
a. Gather information related to the vessel type, position and time of incident.
b. Liaise with Master of the Vessel, Pilot.
c. Gather information related to the weather conditions and accordingly convey the message to CIC, SIC and Port Fire Team.
d. Listening watch to be maintained on VHF channel-16, 68.
e. Notify to CIC, SIC and the vessels moving into, Keep CIC, SIC informed of all the messages received Communication medium.
f. Notify the other Authorities and stakeholders within Port as per instructions of CIC, SIC.
g. Notify the information to the owner of the vessel as per the instruction of CIC, SIC, Master of the Vessel.

3. Chief Incident Controller (CIC)- Director - Marine (Alternate: Dy. Director I/II - Marine)

Response Action
a. Assess the level of disaster and activate the DMP and OSCP.
b. Establish EOC, be stationed to review and assess possible developments to determine the most necessary course of action.

c. Give necessary instructions to SIC, Port Control Room and arrange for external aid as necessary.
d. Review the situation and accordingly inform to the CEC.
e. Decide on clearing of Ships in close proximity to the incident location.
f. Provide instructions to launch rescue craft to be sent to scene of emergency. If required they will bring necessary personnel and equipment to site.
g. Oil Pollution: He will be responsible to activate the Port OSCP on receipt and assessment of the information gathered, he will instruct the IRT and Master of Vessel about the precautionary measures and necessary actions to limit the extent of pollution.
h. Evacuation: Assessment of condition of site of potential affected area and decision taken for evacuation should be taken in consultation with SIC and Master of Vessel.
i. Salvage and or floating of the vessel will be controlled by either the him or person assigned. He will sanction all operations before implementation.
j. Discuss and coordinate with functional heads
k. Be in constant touch with District and Local Administration for rescue and relief operation.
l. Coordinate with external agencies/authorities.
m. Terminate the response and debrief before allowing normal operation.

4. Duties of IRT

Designated Officer	Role	Duties
Dy. Director I- Marine (Alternate Dy. Director II -Marine or Asst. Mooring Master)	Site Incident Controller	During emergency shall proceed to the affected location, communicate and collect all information from the Master of the ship.
		Discuss with the Master or owner for refloating or salvaging of the vessel. Endeavour to obtain from owners/agents a General Arrangement Plan of the vessel and, if appropriate the Cargo Plan.
		Conduct initial briefing and report the situation to the CIC.
		In case of fire on board the vessel after collision or contact, extend all necessary support to the Master of the Ship
		Instruct Pilot to keep tugs ready for fire-fighting.
		Alert other vessels within the vicinity.
		Ascertain oil pollution- leak source, if any.
		Obtain information regarding stability and hull stress of the vessel.
		If vessels have blocked or a possibility of blocking the channel, in co-ordination with the Master, the vessel shall be taken to berth / anchorage.

Disaster Management Plan

		In case of grounding, make arrangements through Pilots to proceed to the spot and to take soundings, plot them in a chart and to ascertain the location of grounding damage on the hull.
		Depending on the way the vessel is grounded and the available high tide on the day, all advance preparations should be made as advised by CIC, SIC.
		In the case of a capsized vessel, make arrangements to hold the vessel in position if drifting would place her in grave danger and, on completion of rescue operations, secure the vessel in position or remove and secure her at some other safe location, whichever is safest and possible, until such time as salvage operations can be undertaken.
		When clear to do so, arrange for the capsized or sunken vessel to be marked with appropriate buoy(s) and lights, to warn other vessels of her position.
		Discuss with the Master, owner or agent plans for righting, refloating or salvaging the vessel. Action in this regard is particularly important where the vessel is obstructing fairways, channels or approaches to berths/Jetties.
		Inform Salvage Companies. Also, inform MoEF&CC and WBPCB approved parties for safe disposal and providing reception facilities for Oil/Sludge.
Harbour Master (River) (Alternate Dock Master/ Pilot)	Port Control Room Coordinator	Shall monitor the communication on VHF or any other communication medium, convey and relay messages on the advice from CIC, SIC.
		Shall be ready for taking the instructions from CIC, SIC and evacuate/move/shift the vessel from the area.
		If possible, accompany SIC to inspect the vessel.
		Plot exact location of the incident in coordination with the hydrographic surveyor.
		Instruct the oil pollution response team to maintain a state of readiness and standby. Coordinate with the team in combating the disaster by taking necessary actions as per the OSCP
		Responsible for organizing tugs for rescue. Instruct pilots.
		Assist Salvage association and SIC.

Pilot	In Charge of Pilotage	Shall be ready for taking the instructions from CIC, SIC and evacuate/move/shift the vessel from the area.
		Shall monitor the communication on VHF, convey and relay messages on the advice from CIC, SIC.
		Responsible for organizing tugs for shifting the vessel to the anchorage area, if required.
Safety & Antipollution Officer (Alternate officer)	Marine Pollution Control Coordinator	Supervise and direct personnel to follow the instructions given by SIC. Inform WBPCB.
		Determine the level of contamination of the site as a result of incident.
		Report to SIC and seek advice.
		Lead the response team and support personnel in combating the disaster by deploying booms and other equipment.
		Hire the barges for collecting the spilled oil and coordinate with the parties involved in the safe disposal of the oil/sludge.
		Ensure cleanup work during and after the emergency to be conducted by the OSRO team.
		Coordinate with the party involved in disposal of the Oil/sludge in a safe manner.
Asst. Port Fire Officer (Alternate officer)	Fire, Search and Rescue Coordinator	Mobilize fire tenders, manpower, firefighting equipment to the scene and extend all necessary support to the master of the vessel for firefighting.
		Assist CISF in evacuation of persons to the assembly points.
		Inform SIC for arrangement of any additional equipment as required.
Commandant-CISF & PSO (Alternate Dy. Commandant-CISF & Alternate Officer)	Security and Evacuation	Cordon off the area as per instruction from SIC.
		Controls and directs gate security and traffic in the area.
		Facilitate evacuation, transport, first aid and rescue of personnel from the scene at the time of emergency.
		Control the entry of authorized, unauthorized persons and vehicles.
		Liaise with the Police authorities.
Sr. Dy. CMO (Alternate Medical Officer)	First Aid and Medical Coordinator	Responsible for the head count of the personnel.
		Shall be responsible to organize and dispatch first aid team with ambulance as required.

Disaster Management Plan

Executive Engineer (Alternate Engineer)	Civil Coordinator	Hire the barges for collecting the spilled oil and coordinate with the parties involved in the safe disposal of the oil/sludge.
Dy. Traffic Manager (Alternate Officer)	Traffic Coordinator	Coordinates with ship owners/agents/stevedores.
Material Manager	Material Management	Maintain sufficient inventory and provide during the emergency as per instructions of CIC, SIC.

S9: Scenario 9: Fire in Office buildings, Hospital, Electrical substations, Pump houses and control rooms at Lock gate and bridges, Dry docks, Warehouses.

Part A: Action Plan

- 1. Precautions:** Fire-fighting system, Shore fire connection for ships in drydocks, Smoke and Fire Detection System, Periodic Maintenance and Inspection, Protected/covered Electrical installations, protection from flood (equipment raising from ground level), trained personnel to combat fire, No-smoking zone, House Keeping.
- 2. Impact Zone:** Incident location and immediate surroundings.
- 3. Resources required:** Action Group enumerated in Figure S9.2, material and equipment resources as given in **Chapter 10**.

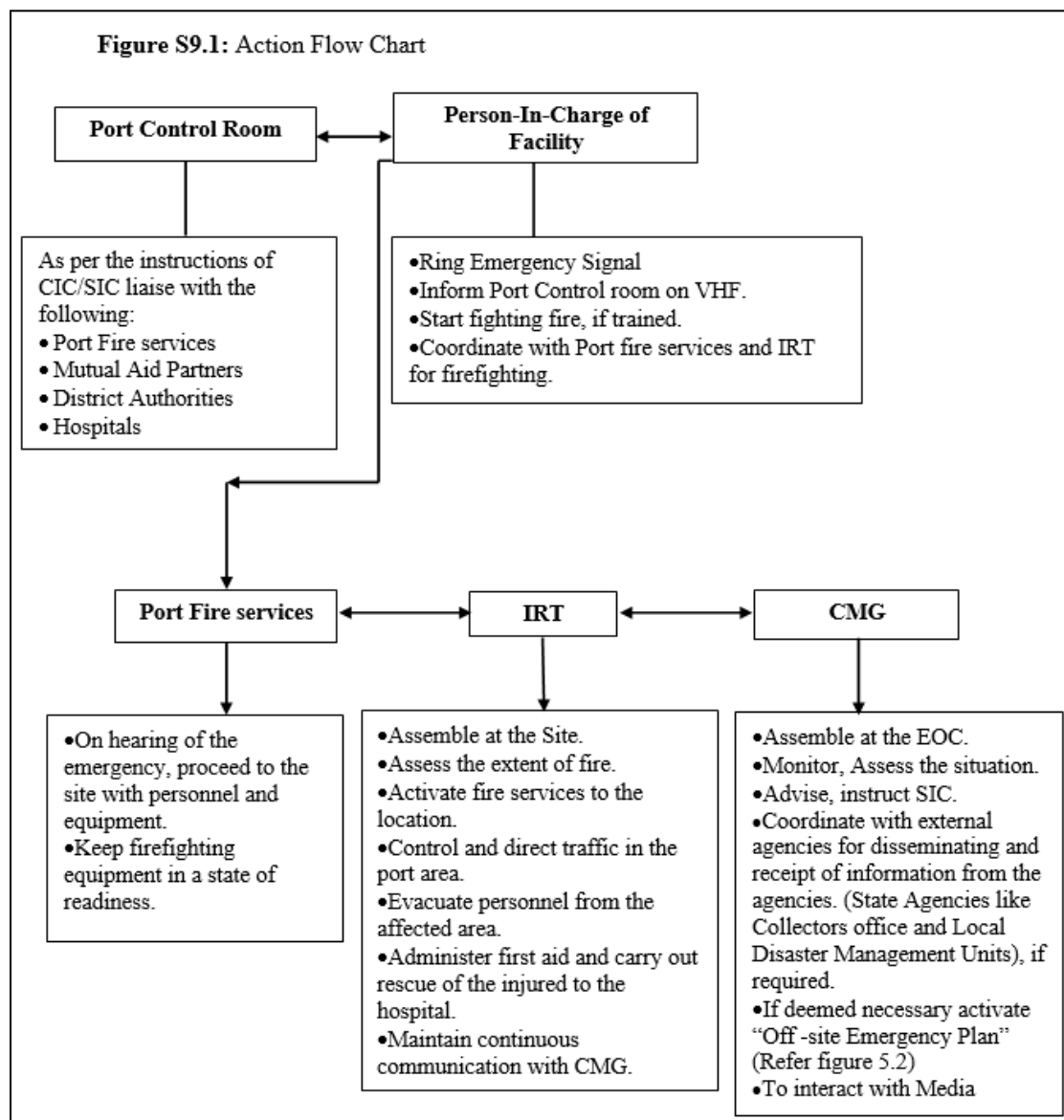
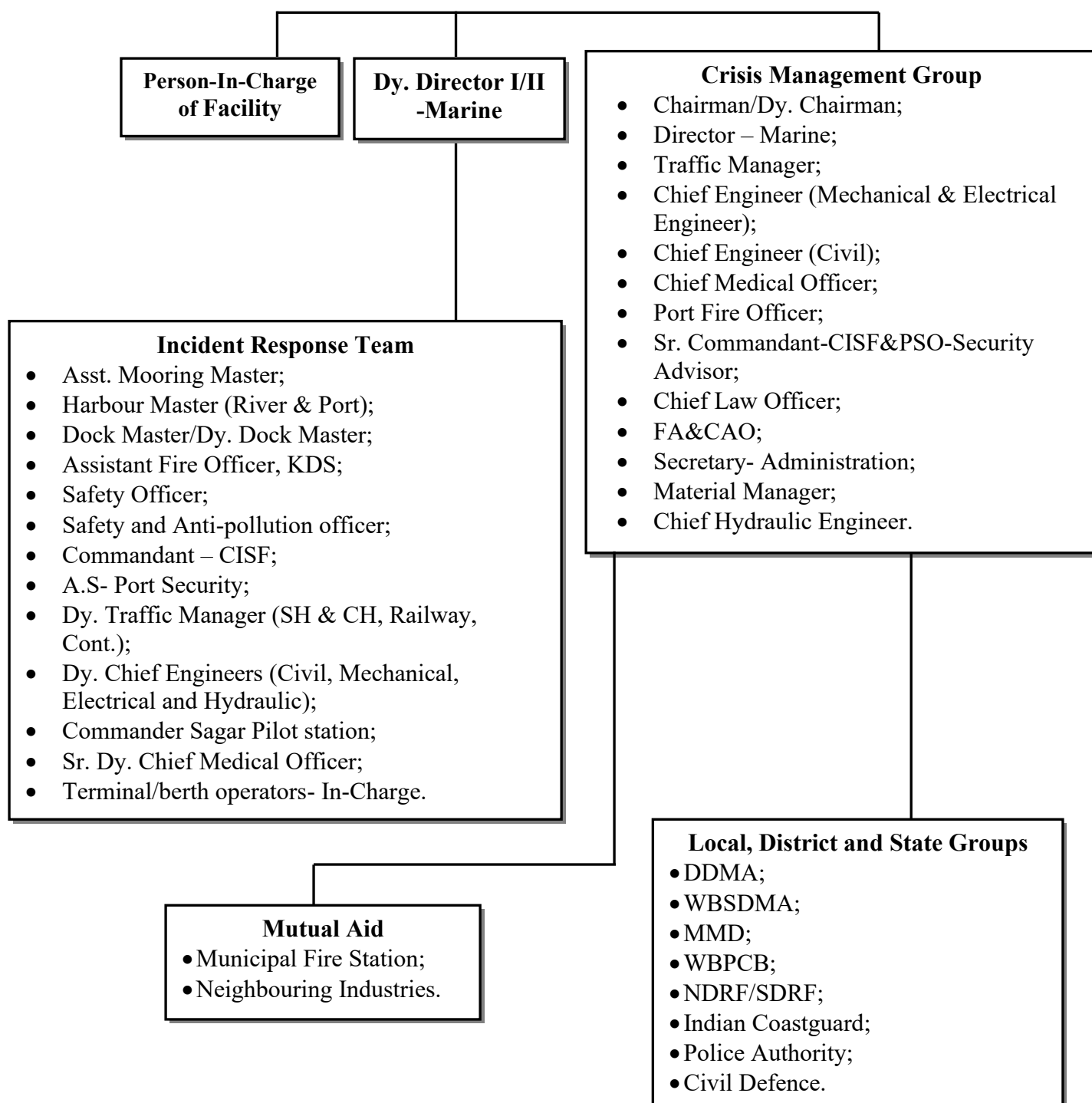


Figure S9.2: Action group

Part B: Roles and Responsibilities**1. The Person-In-Charge of Facility or Observer**

Response Action
a. Shout “Fire Fire Fire” and should raise alarm.
b. Port Control Room should be informed of incident without any delay.
c. If fire is in the Port Control Room, inform Port Fire services and SIC.
d. If trained, try to extinguish the fire and try to evacuate people with assistance from Port Fire services, CISF and PSO. Alert nearby terminals in case of release of toxic fumes.

2. Port Control Room

Response Action
a. Gather information related to the time of incident.
b. Notify CIC and SIC.
c. Gather information about the weather conditions, notify CIC, SIC and Port Fire Services.

3. Chief Incident Controller (CIC)- Director - Marine (Alternate: Dy. Director I/II - Marine)

Response Action
a. Assess the level of disaster and activate the DMP.
b. Establish EOC and be stationed to review and assess possible developments to determine the most necessary course of action.
c. Give necessary instructions to SIC, Port Control Room and arrange for external aid as necessary.
d. Review the situation and accordingly inform to the CEC.
e. Decide on clearing of vehicles in close proximity to the incident location.
f. Authorize use of Ambulance for evacuation along with medical staff to identified hospital/dispensary.
g. Discuss and coordinate with functional heads.
h. Be in constant touch with District and Local Administration for rescue and relief operation.
i. Terminate the response and debrief before allowing normal operation.

4. The Fire-fighting Personnel (Port Fire Services)

Response Action
a. Collect the information about the exact location of the fire and people trapped in the building. Ensure safe evacuation of the people from affected area.
b. Assist In-charge in fighting fire as per SIC Instructions.
c. Mobilize fire tenders, personnel, fire-fighting equipment to the scene for firefighting and take all precautionary measures to protect against the toxic fumes.
d. If the fire is out of control, convey the message to CIC, SIC and seek assistance from Mutual aid partners or other organizations.

- | |
|--|
| e. Ensure cleanup work carry out during and after the emergency as quick as possible |
| f. Assist in evacuation of the personnel as directed by SIC. |
| g. If the fire is under control and extinguished, give all clear signal. |

5. Duties of IRT

Designated Officer	Role	Duties
Dy. Director I - Marine (Alternate Dy. Director II - Marine)	Site Incident Controller	During Emergency shall proceed to the scene, communicate and collect all information from the In-charge.
		Conduct initial briefing and report the situation to the CIC.
		Alert vehicles within the vicinity.
		Extend all necessary support to the Port Fire services to fight the fire.
		Instruct the Port Fire services to keep the fire-fighting installation in a state of readiness and activate if required.
		Ensure isolation of ventilation system and electrical equipment.
Executive Engineer (Alternate Engineer)	M & E Coordinator	Coordinate with all functional heads.
		Assist SIC or lead the IRT in coordination with SIC.
		Coordinate with Electricity board.
		Isolate ventilation system and electrical equipment.
Asst. Port Fire Officer (Alternate Officer)	Port Control Room Coordinator	Shall be responsible for Electrical connections and disconnections to vital equipment, systems at the berth and provide alternate supply if required.
		Lead the fire-fighting team, mobilize fire tenders, manpower and fire-fighting equipment to the scene for fire-fighting.
		Assist CISF, PSO for safe rescue of the personnel, if trapped.
Safety and Anti-Pollution Officer (Alternate Officer)	Pollution Control Coordinator	Inform SIC for the requirement of any additional equipment.
		Ensure safely rescue of personnel and labors.
		Ensure cleanup work during and after the emergency as quick as possible.

Disaster Management Plan

Harbour Master (River) (Alternate Dock Master/ Pilot)	Port Control Room Coordinator	Shall monitor the communication on VHF or any other communication medium, convey and relay messages on the advice from CIC, SIC.
Commandant- CISF & PSO (Alternate Dy. Commandant- CISF & Alternate Officer)	Security and Evacuation	Cordon off the area as per instructions from SIC. Control and direct traffic in the affected area. Facilitate evacuation, transport, first aid and rescue of personnel from the scene at the time of emergency. Liaise with the Police authorities. Responsible the head count of the personnel.
Executive Engineer (Alternate Engineer)	Civil Coordinator	Liaise with SIC.
Sr. Dy. CMO (Alternate Medical Officer)	First Aid and Medical Coordinator	Shall be responsible to organize and dispatch first aid team with ambulance as required.
Dy. Traffic Manager (Alternate Officer)	Traffic Coordinator	Shall mobilize and dispatch sufficient number of vehicles to the site of emergency.
Material Manager (Alternate Officer)	Material Management	Maintain sufficient inventory and provide the same during emergency as per the order of SIC, CIC.

S10: Scenario 10: War and Terrorism like situation.**Part A: Action Plan**

- 1. Precautions:** Protection of the port facilities receiving seagoing vessels from terrorist attacks is as per the provision of the “The International Vessel and Port Facility Security Code (ISPS Code)”.

Security of the KDS is being provided by CISF and PSO.

The measures for port security include "VTMS, CCTVs, Biometric Access Control System, patrolling of port areas by vehicles, creation of deterrence by perimeter wall, illuminating port area, regulating access to ports and Ships, conducting physical verification etc.”

Kolkata dock system has installed high-end Security Surveillance System which functions round the clock and enhances the security measures.

- 2. Impact Zone:** Entire port.
- 3. Resources required:** Intelligence inputs from agencies and Action Group enumerated in Figure S10.2, material and equipment resources as given in **Chapter 10.**

A.1 Prior Emergency Situation (after warnings/inputs)

When war or terrorism like situation is developed or during the declaration of war the priority is to be given to all important/critical areas to remain vigilant to prevent sabotage, to remain ready to combat emergency and to keep normal operation going.

- Set up Crisis management centre and manned continuously.
- CMG to declare plan to be followed which could be based on CISF Contingency Plan/Government of India/Statutory bodies/Indian Navy/Air Force/Government of West Bengal instructions.
- CMG to ensure utmost vigilance in identified area to ensure the adequate resources in terms of security personnel, experts in handling equipment, trained manpower, and flood lights, earth moving equipment, mobile cranes, and rescue crafts are available to guard all gates, roads etc. In case of any unidentified/unauthorized person is found, he must be handed over to police.
- CMG to ensure that evacuation plan is prepared and backup systems such as power generator, communication equipment, and safety systems are working. CMG should also ensure that all required manpower such as electricians/technicians/laborer is available all time.
- All terminal/berth operators and sensitive locations should be informed.
- No movement of the vessels in the port vicinity will be allowed.

A.2 During Emergency

- In case of an enemy attack inform relevant authorities and internal security to defend installations till the external support arrives.
- When additional security arrives, situation is to be handled jointly
- CMG to ensure sufficient supply of food and water.
- All vessels inside the port and at the anchorage will observe blackout as per the instruction of CMG.

Figure S10.1: Action Flow Chart

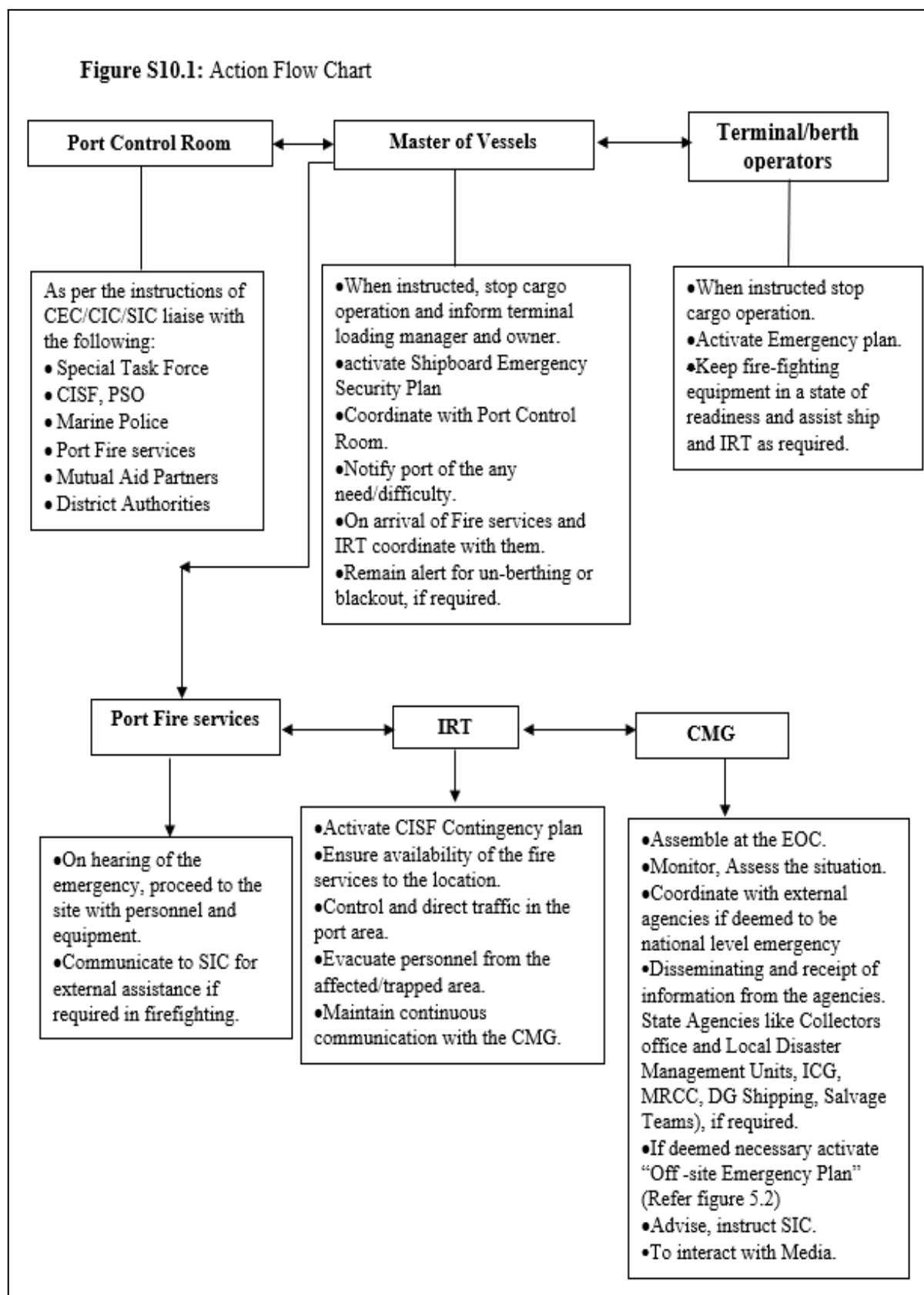
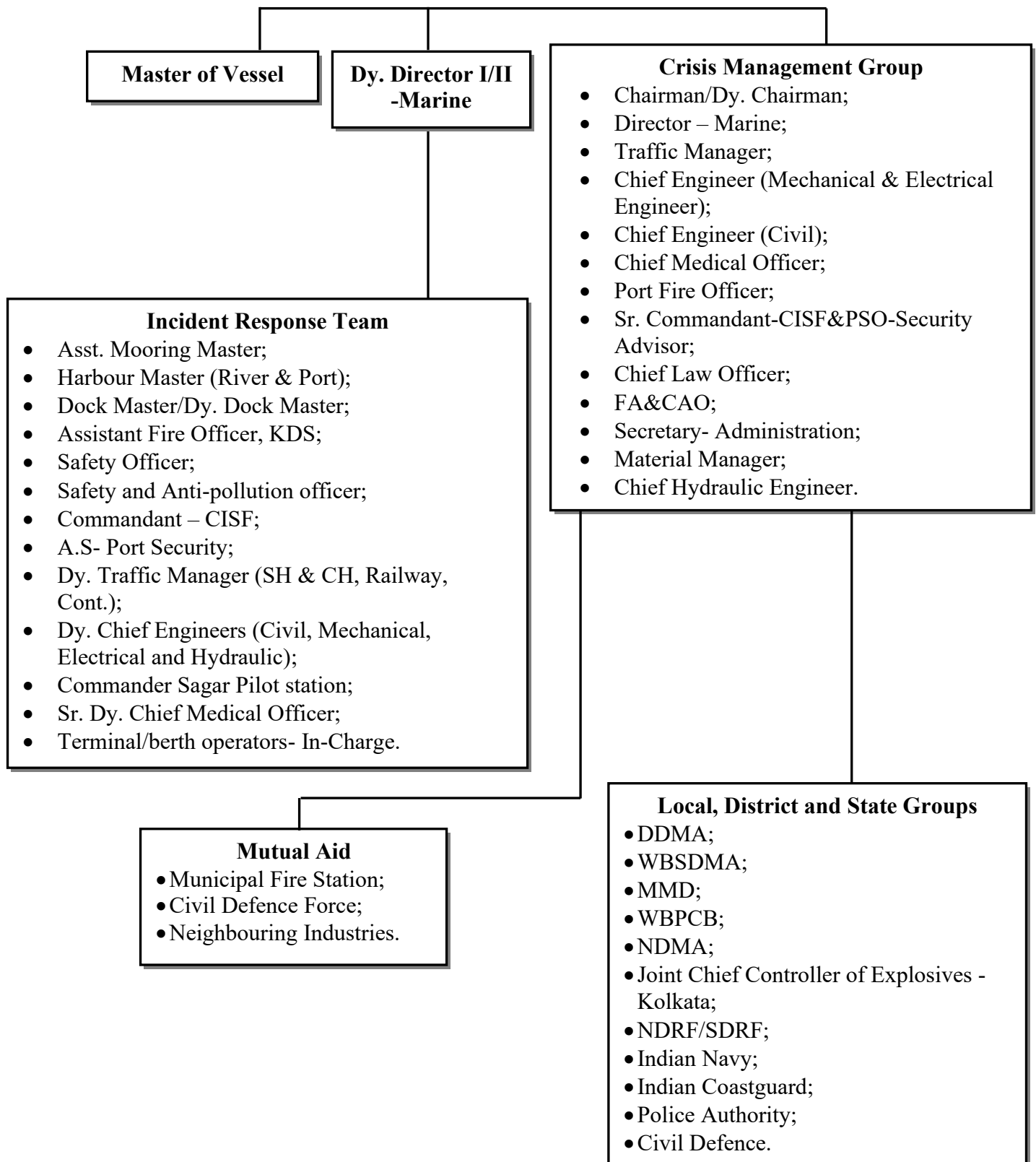


Figure S10.2: Action group

Part B: Roles and Responsibilities**1. Commandant - CISF (Alternate: Dy. Commandant- CISF)**

Response Action
a. Act as per the CISF's Contingency Plan and arrival of specialized task force with their designated duties.
b. Control and direct traffic in the area and Coordinate with the Terminal / Berth operators.
c. Shall supervise evacuation of personnel from the scene at the time of emergency and shift to shelter location.
d. Coordinate with CIC, SIC if external support is required.
e. Terminate the response and debrief before allowing normal operation.

2. Chief Incident Controller (CIC)- Director - Marine (Alternate: Dy. Director I/II - Marine)

Response Action
a. Establish EOC, be stationed to review and assess possible developments to determine the necessary course of action in coordination with CISF-Security and PSO.
b. Give necessary instructions to SIC and Port Control Room and arrange for external aid as necessary.
c. Review the situation and accordingly inform to the CEC.
d. Be in constant touch with District and Local Administration for rescue and relief operation.
e. Terminate the response in coordination with CISF and debrief before allowing normal operation.

3. Duties of IRT

Designated Officer	Role	Duties
Dy. Director I - Marine (Alternate Dy. Director II - Marine)	Site Incident Controller	During Emergency shall communicate and collect all information.
		Conduct initial briefing and report the situation to the CIC.
		Extend all necessary help to CISF (Security) as and when required.
		Ensure that there is blackout at the port and the vessels at the anchorage area as per the guidance and instruction of CMG, CIC and CISF.
Harbour Master (River) (Alternate Dock Master/ Pilot)	Port Control Room Coordinator	Shall be ready for taking the instructions from CIC, SIC and evacuate/move/shift the vessel from the area.
Master of the vessel	In-Charge of operation on	Be ready to take the vessel out of the port as per the instructions of CIC, SIC.

Disaster Management Plan

(Alternate Chief Officer of vessel)	board vessel	Coordinate with SIC and will be responsible for shutting down all cargo operation on board in coordination with terminal/operator In-Charge.
Terminal/Berth Operators (Alternate Officer)	Cargo Work	Shall be responsible of shutting down of cargo operation, coordinating with Port and render necessary assistance to the SIC by providing additional fire-fighting and emergency equipment as required. Arrange to protect cargo in vicinity from damage.
Safety Officer (Alternate Officer)	Safety Coordinator	Ensure all employees (port and contract) within port shifted to safe locations.
Asst. Port Fire Officer (Alternate Officer)	Fire, Search and Rescue Coordinator	Keep the fire –fighting installation in a state of readiness and be in continuous liaison with SIC, CIC. Ensure all employees (port and contract) within port shifted to safe locations.
Executive Engineer (Alternate Engineer)	Civil Coordinator	Assist SIC.
Executive Engineer (Alternate Engineer)	M & E Coordinator	Arrange for specialized equipment if required as per the instruction of the SIC. Take orders from CIC, SIC with regards to power supply and shutdown.
Sr. Dy. CMO (Alternate Medical Officer)	First Aid and Medical Coordinator	Shall be responsible to organize and keep first aid team with ambulance as required. Ensure the hospital is in a state of readiness.
Dy. Traffic Manager (Alternate Officer)	Traffic Coordinator	Shall prepare vessels to vacate from berth. Arrange to protect cargo in vicinity from damage. Submits consolidated list of dangerous goods in port – Vessels in port. Coordinates with ship owners/ agents/ stevedores.

S11: Scenario 11: Bomb Threat – information received via email, SMS, on social media.

Part A: Action Plan

- 1. Precautions:** Protection of the port facilities receiving seagoing vessels from bomb threat is as per the provision of the “The International Vessel and Port Facility Security Code (ISPS Code)”.

Security of the KDS is being provided by CISF and PSO.

The measures for port security include " VTMS, CCTVs, Biometric Access Control System, patrolling of port areas by vehicles, creation of deterrence by perimeter wall, illuminating port area, regulating access to ports and ships, conducting physical verification etc.”

Kolkata dock system has installed high-end Security Surveillance System which functions round the clock and enhances the security measures.

- 2. Impact Zone:** Entire port.
- 3. Resources required:** Action Group enumerated in Figure S11.2, material and equipment resources as given in **Chapter 10**.

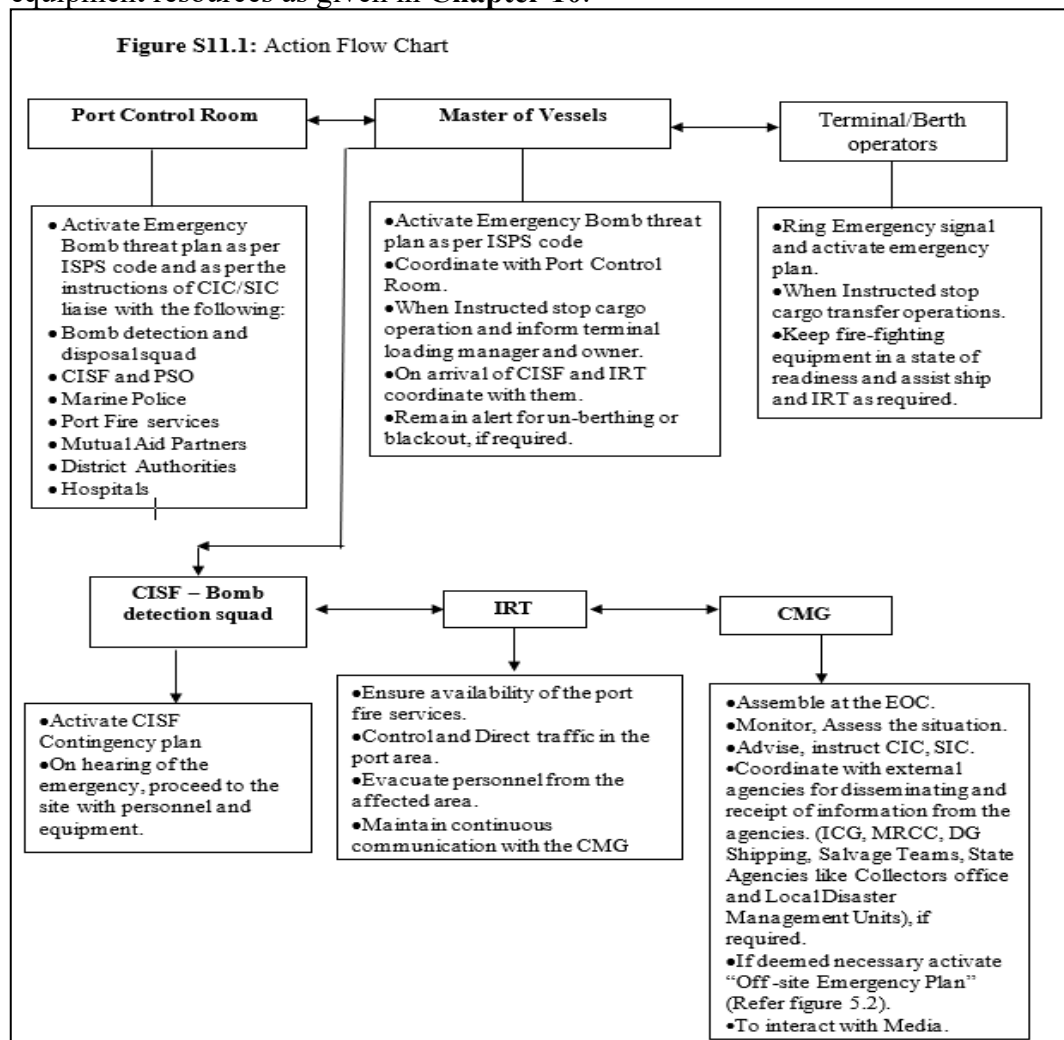
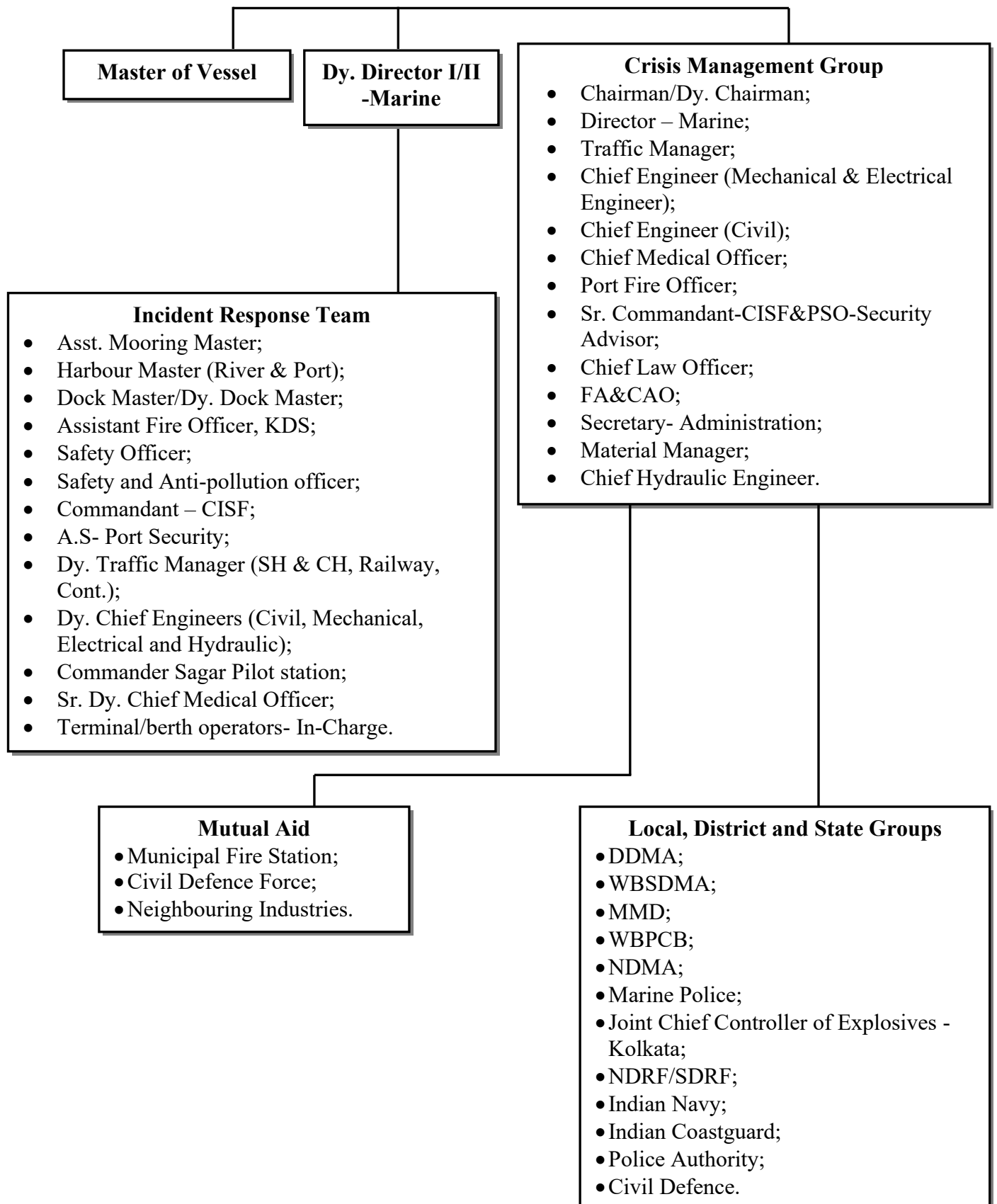


Figure S11.2: Action group

Part B: Roles and Responsibilities**1. The Information receiver**

Response Action
a. Should inform Port Control Room, CISF, PSO without any delay.

2. Commandant - CISF (Alternate: Dy. Commandant- CISF)

Response Action
a. Gather the information as per CISF bomb threat checklist based on Intelligence inputs.
b. Should implement, activate CISF Contingency Plan and search operation as per the message received of the location.
c. Identify the location and cordon off the area.
d. Assist District Police and Bomb detection and Disposal Squad as required.
e. All terminals, berth operators should be informed.
f. Relevant port area should be shut down and people inside the port should be taken to a safe location.

3. Chief Incident Controller (CIC) - Director - Marine (Alternate: Dy. Director I/II - Marine)

Response Action
a. Establish EOC and be stationed to review and assess possible developments to determine the necessary course of action.
b. Give instructions to SIC, CISF and Port Control Room and arrange for external aid as necessary.
c. Review the situation and accordingly inform to the CEC.
d. Be in constant touch with District and Local Administration for rescue and relief operation.
e. Terminate the response and debrief before allowing normal operation.

4. Duties of IRT

Designated Officer	Role	Duties
Dy. Director I -Marine (Alternate Dy. Director II - Marine)	Site Incident Controller	During Emergency shall communicate and collect all the information.
		Ensure that the identified location is cordoned off and the people are evacuated.
		Report the situation to the CIC, CMG.
		Extend all necessary help to CISF, PSO as and when required.
Harbour Master (River) (Alternate Dock Master/Pilot)	Port Control Room Coordinator	As per instructions of CIC, SIC evacuate/move/shift the vessel from the area.

Disaster Management Plan

Safety Officer (Alternate Officer)	Safety Coordinator	Ensure all employees (port and contract) within port shifted to safe locations.
Master of the vessel (Alternate Chief Officer of vessel)	In-Charge of operation on board vessel	As per the instructions of CIC, SIC take the vessel out of the port. Coordinate with SIC and will be responsible for shutting down all cargo operation on board in coordination with terminal In-Charge.
Terminal/ Berth Operator (Alternate Officer)	Cargo Work	Shall be responsible of shutting down of cargo operation & coordinating with Port and rendering necessary assistance to the SIC by providing additional equipment as required. Coordinate with the agencies for screening of their cargoes. Arrange to protect cargo in vicinity from damage.
Asst. Port Fire Officer (Alternate Officer)	Fire, Search and Rescue Coordinator	Keep the fire –fighting installation in a state of readiness and be in continuous liaison with SIC, CIC. Ensure all employees (port and contract) within port shifted to safe locations.
Executive Engineer	Civil Coordinator	Assist SIC.
Executive Engineer (Alternate Engineer)	M & E Coordinator	Arrange for specialized equipment if required as per the instruction of the SIC. Take orders from CIC, SIC with regards to power supply and shutdown.
Sr. Dy. CMO (Alternate Medical Officer)	First Aid and Medical Coordinator	Shall be responsible to organize and keep first aid team with ambulance as required. Ensure hospital is in a state of readiness.
Dy. Traffic Manager (Alternate Officer)	Traffic Coordinator	Shall prepare vessels to vacate from berth. Arrange to protect cargo in vicinity from damage. Submits consolidated list of dangerous goods in port – Vessels in port. Coordinates with ship owners/agents/stevedores.
Duty Pilot (Alternate Standby Pilot)	In-Charge of Pilotage	Shall be ready on site for taking the vessel out of berth and be ready for providing any assistance on site. Responsible for organizing tugs for shifting the vessel to the anchorage area.

S12: Scenario 12: Hijacking**Part A: Action Plan**

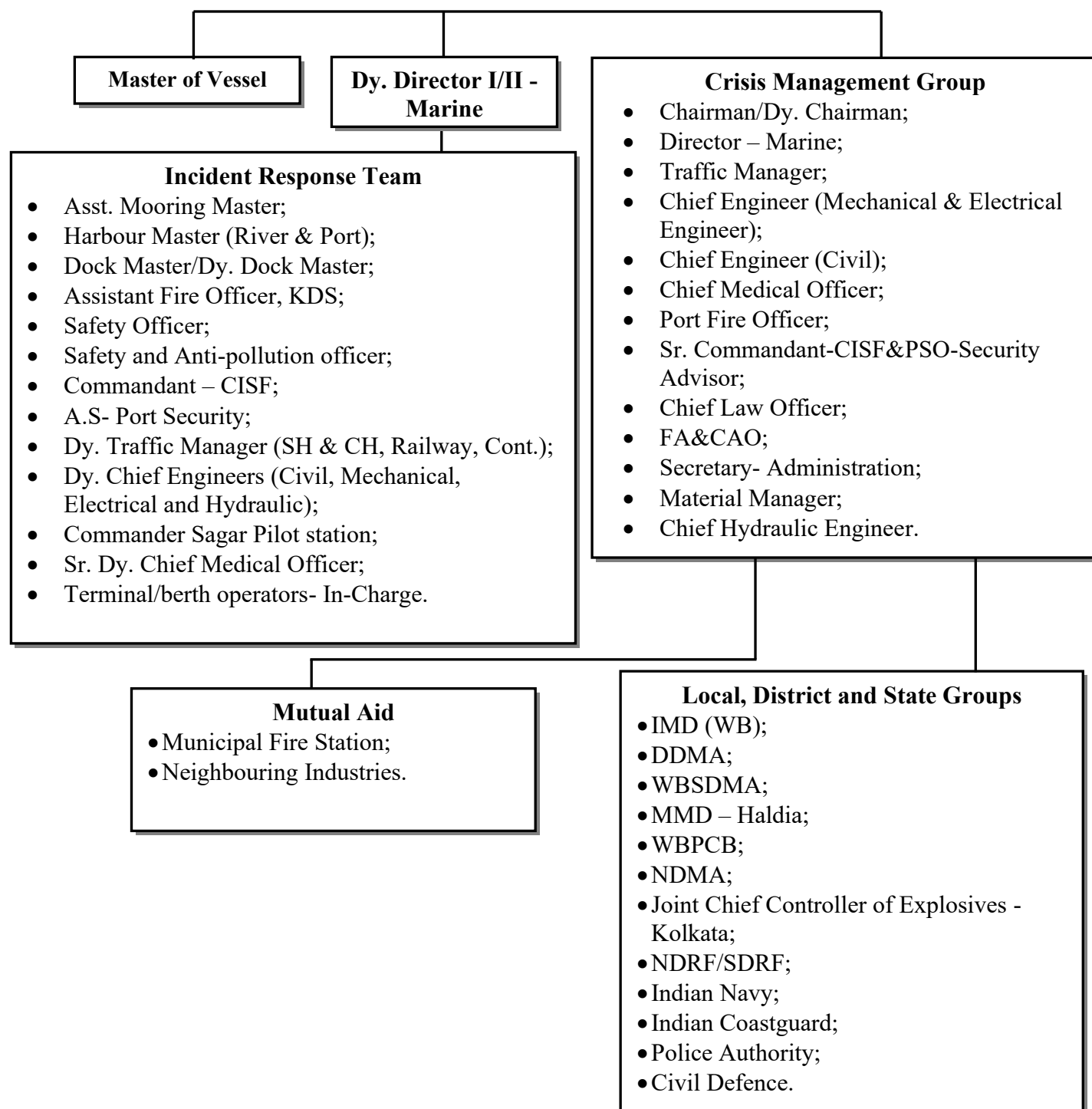
1. **Precautions:** Security of the KDS is being provided by CISF and PSO.

Port Security level will be enhanced during the Labour dispute emergency.

The measures for port security include "VTMS, CCTVs, Biometric Access Control System, patrolling of port areas by vehicles, creation of deterrence of perimeter wall, illuminating port area, regulating access to ports and ships, conducting physical verification etc."

KDS has installed high-end Security Surveillance System which functions round the clock and enhances the security measures.

2. **Impact Zone:** Entire port.
3. **Resources required:** Intelligence inputs from agencies, Action group enumerated in Figure S12.1, material and equipment resources as given in **Chapter 10**.

Figure S12.1: Action group

Part B: Roles and Responsibilities**1. Sr. Commandant-CISF & PSO-Security Advisor**

Response Action
a. Sufficient security to be deployed at the affected area and increase the security level in consultation with the CIC.
b. Act as per the CISF and PSO Contingency Plan and arrival of specialized task force with their designated duties.
c. Coordinate with the Intelligence Agencies, Commandoes, Bomb Squad team etc. participating.
d. High Alert declared in the Port and intimate the concerned all the Stake holders, Port users etc.
e. Control and direct traffic in the area.
f. Coordinate with the Terminal / Berth operators.
g. Shall supervise evacuation of personnel from the scene at the time of emergency and shift to shelter location.
h. Coordinate with CIC, SIC if external support is required.
i. Terminate the response and debrief before allowing normal operation.

2. Chief Incident Controller (CIC) - Director – Marine (Alternate: Dy. Director I/II - Marine)

Response Action
a. Establish EOC, be stationed to review and assess possible developments to determine the necessary course of action in coordination with Security.
b. Meeting to be convened along with the CMG, Intelligence Authorities to develop a strategy to carry out the operations successfully.
c. Take necessary actions to suspend the Port operations and intimate the concerned accordingly.
d. Take necessary action to increase the security level of the Port.
e. Give instructions to SIC, Port Control Room and arrange for external aid as necessary.
f. Review the situation and accordingly inform to the CEC.
g. Incident Report to be prepared and forwarded to the DG Shipping.
h. Be in constant touch with District and Local Administration for rescue and relief operation.
i. Terminate the response in coordination with CISF and debrief before allowing normal operation.

3. Duties of IRT

Designated Officer	Role	Duties
Dy. Director I - Marine (Alternate Dy. Director II - Marine)	Site Incident Controller	During Emergency shall communicate and collect all information.
		Conduct initial briefing and report the situation to the CIC.
		Extend all necessary support to Security as required.
		To make arrangements for boarding of the security persons on the crafts, if required.
		Coordinate and establish communication between all security agencies and the hijacker for their demand.
Harbour Master (River) (Alternate Dock Master/Pilot)	Port Control Room Coordinator	Evacuate / move / shift the vessel from the area as per instructions from CIC, SIC.
		To keep good listening and visual watch by all available means to monitor the vessel at all times, keep reporting to all concerns and update the situation.
		Alert the stake holders such as agencies, stevedores, terminals etc.
Master of the vessel	In-Charge of operation on board vessel	Be ready to take the vessel out of the port as per the instructions of CIC, SIC.
		Coordinate with SIC and will be responsible for shutting down all cargo operation on board in coordination with berth operator In-Charge.
Asst. Port Fire Officer (Alternate Officer)	Fire, Search and Rescue Coordinator	Keep the fire-fighting installation in a state of readiness and be in continuous liaison with SIC, CIC.
		Ensure all employees (port and contract) within port shifted to safe locations.
Commandant – CISF; A.S- Port Security	Security and Evacuation	Act as per the CISF and PSO Crisis Management plan.
		Control and direct traffic in the area.
		Shall supervise evacuation of personnel from the scene at the time of emergency and shift to safe location.
Executive Engineer (Alternate Engineer)	Engg. Coordinator	Arrange for specialized equipment if required as per the instruction of the SIC.
		Coordinate with CIC, SIC with regards to power supply and shutdown.
Sr. Dy. CMO (Alternate Medical Officer)	First Aid and Medical Coordinator	Shall be responsible to organize and keep first aid team with ambulance as required. Ensure the hospital is in a state of readiness.

Disaster Management Plan

Dy. Traffic Manager (Alternate Officer)	Traffic Coordinator	Ensure arrangements are made to protect cargo.
		Submits consolidated list of dangerous goods in port – Vessels in port.
		Coordinates with ship owners/agents/stevedores.

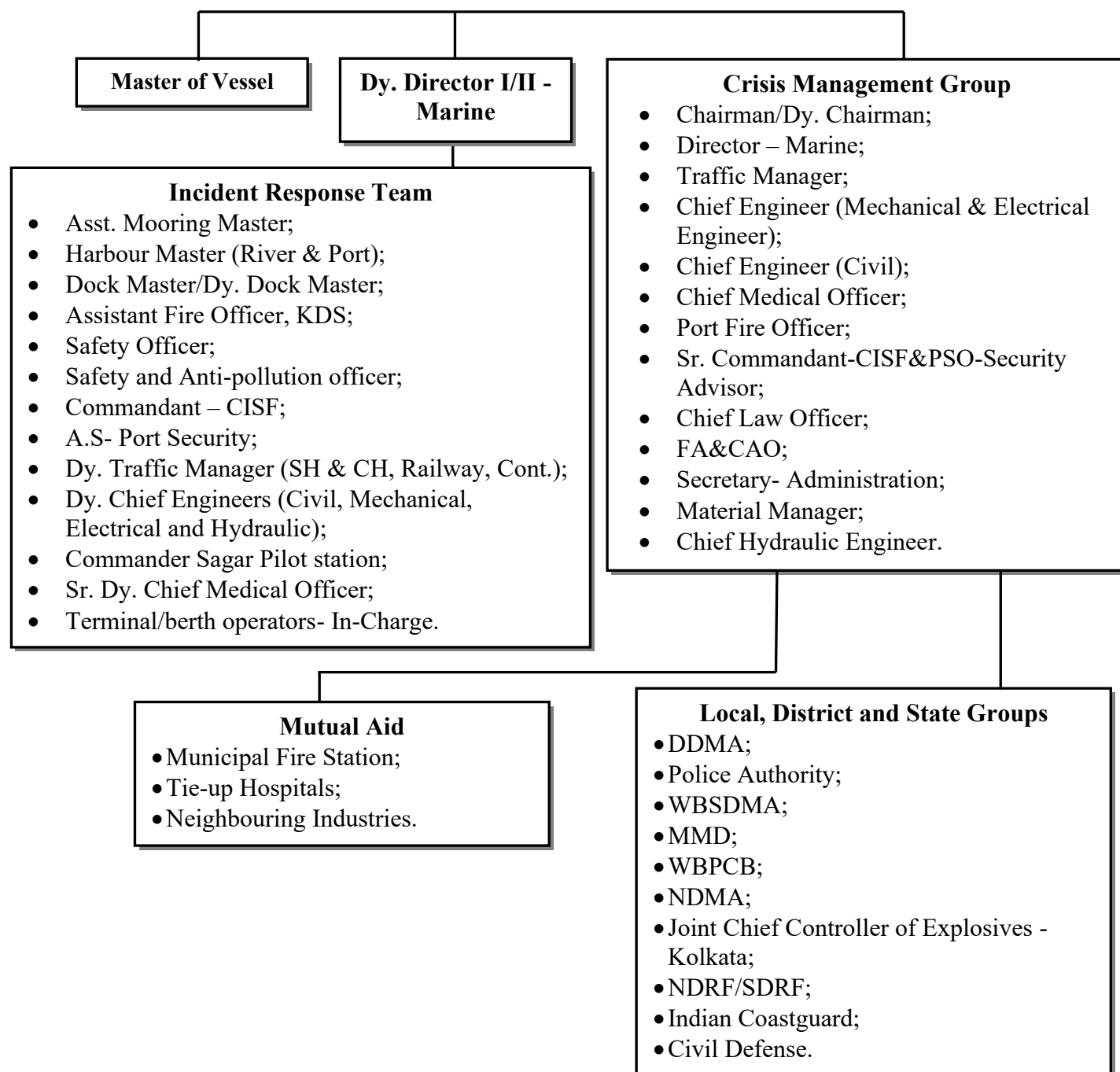
S13: Scenario 13: Labour Dispute**Part A: Action Plan****1. Precautions:** Security of the KDS is being provided by CISF and PSO.

Port Security level will be enhanced during the Labour dispute emergency.

The measures for port security include "VTMS, CCTVs, Biometric Access Control System, patrolling of port areas by vehicles, creation of deterrence of perimeter wall, illuminating port area, regulating access to ports and ships, conducting physical verification etc."

KDS has installed high-end Security Surveillance System which functions round the clock and enhances the security measures.

2. Impact Zone: Entire port.**3. Resources required:** Inputs from trade union leaders, Action group enumerated in Figure S13.1, material and equipment resources as given in **Chapter 10**.

Figure S13.1: Action group

Part B: Roles and Responsibilities**1. Sr. Commandant-CISF & PSO-Security Advisor**

Response Action
a. Sufficient security to be deployed at the affected area and increase the security level in consultation with the CIC.
b. Act as per the CISF & PSO Crisis Management Plan.
c. Control and direct traffic in the area.
d. Coordinate with the port control room.
e. Shall supervise evacuation of personnel from the scene at the time of emergency and shift to safe location.
f. Coordinate with CIC, SIC if external support is required.
g. Terminate the response and debrief before allowing normal operation.

2. Chief Emergency Controller (CEC) – Chairman / Dy. Chairman

Response Action
a. Convening the meeting with the Union Leaders to discuss and sort out demands so as to avoid strike.
b. If the strike is imminent, directing/instructing the CMG for actions to be taken in order to ensure uninterrupted operations.
c. Intimating the MoPSW and District Authorities regarding the strike and seeking necessary assistance to resolve the problem.
d. Give instructions to CIC and arrange for external aid as necessary.

3. Chief Incident Controller (CIC) - Director – Marine (Alternate: Dy. Director I/II - Marine)

Response Action
a. Establish EOC, be stationed to review and assess possible developments to determine the necessary course of action in coordination with Security.
b. As instructed by the CEC, issue Circular informing about the strike declared by the Labour Unions to all the stake holders and Port users.
c. Take actions to ensure uninterrupted operations.
d. To inform the Local Police regarding the strike and seek assistance from the Police.
e. Give instructions to SIC, Port Control Room and arrange for external aid as necessary.
f. Review the situation and accordingly inform to the CEC.
g. Take necessary action to increase the security level of the Port.
h. Be in constant touch with District and Local Administration for rescue and relief operation.
i. The movement strike is called off; the security deployment should be withdrawn step by step.

4. Duties of IRT

Designated Officer	Role	Duties
Dy. Director I - Marine (Alternate Dy. Director II - Marine)	Site Incident Controller	During Emergency shall communicate and collect all information.
		Conduct initial briefing and report the situation to the CIC.
		Extend all necessary support to Security as required.
Harbour Master (River) (Alternate Dock Master/Pilot)	Port Control Room Coordinator	Evacuate / move / shift the vessel from the area as per instructions from CIC, SIC.
Master of the vessel	In-Charge of operation on board vessel	Be ready to take the vessel out of the port as per the instructions of CIC, SIC.
		Coordinate with SIC and will be responsible for shutting down all cargo operation on board in coordination with berth operator In-Charge.
Asst. Port Fire Officer (Alternate Officer)	Fire, Search and Rescue Coordinator	Keep the fire-fighting installation in a state of readiness and be in continuous liaison with SIC, CIC.
		Ensure all employees (port and contract) within port shifted to safe locations.
Commandant – CISF; A.S- Port Security	Security and Evacuation	Act as per the instructions of Sr. Commandant, PSO Security Advisor and CIC.
		Control and direct traffic in the area.
		Identify gathering spots of the union workers and regulating traffic in these areas.
		Ensure security of Port workers if they face any problem from workers/employees involved in strike.
		Shall supervise evacuation of personnel from the scene at the time of emergency and shift to safe stations.
Executive Engineer (Alternate Engineer)	Engg. Coordinator	Arrange for specialized equipment if required as per the instruction of the SIC.
		Coordinate with CIC, SIC with regards to power supply and shutdown.
Sr. Dy. CMO (Alternate Medical Officer)	First Aid and Medical Coordinator	Shall be responsible to organize and keep first aid team with ambulance as required. Ensure the hospital is in a state of readiness.
Dy. Traffic Manager (Alternate Officer)	Traffic Coordinator	Ensure the arrangement is made to protect cargo.
		Submits consolidated list of dangerous goods in port – Vessels in port.
		Coordinates with ship owners/agents/stevedores.

S14 Scenario 14: Natural Disaster (Cyclone)

Part A:

Note: The action plan will come into force as soon as the storm warning signal no.5 or higher is hoisted.

- 1. Precautions:** Procedure for Cyclone, Continuous weather monitoring, Early warning system, Cyclone Shelters.

- 2. Impact Zone:** Entire port.

Note: The Kolkata/ South-24 Parganas districts falls under very high damage risk zone (max. wind speed of 50 m/s) as per the vulnerability hazard map of the region.

- 3. Resources required:** Action Group enumerated in Figure S14.2, material and equipment resources as given in **Chapter 10**.

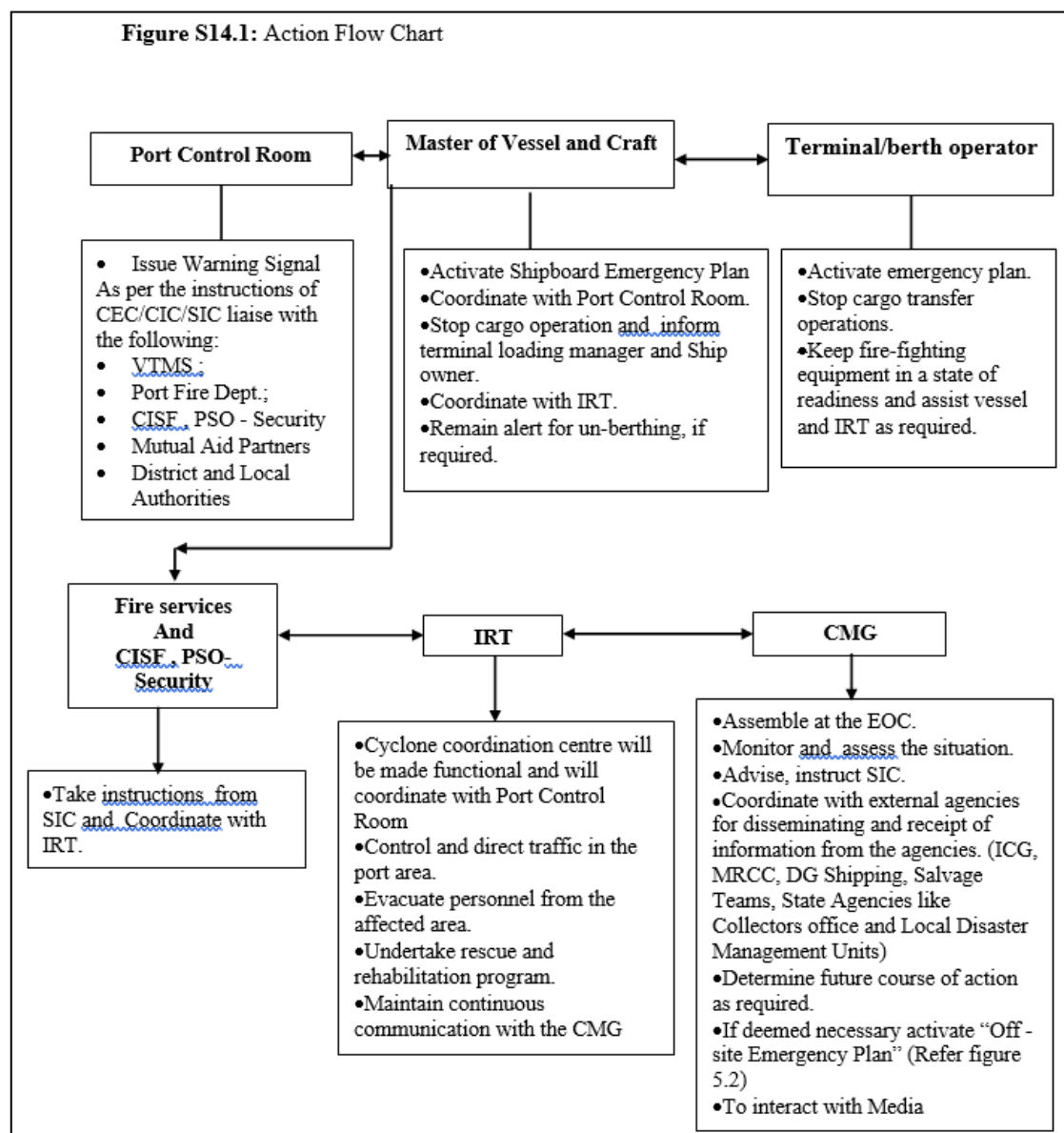
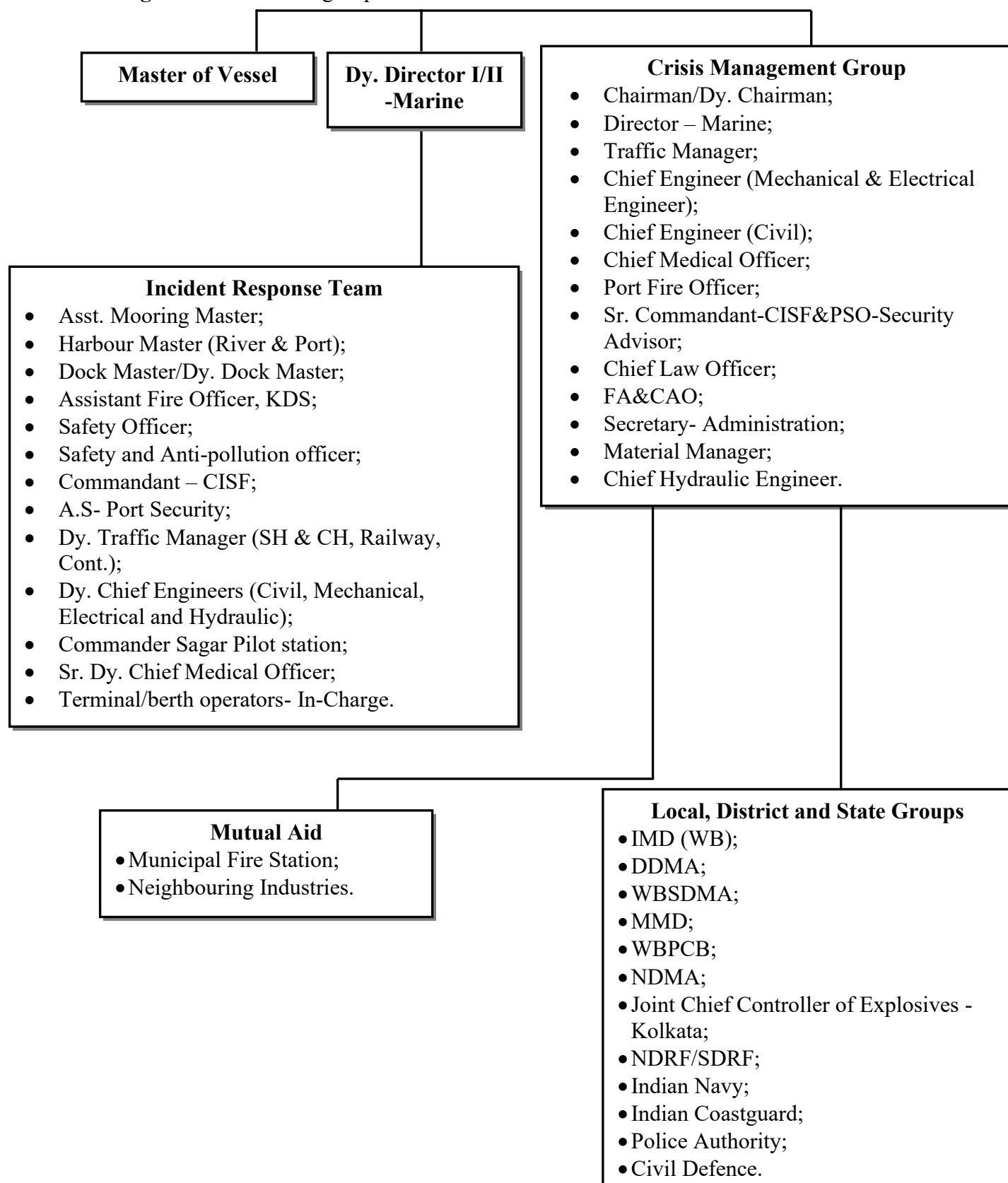


Figure S14.2: Action group

Part B: Roles and Responsibilities**1. Port Control - KDS, VTMS - Sagar Island and HDC**

Response Action
a. Gather information related to the vessel type and position in the port limit.
b. Gather information related to the weather conditions by liaising with competent agencies for issuing warnings as mentioned in section 7.1.5 and other media. Weather monitoring through Internet or Television and record approximate position of the cyclone and information about its movement as given in the news.
c. The staff of Port Control Room will remain on duty until they are relieved by next shift staff or till alternative arrangements are made or till the storm has passed.
d. Every two hourly barometer reading will be recorded after cyclone warning signal No. 3 is hoisted but the same will be made hourly if further upward signal is placed.
e. Liaise with Master of the Vessel, Pilot.
f. Ensure that telephones, VHF and walkie-talkie all are operational. Listening watch to be maintained on VHF channel-16, 68.
g. Notify CIC, SIC about Vessel Movements. Keep CIC, SIC informed of all the messages received by Communication medium.
h. Notify the other Authorities and stakeholders within Port as per instructions of CIC, SIC.
i. Inform the SIC of any buoys or crafts or any Port installation is seen adrift.
j. Hoist signals or raise alarms, as per the warnings received by the competent agencies for issuing warnings.

2. Tidal observatory

Response Action
a. The Gauge Clerk will record the range of tide, time and heights of high and low water and will report to Senior Hydrographic Surveyor who in turn will apprise the CIC and SIC of the actual and predicted tides.

3. The Master of the Vessel (Alternate: Chief Officer)

Response Action
a. Remain alert for un-berthing, if required.
b. The Master will provide the Port Authority with details of the vessel.
c. Should follow the instruction of the CIC, SIC and be in continuous liaison with the CIC, SIC, Port Control Room, terminal, and berth operators.
d. Should be in a state of readiness to take the vessel to safe area as instructions from CIC.

4. The terminal, berth operator personnel

Response Action
a. Activate EAP and inform Port control Room.
b. Shall be responsible of shutting down of cargo operation (as per SOP and/ contingency plan), coordinate with Port and Master of the Vessel and rendering necessary assistance to the SIC and vessel.

- | |
|---|
| c. Submit consolidated list of dangerous goods in terminal. Make arrangements to protect cargo. |
| d. All type of heavy earth moving equipment to be secured in a safe manner. |
| e. Assist IRT and provide all necessary equipment. |
| f. Coordinate with the Master of the vessel. |

5. Chief Incident Controller (CIC)- Director – Marine (Alternate: Dy. Director I/II -Marine)

Response Action
a. He will keep himself apprise of the weather developments.
b. Establish EOC and be stationed to review and assess possible developments to determine the necessary course of action.
c. Give instructions to SIC, Port Control Room and arrange for external aid as necessary.
d. Review the situation periodically and accordingly inform to the CEC.
e. Ensure adequate shelter homes for staff of KDS.
f. Consult with CEC and decide on berthing / unberthing of vessels as soon as the cyclone is confirmed to pass near the port.
g. Ensure port crafts are to be shifted to shelter inside dock.
h. Plan movements of vessels such that the vessels are cleared in shortest possible time.
i. Coordinate with external agencies/authorities such as DG Shipping, Indian Navy and Coastguard.
j. Be in constant touch with District and Local Administration for rescue and relief operation.
k. Terminate the response and debrief before allowing normal operation.

6. Duties of IRT

Designated Officer	Role	Duties
Dy. Director I/II- Marine (Alternate Asst. Mooring Master)	Site Incident Controller	During Emergency shall proceed to the Port Control Room and establish Cyclone Station, communicate, and collect all information.
		Ensure the action plan is promulgated as per the instructions of CIC.
		Inform Ships, Mooring team alongside berths to double up their moorings, provide shore gang assistance and ask Masters to keep their Ships ready to proceed to the sea at short notice as per the instruction of CIC.
		He will keep close liaison with IMD, Police Wireless Station, Coast Guard and Ships in Port about the likely weather conditions.
		Ensure Port Control Room, hoists appropriate storm signal as per the situation.
		Report the situation to the CIC.

Disaster Management Plan

		Keep rescue team ready with rubber boats, Life jackets etc.
		Ensure that the hazardous cargoes are shifted / Secured / stored in a safe manner.
		Ensure that the operations are brought back to normal after the termination of the emergency procedure.
Harbour Master (River) (Alternate Dock Master/ Pilot)	Port Control Room Coordinator	Shall monitor the communication on VHF or any other communication medium, convey and relay messages on the advice from CIC, SIC.
		Instruct Master of craft to secure tugs, crafts and workboats.
Harbour Master for Vessel in Dry Dock (Alternate Officer)	In-Charge of Dry Dock	Securing of loose items.
		Ensure securing of dock cranes.
		Engine room entrance doors, sky lights etc. of all the crafts to be kept shut.
		Master shall be in constant touch with Port Control Room.
Safety & anti-pollution Officer (Alternate officer)	Pollution Control Coordinator	Determine the level of contamination of the site as a result of incident.
		Ensure clean- up work during and after the emergency as quick as possible.
		Coordinate with SIC, WBPCB and approved waste disposal agencies.
Asst. Port Fire Officer (Alternate Officer)	Fire, Search and Rescue Coordinator	Keep fire tenders and fire-fighting equipment in a state of readiness.
		Ensure the Fire tugs is properly manned and secured with double ropes and engines running in idling condition.
		Ensure hazardous cargo out are kept at a sheltered or safe location.
		Responsible for mobilizing fire tenders, manpower and fire-fighting equipment to the scene and extend all necessary support.
		Liaise with State Fire brigade for any assistance.
		All other workers to move out of port area.
Commandant- CISF (Alternate Dy. Commandant- CISF)	Security and Evacuation	Controls and directs traffic in the area. Shall be responsible for forming a cyclone task force and will lead the same.
		Shall supervise evacuation of personnel from the scene at the time of emergency and Responsible for rescue operation.

Disaster Management Plan

		Till normality is restored, arrangement will be made for thorough checks on all out-going vehicles to guard against pilferage.
Dy. Traffic Manager (Alternate Officer)	Traffic Coordinator	Submits consolidated list of dangerous goods in port area.
		Coordinate with the truck contractors.
		Ensure availability of vehicles and mobilize and dispatch sufficient number of vehicles to the site during emergency.
Executive Engineer (Alternate Engineer)	Civil Coordinator	Shall ensure the standard procedure before the monsoon has been followed and complied with by all the divisions.
		Keep enough cement and sand bags ready as per SIC instructions.
		Ensure all the drains are cleaned for easy discharge of sludge water.
Executive Engineer (Alternate Engineer)	M & E Coordinator	Shall ensure the standard procedure before the monsoon has been followed.
		All types of cranes, forklifts, heavy earth moving equipment to be secured in a safe manner.
		Shall ensure that critical installations and equipment are secured.
		Pump house equipment and all generator sets shall be tried out and kept ready.
		Shall be responsible for alternate electrical supply to vital equipment and systems at the berth.
		All Sub Stations, Power Control rooms will be manned round the clock.
Sr. Dy. CMO (Alternate Medical Officer)	First Aid and Medical Coordinator	Shall be responsible to organize and keep first aid team with ambulance as required.
Duty Pilot (Alternate Standby Pilot)	In-Charge of Pilotage	Shall be ready on site for taking the vessel out of berth or will not bring the vessel to berth as per the instruction given by CIC, SIC.
		Inform the Masters of all ships at the berths to double the moorings and to keep engine ready to proceed out to sea if situation warrants.
		Decision regarding moving Ship to the anchorage will be taken depending on the strength of the wind likely to be encountered and number of vessels in the Port.

Disaster Management Plan

		Take all necessary steps for the safety of the Port crafts inside dock.
		Fender and extra lengths of ropes/wires will be kept ready so as to attend to any craft whose moorings may part.
		Inform the Port Control Room immediately in the event any craft is seen adrift or any other Port installation is seen in danger. Arrange an Emergency Maintenance team.
		Responsible for directing tugs for combating the fire and rescue.
Master Floating Craft		Securing of loose items.
		Engine room entrance doors, sky lights etc. of all the crafts to be kept shut.
		Master shall be in constant touch with Port Control Room.
Material Manager (Alternate Officer)	Material Management	During cyclonic season sufficient stock of stores like corrugated iron sheets, J. Hooks, screw hinges, gunny bags, tarpaulins, ropes and wires for Port Crafts, diesel oil, torch lights with batteries and bulbs, electrical items etc. is kept.

POST-CYCLONE DUTIES	
Sr. no.	Duty
1.	All the Heads of the Departments are required to assess the damage and submit a detailed report indicating the estimate to the CEC.
2.	Hydrographic survey to be conducted to assess the channel condition and Shipping to resume as early as possible.
3.	In case of any small craft sunk or grounded, the same to be removed to make the channel/ berth safe for navigation. SIC will detail a salvage Companies.
4.	Secretary to supervise the rescue and relief operation and disposal of carcasses in co-ordination with the local and District Administration.
5.	Mobile medical service, if required, to be provided by Medical Superintendent. Preventive measures for epidemics to be taken.
6.	All the operating systems need to be attended urgently and made operational as early as possible to resume operation.
7.	Water supply and electricity to be given priority. The CME shall be authorized to extend all assistance for manpower, conveyance, equipment and materials etc. for resuming power supply. The electrical cabling network to be checked area wise.
8.	The Material Manager will be responsible for procurement and supply of essential materials for repair of various structures and equipment as reported.
9.	To assess the progress of repair works, HOD meeting will be held daily till normalcy is restored.

S15: Scenario 15: Natural Disaster: Flood due to high tide and/or heavy rains**Part A: Action Plan**

1. **Precautions:** Pre-monsoon preparation, Continuous weather monitoring, Early warning system.
2. **Impact Zone:** Entire port.
3. **Resources required:** Action Group enumerated in Figure S15.2, material and equipment resources as given in **Chapter 10**.

***Note:** Instances of flooding increase due to storm/cyclonic conditions coupled with infrastructural challenges such as drainage systems, bulk handling and storage yards, internal roads and natural topography of the area. Instances of flooding can also occur as a result of heavy rainfall coupled with high tide. Similar organizational setup for managing this emergency on the lines of cyclone situation will be required.*

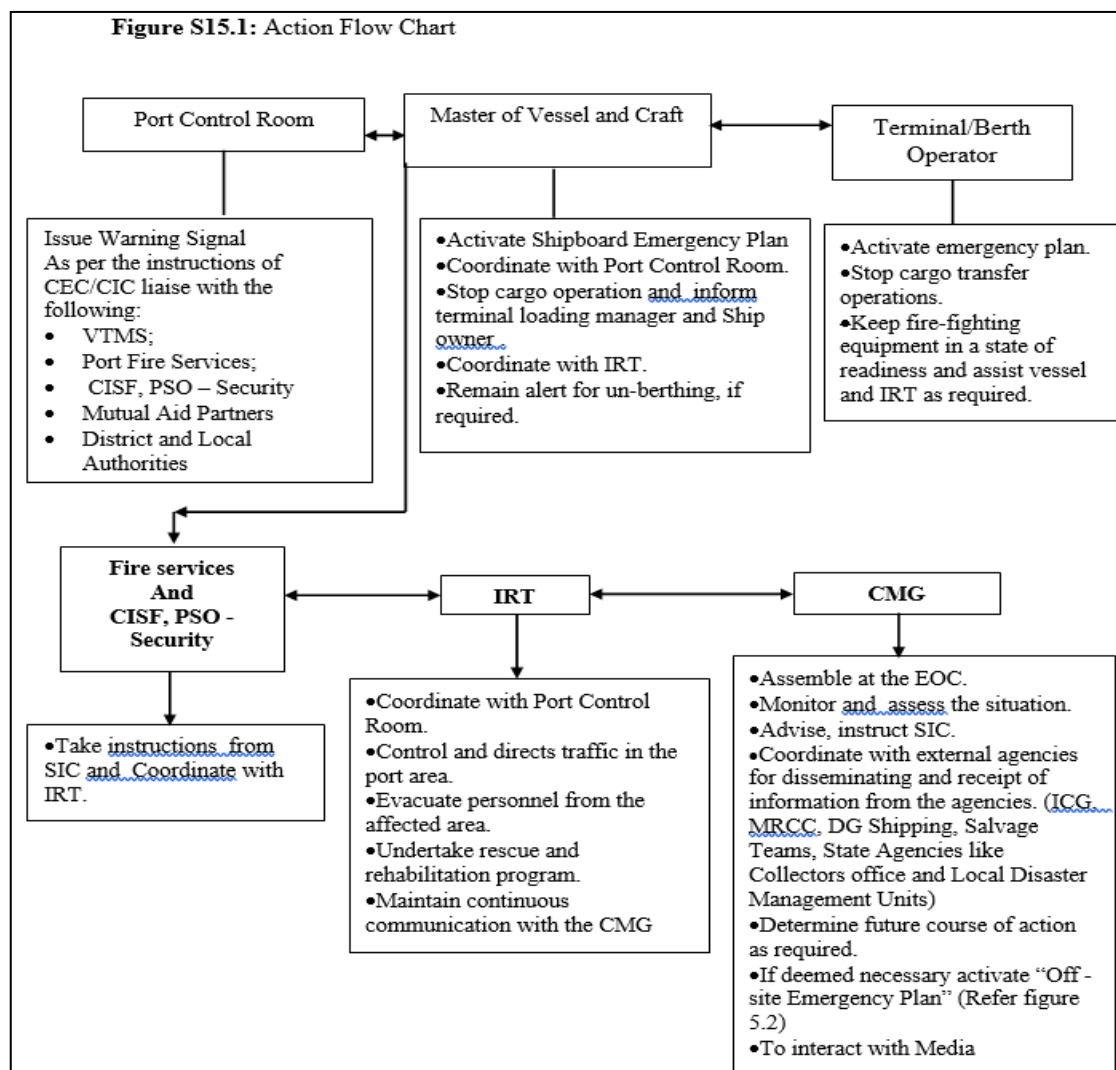
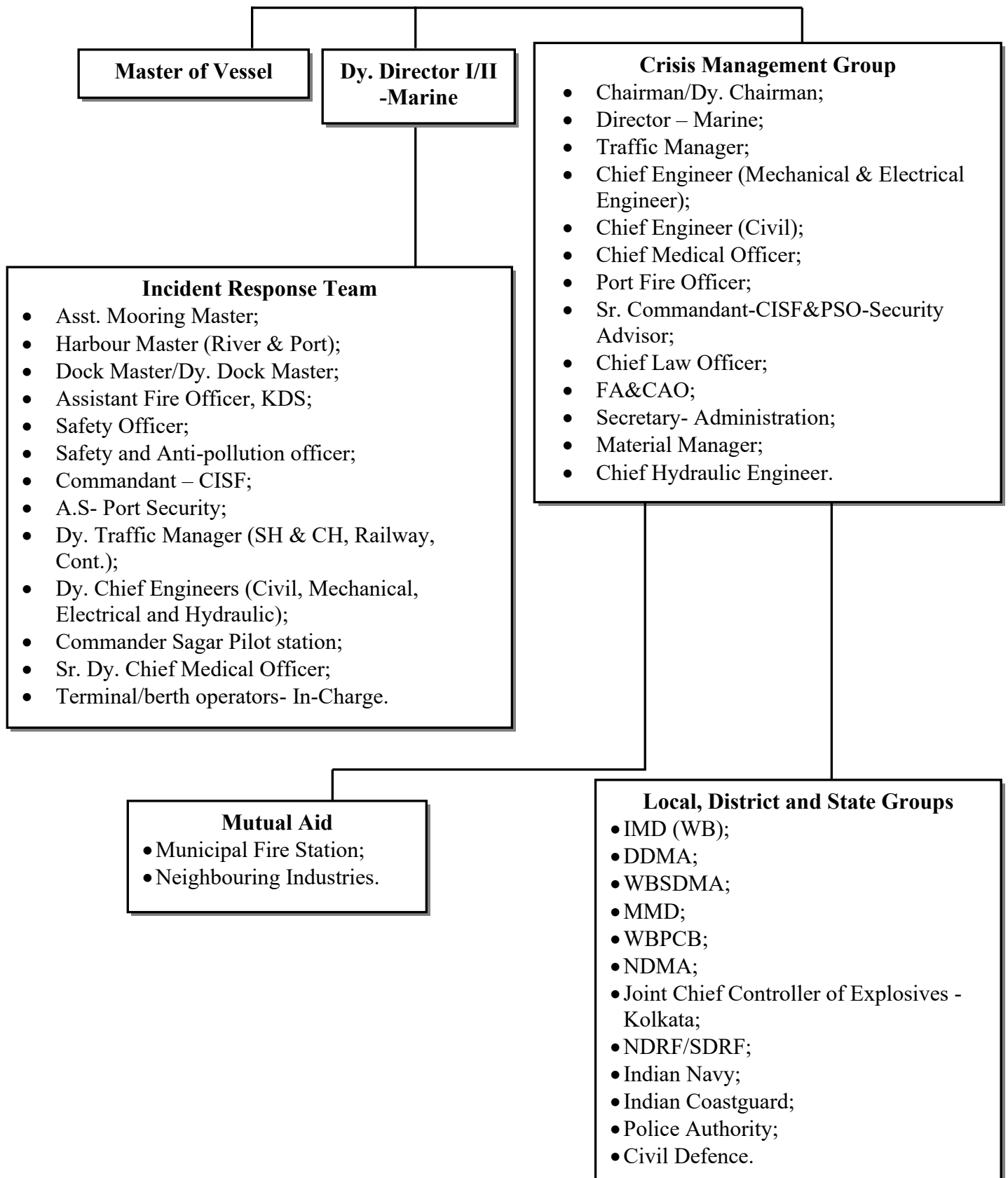


Figure S15.2: Action group

Part B: Roles and Responsibilities**1. Port Control – KDS, VTMS – Sagar Island, HDC**

Response Action
a. Gather information related to the vessel type and position in the port limit.
b. Gather information related to the weather conditions by liaising with competent agencies for issuing warnings as mentioned in section 7.1.5 and other media.
c. Liaise with Master of the Vessel or Pilot.
d. Ensure that telephones, VHF and walkie-talkie all are operational in the Port control centre. Listening watch to be maintained on VHF channel-16, 68.
e. Notify CIC, SIC about vessel movements. Keep CIC informed of all the messages received by Communication medium.
f. Notify the other Authorities and stakeholders within Port as per instructions of CIC, SIC.
g. Inform SIC of any buoys or crafts or any Port installation is seen adrift.

2. Tidal observatory

Response Action
a. The Gauge Clerk will record the range of tide, time and heights of high and low water and will report to Senior Hydrographic Surveyor who in turn will apprise the CIC and SIC of the actual and predicted tides.
b. Automated tidal gauges to be continuously monitored and inform to Port control room.

3. The Master of the Vessel (Alternate: Chief Officer)

Response Action
a. Should raise ship emergency alarm and activate ship board emergency action plan.
b. The Master will provide the Port Authority with details of the vessel.
c. Should follow the instructions of the CIC, SIC and be in continuous liaison with the CIC, SIC, Port Control Room.
d. Should be in a state of readiness to take the vessel out of the port.

4. The terminal/berth operator

Response Action
a. Activate EAP and inform Port.
b. Shall be responsible of shutting down of cargo operation (as per SOP and/ contingency plan), coordinate with Port and Master of the Vessel and rendering necessary assistance to the SIC and vessel.
c. Submit consolidated list of dangerous goods in terminal. Make arrangements to protect cargo.
d. Assist IRT and provide all necessary equipment.
e. All types of heavy earth moving equipment to be secured in a safe manner.

5. Chief Incident Controller (CIC)- Director – Marine (Alternate: Dy. Director I/II -Marine)

Response Action
a. He will apprise himself of weather the developments.
b. Establish EOC and be stationed to review and assess possible developments to determine the most necessary course of action.
c. Give necessary instructions to SIC, Port Control Room and arrange for external aid as necessary.
d. Review the situation and accordingly inform to the CEC.
e. During the high flood level if the situation becomes serious enough then vital installations and communication equipment including port personnel to be relocated in a safer zone until the water level recedes.
f. Consult with CEC and decide on clearing of ships as soon as the cyclone is confirmed to pass in close proximity to the Port.
g. Coordinate with external agencies/authorities such as DG Shipping, Indian Navy and Coastguard.
h. Be in constant touch with District and Local Administration for rescue and relief operation.
i. Terminate the response and debrief before allowing normal operation.

6. Duties of IRT

Designated Officer	Role	Duties
Dy. Director I/II- Marine (Alternate Asst. Mooring Master)	Site Incident Controller	During Emergency shall proceed to the Port Control Room, communicate and collect all information.
		Inform vessels alongside berths to double up their moorings, provide shore gang assistance and ask Masters to keep their vessels ready to proceed to the safe area at short notice as per the instruction of CIC.
		Liaison with IMD, CWC, Radar Station, Police Wireless Station, ICG and Ships in Port in regard to the likely weather conditions in the near further.
		Report the situation to the CIC.
		Keep rescue team ready with rubber boats, Life jackets etc.
		Ensure that the hazardous cargoes are shifted / secured / stored in a safe manner.
Harbour Master (River) (Alternate Dock Mater/ Pilot)	Port Control Room Coordinator	Ensure that the operations are brought back to normal after the termination of the emergency procedure.
		Shall monitor the communication on VHF or any other communication medium, convey and relay messages on the advice from CIC, SIC. Instruct pilots to secure tugs, crafts and workboats.

Disaster Management Plan

Safety & anti-pollution Officer (Alternate Officer)	Pollution Control Coordinator	Determine the level of contamination of the site as a result of incident.
		Ensure clean- up work during and after the emergency as quick as possible.
		Coordinate with SIC, WBPCB and approved waste disposal agencies.
Asst. Port Fire Officer (Alternate Asst. Port Fire Officer)	Fire, Search and Rescue Coordinator	Responsible for mobilizing fire tenders, manpower, fire-fighting equipment to the scene and extend all necessary support.
		Keep fire tenders and fire-fighting equipment in a state of readiness.
		Liaise with State Fire brigade for any assistance.
Commandant-CISF & PSO (Alternate Dy. Commandant-CISF & Alternate Officer)	Security and Evacuation	Shall be responsible for forming a cyclone/flood task force and will lead the same.
		Control and direct traffic in the area.
		Shall supervise evacuation of personnel from the scene at the time of emergency.
		Till normality is restored, arrangement will be made for thorough checks on all out-going vehicles to guard against pilferage.
Dy. Traffic Manager (Alternate Officer)	Traffic Coordinator	Shall be responsible for rescue of the personnel.
		Submit consolidated list of dangerous goods in port area.
		Coordinate with the truck contractors.
Executive Engineer (Alternate Engineer)	Civil Coordinator	Ensure availability of vehicles and mobilize and dispatch sufficient number of vehicles to the site during emergency.
		Shall ensure the standard procedure before the monsoon has been followed.
		Keep enough number of cement and sand bags ready as per SIC instructions.
		Ensure all the drains are cleaned for easy discharge of sludge water. Also, make arrangements for additional dewatering pumps as required.
Executive Engineer	M & E Coordinator	As soon as the contingency plan is made operational, the water tanks should be filled up and standby arrangement for supply of water to be made.
		Shall ensure the standard procedure before the monsoon has been followed.
Executive Engineer	M & E Coordinator	All types of cranes, forklifts, heavy earth moving equipment to be secured in a safe manner.

Disaster Management Plan

(Alternate Engineer)		Pump house equipment and generator sets shall be tried out and kept ready.
		Shall be responsible for alternate electrical supply to vital equipment and systems.
		All Sub Stations, Power Control rooms will be manned round the clock.
Sr. Dy. CMO (Alternate Medical Officer)	First Aid and Medical Coordinator	Shall be responsible to organize and keep first aid team with ambulance and necessary medicines to attend to any injured person.
Duty Pilot (Alternate Standby Pilot)	In-Charge of Pilotage	Shall be ready on site for taking the Ship out of berth or will not bring the vessel to berth as per the instruction given by CIC, SIC.
		Inform the Masters of all vessels at the berths to double the moorings and to keep engine ready to proceed out to sea if situation warrants.
		Decision regarding moving vessels to the anchorage will be taken depending on the strength of the wind likely to be encountered and number of vessels in the Port.
		Take all necessary steps for the safety of the Port crafts.
		Ensure all other crafts are placed at safe place and properly secured.
		Fender and extra lengths of ropes/wires will be kept ready so as to attend to any craft whose moorings may part.
		Inform the Port Control Room immediately in the event any craft is seen adrift or any other Port installation is seen in danger. Arrange an Emergency Maintenance team.
Harbour Master for Vessel in Dry Dock (Alternate Officer)	In-Charge of Dry Dock	Responsible for directing tugs for combating the fire and rescue.
		Securing of loose items.
		Ensure securing of dock cranes.
		Engine room entrance doors, sky lights etc. of all the floating crafts to be kept shut.
Master Floating Craft		Master shall be in constant touch with Port Control Room.
		Masters will shift their respective crafts at safe places as directed by the SIC and will secure them suitably with additional moorings.
		Masters will keep the engines of their crafts ready to

		proceed at short notice as per the instructions of the SIC. Extra fenders will be kept ready on board the Tug for use as required. Engine room entrance doors, sky lights etc. of all the floating crafts to be kept shut. Master shall be in constant touch with Signal Station.
Material Manager (Alternate Officer)	Material Management	During cyclonic season sufficient stock of stores like Corrugated iron sheets, J. Hooks, screw hinges, gunny bags, tarpaulins, ropes and wires for Port Crafts, diesel oil, kerosene oil, hurricane lantern, kerosene lamps, torch lights with batteries and bulbs, electrical items etc. is kept.

POST FLOOD DUTIES	
Sr. no.	Duty
1.	All the HODs are required to assess the damage and submit a detailed report indicating the estimate to the CEC.
2.	Hydrographic survey to be conducted to assess the channel condition and Shipping to resume as early as possible.
3.	Secretary to supervise the rescue and relief operation and disposal of carcasses in co-ordination with the local and District Administration.
4.	Mobile medical service, if required, to be provided by Medical Superintendent. Preventive measures for epidemics to be taken.
5.	All the operating systems to be attended urgently and made operational as early as possible on war footing basis to resume operation.
6.	Water supply and electricity to be given priority. The CME shall be authorized to extend all assistance for manpower, conveyance, equipment and materials etc. to electrical board, if required, for resuming power supply. The electrical cabling network to be checked area wise.
7.	The Material Manager will be responsible for procurement and supply of essential materials for repair of various structures and equipment as reported.
8.	To assess the progress of repair works, HOD meeting will be held regularly till normalcy is restored.

S16: Scenario 16: Natural Disaster (Earthquake)**Part A: Action Plan**

Note: As there are no warning signals for major earthquake the action plan will be for the aftermath of the emergency.

- 1. Precautions:** Earthquake resilient buildings, equipment (cranes), pipeline infrastructure (as per relevant standards), Periodic inspection of old structures, pipelines and their support structures etc.

- 2. Impact Zone:** Entire port.

Note: The Kolkata/South-24 Parganas district falls under Seismic zone category III- Moderate Damage Risk Zone as per the vulnerability hazard map of the region.

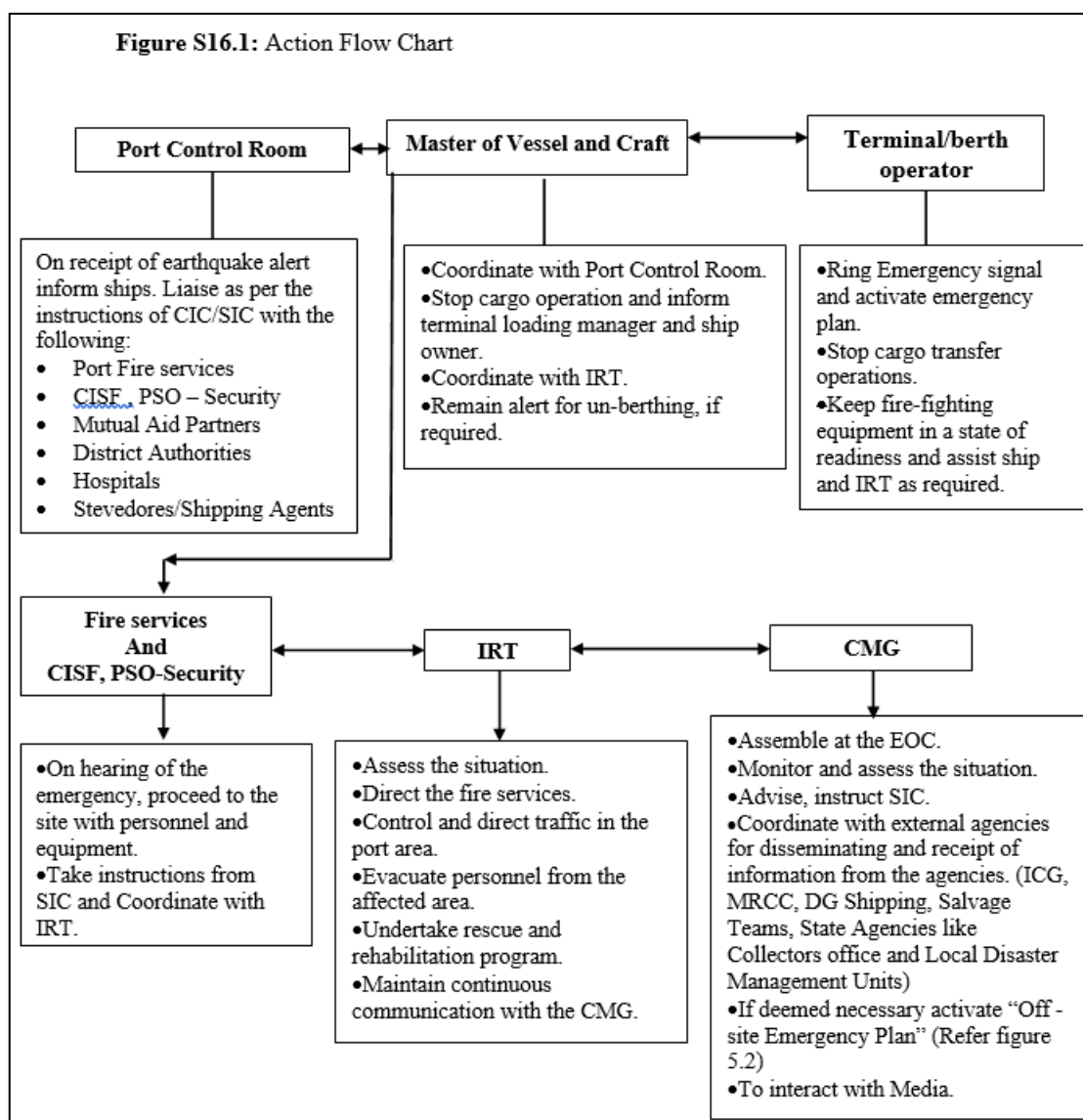
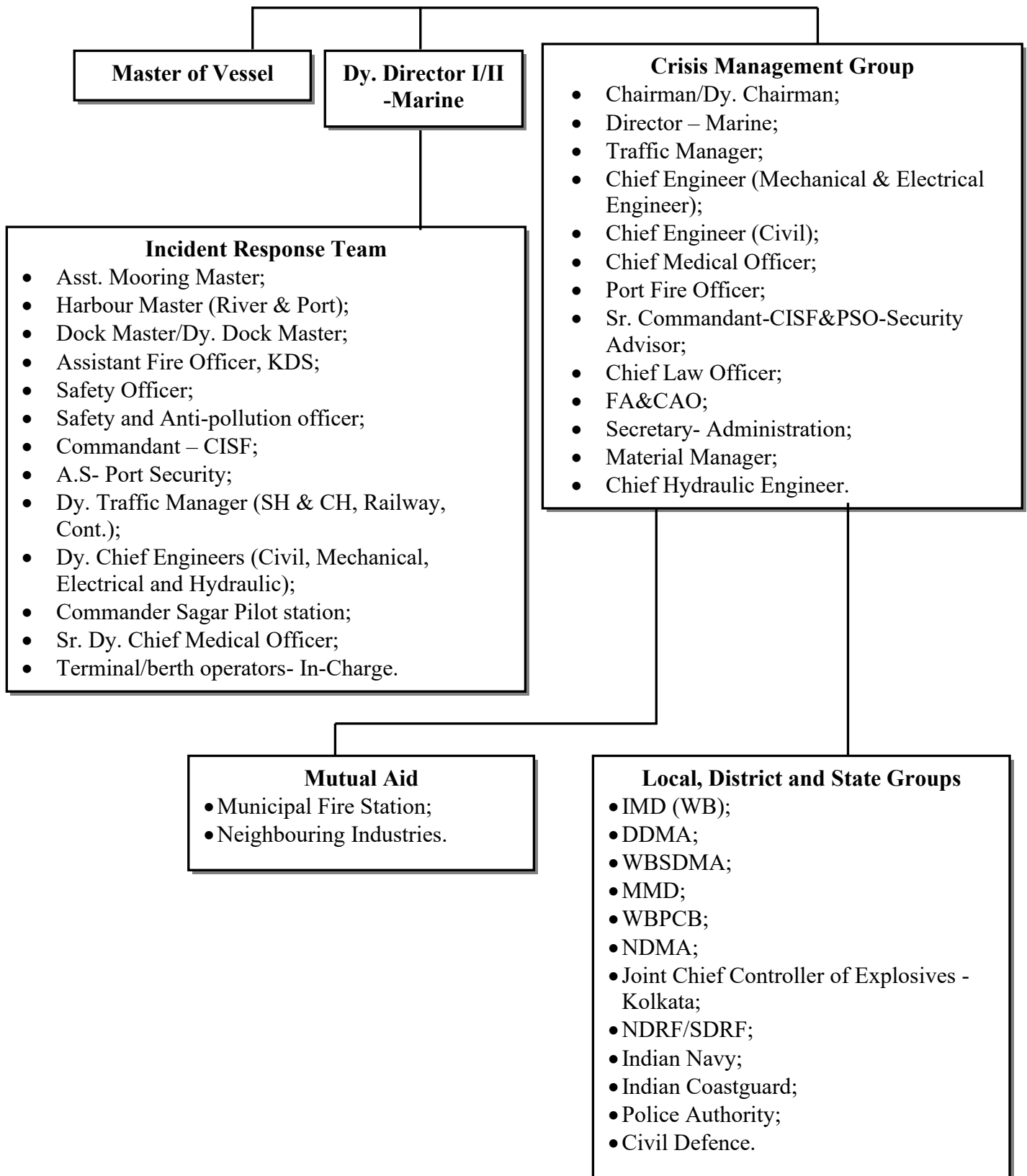


Figure S16.2: Action group

Part B: Roles and Responsibilities**1. The Port Control Room - KDS**

Response Action
a. Gather information related to the vessel type and position in the port limit.
b. Liaise with Master of the Vessel or Pilot.
c. Ensure that telephones, VHF and walkie-talkie all are operational in the Port control centre. Listening watch to be maintained on VHF channel-16 ,68.
d. Notify CIC, SIC about the vessel movements. Keep CIC, SIC informed of all the messages received by communication medium.
e. Notify the Authorities and stakeholders within Port as per instructions of CIC, SIC.
f. Notify the information to the owner of the vessel as per the instruction of CIC, SIC, Master of the Vessel. Pass the information to various Port departments and other Port related organizations through Communication medium.

2. The Master of the Vessel (Alternate: Chief Officer)

Response Action
a. Raise ship emergency alarm and activate ship board emergency action plan.
b. Follow the instruction of the CIC, SIC and be in continuous liaise with the CIC, SIC, Port Control Room and terminal/berth operators.
c. Be in a state of readiness to take the vessel to safe area as per instructions from CIC.

3. The terminal/berth operator

Response Action
a. Activate EAP and inform Port control room.
b. Shall be responsible of shutting down of cargo operation (as per SOP and/ contingency plan), coordinate with Port and Master of the Vessel and rendering necessary assistance to the SIC and vessel.
c. Make arrangements to protect cargo.
d. Assist IRT and provide all necessary equipment.
e. Coordinate with the Mater of the ship/ agents/stevedores.

4. Chief Incident Controller (CIC)- Director- Marine (Alternate: Dy. Director I/II -Marine)

Response Action
a. Establish EOC and be stationed to review, assess the damage and determine the necessary course of action.
b. Give necessary instructions to SIC and Port Control Room and arrange for external aid as necessary.
c. Review the situation and accordingly inform to the CEC.
d. Consult with CEC and decide on clearing of ships.
e. Be in constant touch with District and Local Administration for rescue and relief operation.

5. Duties of IRT

Designated Officer	Role	Duties
Dy. Director I/II -Marine (Alternate Asst. Mooring Master)	Site Incident Controller	During Emergency shall communicate and collect all information.
		Ensure the action plan is promulgated as per the instructions of CIC.
		Ensure that the operations are brought back to normal after the termination of the emergency procedure.
Harbour Master (River) (Alternate Dock Master/ Pilot)	Port Control Room Coordinator	Shall monitor the communication on VHF or any other communication medium and convey and relay messages on the advice from CIC, SIC.
Safety & anti- pollution Officer (Alternate Officer)	Pollution Control Coordinator	All other workers to move out to safe (open) area. Assist in evacuation of the personnel to the assembly point or as directed by SIC.
		Determine the level of contamination of the site as a result of incident.
		Ensure clean- up work during and after the emergency as quick as possible.
		Coordinate with SIC, WBPCB and approved waste disposal agencies.
Asst. Port Fire Officer (Alternate Asst. Port Fire Officer)	Fire, Search and Rescue Coordinator	Assist in rescue and rehabilitation for the affected persons as per instructions of SIC.
		Responsible for mobilizing fire tenders, manpower, fire-fighting equipment to the scene, extend all necessary support after the earthquake.
		Liaise with State Fire brigade for any assistance.
Commandant- CISF & PSO (Alternate Dy. Commandant- CISF & Alternate Officer)	Security and Evacuation	Control and direct traffic in the area.
		Shall search and rescue operations of the personnel trapped under the debris. A special task force can be formed for the same. Shifting of the injured and casualties to hospital.
		Till normality is restored, arrangement will be made for thorough checks on all out-going vehicles to guard against pilferage.
Executive Engineer (Alternate	Civil Coordinator	Assist SIC, CIC and CISF, PSO after an earthquake emergency.
		Deploy engineers to direct or guide earth moving equipment and cranes to remove debris.

Disaster Management Plan

Executive Engineer)		
Executive Engineer (Alternate Executive Engineer)	M & E Coordinator	Shall be responsible for Electrical supply to vital equipment and systems. Ensure that all Sub Stations, Power Control rooms will be inspected and made operation.
Sr. Dy. CMO (Alternate Medical Officer)	First Aid and Medical Coordinator	Shall be responsible to organize and dispatch first aid team with ambulance as required. Mobile medical service, if required, to be provided.
Duty Pilot (Alternate Standby Pilot)	In-Charge of Pilotage	Assist SIC and remain standby till further instructions.
Material Manager (Alternate Officer)	Material Management	Will nominate a team of officers and staff for procurement and supply of essential materials for repair of various structures and equipment as reported.

ADDITIONAL POST-EARTHQUAKE DUTIES

Sr. no.	Duty
1.	All the HODs are required to assess the damage and submit a detailed report indicating the estimate to the CEC.
2.	Secretary to supervise the rescue, relief operation and disposal of carcasses in co-ordination with the local and District Administration.
3.	Critical systems to be attended urgently and made operational as early as possible to resume operation.
4.	Water supply and electricity to be given priority. CME shall be authorized to extend all assistance for manpower, conveyance, equipment and materials etc. for resuming power supply. The electrical cabling network to be checked area wise.
5.	To assess the progress of repair works, HOD meeting will be held regularly till normalcy is restored.

S17: Scenario 17: Natural Disaster (Tsunami)

Part A: Action Plan

1. **Precautions:** Continuous weather monitoring, Early warning system, Tsunami Shelters.

Note: INCOIS and its monitoring centers will provide early warning by way of messages to the port about the occurrence of tsunami

2. **Impact Zone:** Entire port.

Note: While in the past the Indonesian tsunami (2004) generated a small wave of approx. 2 mtrs. the damages in the event of a higher wave would be in proportion to the proximity to the earthquake zone and the resultant height of wave generation. Thus, the wave energy would impact the port and its constituents including marine and fixed assets in proportion to its severity. Actions at the National and State level for evacuation measures will be taken if the impact assessment is of a high magnitude. Thus, necessary coordination with District and State agencies will be required in case of “Red” and “Orange” alerts.

3. **Resources required:** Action Group enumerated in Figure S17.2, material and equipment resources as given in **Chapter 10**.

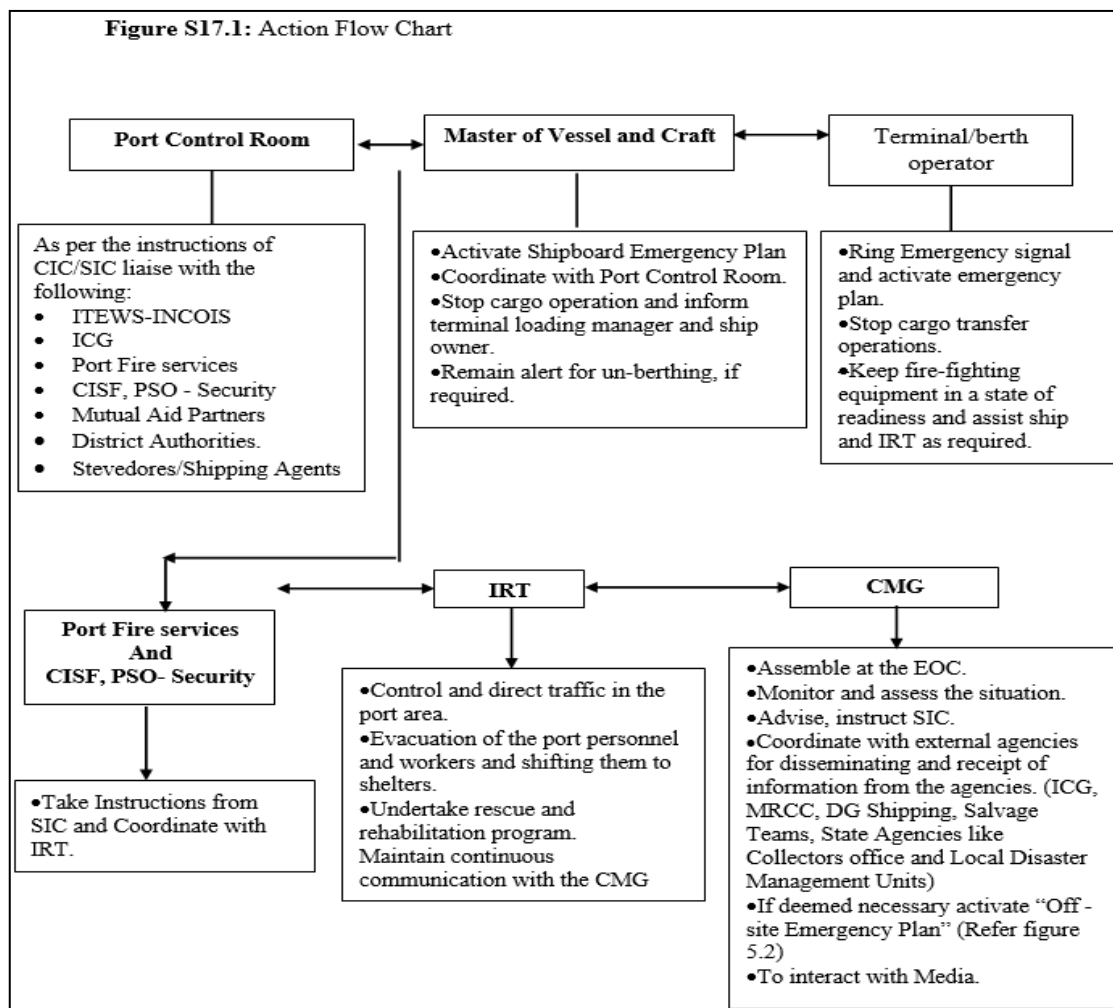
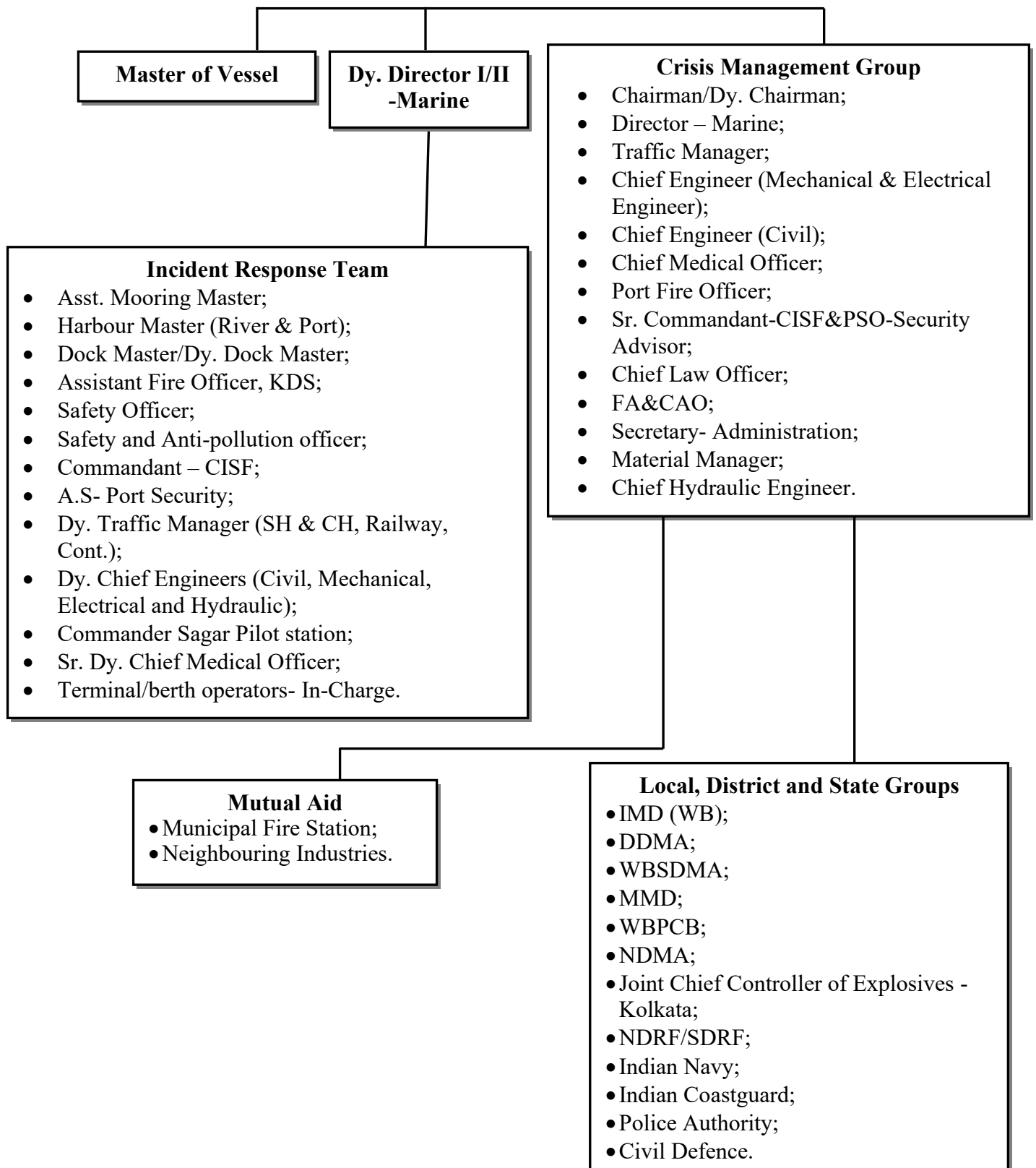


Figure S17.2: Action group

Part B: Roles and Responsibilities**1. Port Control – KDS, VTMS – Sagar Island, HDC**

Response Action
a. Gather information related to the vessel type and position in the port limit.
b. Gather information related to the tsunami conditions by liaising with competent agencies for issuing warnings as mentioned in section 7.1.5 and other media.
c. Liaise with Master of the Vessel or Pilot.
d. Ensure that telephones, VHF and walkie-talkie all are operational in the Port control centre. Listening watch to be maintained on VHF channel-16, 68.
e. Notify CIC, SIC about the vessel movements. Keep CIC, SIC informed of all the messages received by communication medium.
f. Notify the other Authorities and stakeholders within Port as per instructions of CIC, SIC.
g. Inform the SIC of any buoys or crafts or any Port installation is seen adrift.
h. Hoist signals or raise alarms, as per the warnings received by the competent agencies for issuing warnings.

2. Tidal observatory

Response Action
a. The Gauge Clerk will record the range of tide, time and heights of high and low water and will report to Senior Hydrographic Surveyor who in turn will apprise the CIC and SIC of the actual and predicted tides.
b. Automated tidal gauges to be continuously monitored and inform to Port control room.

3. The Master of the Vessel (Alternate: Chief Officer)

Response Action
a. Should raise Ship emergency alarm and activate ship board emergency action plan.
b. Should follow the instruction of the CIC, SIC and be in continuous liaison with the CIC, SIC, Port Control Room and berth Operator.

4. The terminal/berth operator

Response Action
a. Activate EAP and inform Port and be in a state of readiness to move out all types of cargo, equipment and vehicles (mobile cranes) in the safe area.
b. Shall be responsible of shutting down of cargo operation (as per SOP and contingency plan), coordinate with Port and Master of the Vessel and rendering necessary assistance to the SIC and vessel.
c. Submit consolidated list of dangerous goods in terminal. Make arrangements to protect cargo.
d. All types of heavy earth moving equipment to be secured in a safe manner.
e. Assist IRT and provide all necessary equipment.

Note: It is important to understand that movable objects and structures which may float as a result of high-water levels will tend to generate flotsam and move with the current during the flooding and ebb situation of tsunami. This normally results in floating debris in large swaths causing structural, environmental and living beings damages.

As a lifesaving measure multi-storey building higher than 45ft are considered as safe zones in coastal areas.

5. Chief Incident Controller (CIC)- Director -Marine (Alternate: Dy. Director I/II -Marine)

Response Action
a. Establish EOC and be stationed to review and assess possible developments to determine the necessary course of action.
b. Give instructions to SIC, Port Control Room and arrange for external aid as necessary.
c. Review the situation and accordingly inform the CEC and decide on clearing of ships as soon as the tsunami is confirmed. When required vessels in harbor are planned to be moved out to sea.
d. Coordinate with external agencies/authorities such as DG Shipping, Indian Navy and ICG.
e. Be in constant touch with District and Local Administration for rescue and relief operation.
f. Terminate the response and debrief before allowing normal operation.

6. Duties of IRT

Designated Officer	Role	Duties
Dy. Director I/II -Marine (Alternate Asst. Mooring Master)	Site Incident Controller	During Emergency shall communicate and collect all information.
		Inform vessels alongside berths to double up their moorings, provide shore gang assistance and ask Master to keep their vessels ready to proceed to the sea at short notice as per the instruction of CIC.
		Keep Close liaison with INCOIS, Radar Station, Police Wireless Station, Coast Guard, and Vessels in Port in regard to the likely weather conditions.
		Keep rescue team ready with rubber boats, Life jackets etc.
		Ensure that the hazardous cargoes are shifted /secured/stored in a safe manner.
		Ensure that the operations are brought back to normal after the termination of the emergency procedure.
Harbour Master (River)	Port Control Room Coordinator	Shall monitor the communication on VHF or any other communication medium, convey and relay messages on the advice from CIC, SIC.

(Alternate Dock Master/ Pilot)		Instruct pilots to secure tugs, crafts and workboats.
Safety & anti-pollution Officer (Alternate Officer)	Pollution Control Coordinator	Determine the level of contamination of the site as a result of incident.
		Ensure clean- up work during and after the emergency as quick as possible.
		Assist in evacuation of the personnel as per instructions of SIC.
		Coordinate with SIC, WBPCB and approved waste disposal agencies.
Asst. Port Fire Officer (Alternate Officer)	Fire, Search and Rescue Coordinator	Shall take orders from the SIC.
		Liaise with State Fire brigade for any assistance.
Commandant- CISF & PSO (Alternate Dy. Commandant- CISF & Alternate Officer)	Security and Evacuation	Shall be responsible for forming a task force and will lead the same.
		Control and direct traffic in the area.
		Shall supervise evacuation of personnel from the port at the time of emergency and move them to identified shelters.
		Responsible for rescue operation.
Dy. Traffic Manager (Alternate Officer)	Traffic Coordinator	Submits consolidated list of dangerous goods in port area.
		Coordinate with the truck contractors.
		Ensure availability of vehicles and mobilize and dispatch sufficient number of vehicles to the site during emergency.
Executive Engineer (Alternate Engineer)	M & E Coordinator	Shall ensure the standard procedure has been followed.
		All types of cranes, forklifts, heavy earth moving equipment to be secured in a safe manner.
		Shall be responsible for alternate electrical supply to vital equipment and systems.
		All Sub Stations, Power Control rooms will be manned as per the requirement.
Sr. Dy. CMO (Alternate Medical Officer)	First Aid and Medical Coordinator	Shall be responsible to organize and keep first aid team with ambulance as required.

Harbour Master for Vessel in Dry Dock (Alternate Officer)	In-Charge of Dry Dock	Securing of loose items.
		Ensure securing of dock cranes.
		Engine room entrance doors, sky lights etc. of all the crafts to be kept shut.
		Master shall be in constant touch with Port Control Room.
Duty Pilot (Alternate Standby Pilot)	In-Charge of Pilotage	Shall be ready on site for taking the vessel out of berth or will not bring the vessel to berth as per the instruction given by CIC, SIC.
		Inform the Masters of all vessels at the berths to double the moorings and to keep engine ready to proceed out to sea if situation warrants.
		Decision regarding moving vessels to the anchorage will be taken depending on the strength of the tsunami likely to be encountered and number of vessels in the Port.
		Take all necessary steps for the safety of the Port crafts.
		Ensure all other crafts are placed at safe place as per instructions of the SIC and will secure suitably with additional moorings.
Material Manager (Alternate Officer)	Material Management	Fender and extra lengths of ropes/wires will be kept ready so as to attend to any craft whose moorings may part.
		Ensure availability of sufficient stock of stores like Corrugated iron sheets, J. Hooks, screw hinges, gunny bags, tarpaulins, ropes and wires for Port Crafts, diesel oil, torch lights with batteries and bulbs, electrical items etc. is kept.

POST TSUNAMI DUTIES	
Sr. no.	Duty
1.	All the HODs are required to assess the damage and submit a detailed report indicating the estimate to the CEC.
2.	Hydrographic survey to be conducted to assess the channel condition and Shipping to resume as early as possible.
3.	In case of any small craft sunk or grounded, the same to be removed to make the channel/ berth safe for navigation. CIC, SIC will detail a salvage, Company.
4.	Secretary to supervise the rescue and relief operation and disposal of carcasses in co-ordination with the local and District Administration.
5.	Mobile medical service, if required, to be provided by Medical Superintendent. Preventive measures for epidemics to be taken.
6.	All the operating systems to be attended urgently and made operational as

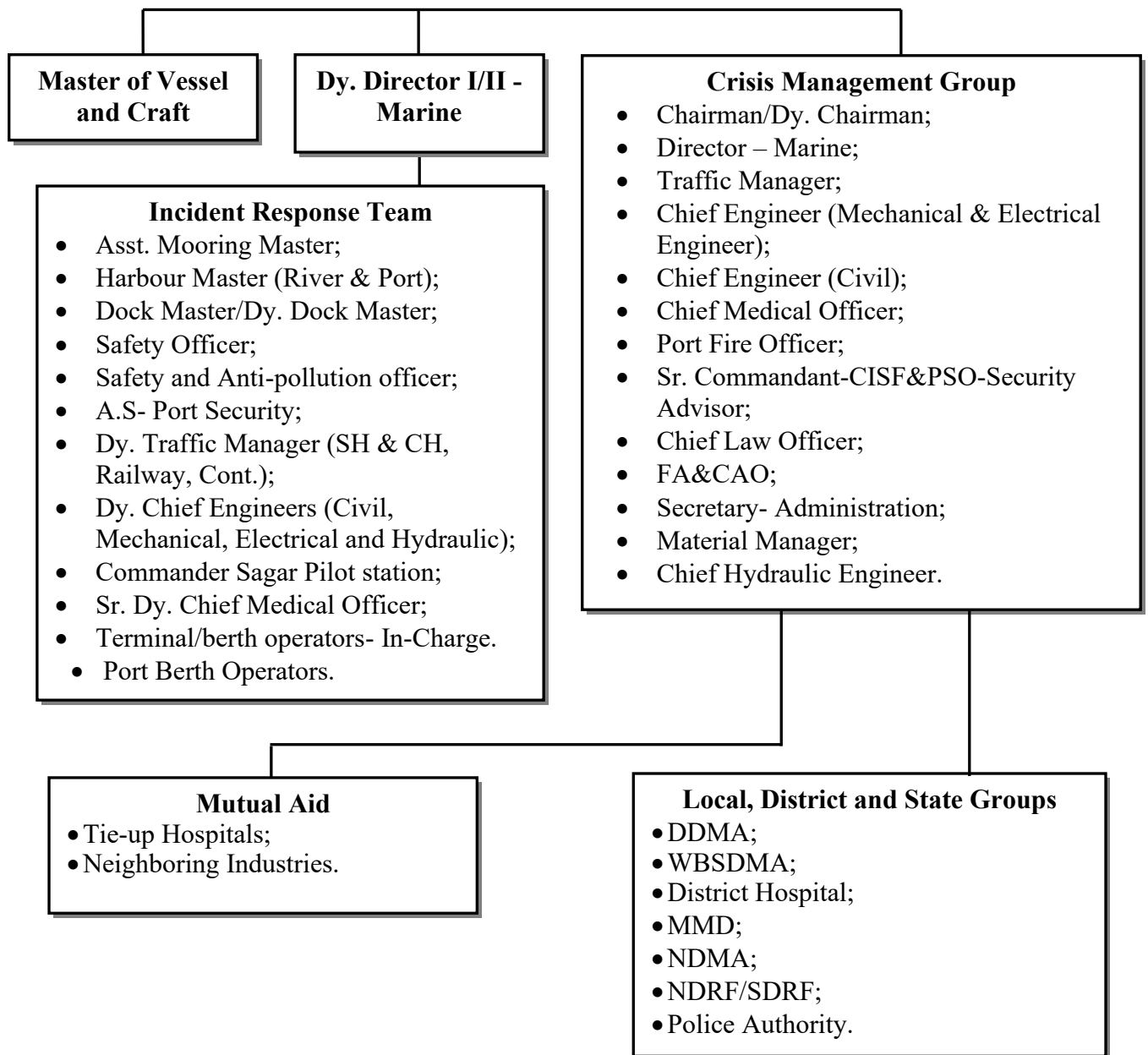
	early as possible on war footing basis to resume operation.
7.	Water supply and electricity to be given priority. The CME shall be authorized to extend all assistance for manpower, conveyance, equipment and materials etc. to electrical board, if required, for resuming power supply. The electrical cabling network to be checked area wise.
8.	Material Manager will be responsible for procurement and supply of essential materials for repair of various structures and equipment as reported.
9.	To assess the progress of repair works, HOD meeting will be held regularly till normalcy is restored.

S18: Scenario 18: Pandemic**Part A: Action Plan**

1. **Precautions:** Advisories from Ministry of Home Affairs and Ministry of Health and Family Welfare, WHO and DG Shipping Guidelines.

The Port shall take all necessary precautionary measures as per guidelines to prevent the spread of health epidemics in order to ensure the safety of all employees, contractors, stakeholders and ship's crew. These precautionary measures may change based on the latest guidelines by the national health authorities and international organizations regarding the spread of health epidemics.

2. **Impact Zone:** Entire port.
3. **Resources required:** Action Group enumerated in Figure S18.1, material and equipment resources as given in **Chapter 10**.

Figure S18.1: Action group

Part B: Roles and Responsibilities

The vessel upon berthing, berth operator will follow standard procedures for Pandemic.

1. The Master of the Ship (Alternate: Chief Officer)

Response Action
a. Coordinate with Port and Berth Operator for the details of the crew on board.
b. In case of the any health emergency inform the Port Control room.
c. Remain prepared to un-berth the ship to the safe area as per CIC instructions.

2. Chief Incident Controller (CIC) - Director – Marine operation (Alternate: Dy. Director I/II -Marine)

Response Action
a. Assess the level of disaster and activate the DMP in coordination with CMO.
b. Review and assess possible developments to determine the necessary course of action.
c. Enforce mandatory mask-wearing and social distancing protocols.
d. Give instructions to SIC, Port Control Room and arrange for external aid as necessary.
e. Review the situation and accordingly inform the CEC.
f. Be in constant touch with District and Local Administration.
g. Gradually resume normal port operations once the pandemic is under control in consultation with CEC and as per the advisory issued by Government.

3. The Administration department

Response Action
a. Ensure that Circulars are issued from time to time that preventive measures are followed by all the personnel working in the port premises as per the Central/State Govt./District administration directives.
b. Ensure that Campaign for the awareness of the pandemic to be conducted with the Coordination with the District Health Officer (DHO) and local PHCs.
c. Ensure that sufficient personnel are available for daily office and Port operations related works.
d. Arrange for the health insurance for the pandemic for the port personnel.
e. Ensure the food arrangements are made for the personnel in port.

4. The Chief Medical Officer (CMO)

Response Action
a. Establish a Port health unit with sufficient number of beds, trained medical personnel and isolation facilities.
b. Maintain liaison with the CIC, Safety Officer, District health centers, Diagnostic centers and Tie-up hospitals.
c. Ensure stockpile of personal protective equipment (PPE), Critical medical equipment and supplies.
d. Ensure availability of handwashing stations, temperature scanners, and sanitation points at key locations.
e. Develop a communication system for rapid alerts and coordination in coordination with Port Control room.
f. Authorize use of Ambulance for evacuation along with medical staff to identified hospital/dispensary.
g. Ensure the collation and documentation of the Vaccination.
h. Ensure the continuous health monitoring of the port and contractual personnel.
i. Implement health screening for all incoming vessels and vehicles crew (e.g., temperature checks, health declarations).
j. Provide the regular updates on the situation to the CEC and CIC.

5. The Port Control Room

Response Action
a. Liaise with Master of the Vessel or Pilot.
b. Listening watch to be maintained on VHF channel 16, 68.
c. Notify CIC, SIC about the vessel movements. Keep CIC, SIC informed of all the messages received by communication medium.
d. Notify the authorities and stakeholders as per instructions of CIC, SIC.
e. Notify the information to the owner of the vessel as per the instruction of CIC, SIC, Master of the Vessel.

6. Duties of IRT

Designated Officer	Role	Duties
Dy. Director I/II -Marine (Alternate Asst. Mooring Master)	Site Incident Controller	Collect all information from the Berth Operator and terminals regarding the health situations in their facilities.
		Report the situation to the CIC.
		Coordinate with the Port Health Officer for the clearance of the vessels entering the Port and Crew Changes.
		Assess the condition of site and take decision on evacuation in consultation with CIC.
		Extend all necessary support to the Master of the ship.
		Arrange for issue of special passes in consultation with the concerned district authorities to enable port employees and workers to attend duties.
Dy. Traffic Manager (Alternate Officer)	Traffic Coordinator	Issue trade notices to the shipping agents / stevedores for the preventive measures to be followed and to ensure uninterrupted shipping operations complying the directives of the Central/State Govt./District administration.
Commandant- CISF & PSO (Alternate Dy. Commandant- CISF & Alternate Officer)	Security and Evacuation	Control and direct gate security and traffic in the area.
		Control the entry of authorized and unauthorized persons and vehicles.
		Ensure surveillance rounds to see that the pandemic guidelines followed by the people in the Port area.
		Responsible the head count of the personnel.
FA & CAO	Finance & Accounts Coordinator	Coordinates with insurance providers for claims processing
		Release funds for the procurement of the critical medical equipment's.

8. DISASTER RISK REDUCTION AND MITIGATION

DMP incorporates the framework for Disaster Risk Reduction (DRR) under the **six thematic areas** for action as follows

1. Understanding Risk
2. Inter-Agency Coordination
3. Investing in DRR – Structural Measures
4. Investing in DRR – Non-Structural Measures
5. Capacity Development
6. Climate change risk management.

The Disaster Risk Reduction (DRR) requires responsibilities to be shared by different divisions/departments of port and Stakeholders. The effectiveness of DRR will depend on coordination mechanisms with all stakeholders.

In accordance with the Sendai framework, the measures illustrated in para 8.1 provides a brief description of actions by the port for each thematic areas in the form of responsibility matrix.

8.1 HAZARD-WISE RESPONSIBILITY MATRICES FOR DISASTER RISK MITIGATION

For the successful implementation of DM plans, it is necessary to identify various stakeholders within the port and clearly specify their roles and responsibilities. For each hazard/disaster, in the subsections that follow, themes for action are presented in a separate responsibility matrix for each of the five thematic areas for action. The port will play a pro-active role in disaster situations. In the domains of DM planning, preparedness, and capacity building, the port will constantly work to upgrade DM systems and practices. This section covers the matrices for the identified hazards relevant to port as listed below:

Hazard		Chemical / Oil Disaster – Loss of containment during Navigation incidents, at Budge -budge jetty, Berths, Pipelines.					
1. Thematic area		Understanding Risk					
Sr. no.	Sub-thematic area	Plan components	Responsible section	Recurring / Regular measures	Short term	Medium term	Long term
1	Information Systems and Research	Support and coordination	- SMP-KDS, - Operators.	- Coordination with vessel for port entry, - Ship to Shore checklist, - Berthing and Unberthing schedule, - Allotment of tugs, - Deployment of Competent and experienced pilot, - Provision and maintenance of safe navigational channel, - Navigation support through VTMS, - Inventory of oils/chemicals/IMDG cargo handled.			
		Information on (operation and during emergency) dealing with HAZCHEM	- SMP-KDS, - Operators.	- MSDS copy maintained, - Hazardous Waste Management Plan.			
		Incident Information Reporting System	- SMP-KDS, - Operators.	Incidents records maintained	Centralized mechanism for incident data collection with SMP-KDS		

Hazard		Chemical / Oil Disaster – Loss of containment during Navigation incidents, at Budge -budge jetty, Berths, Pipelines.					
1. Thematic area		Understanding Risk					
Sr. no.	Sub-thematic area	Plan components	Responsible section	Recurring / Regular measures	Short term	Medium term	Long term
2	Zoning/ Mapping	Zones on basis of hazard potential and effective disaster management for worst case scenarios	- SMP-KDS, - Operators.	- Earmarked area for DG cargo at NSD container terminal, - Navigational charts and passage plan.	- PESO approved hazardous area classification for oil jetties at Budge-Budge, NSD-berth 12. - Safety instructions to be displayed and ensured for oil cargo handling at berth no. 12 – NSD, - Updation of zoning carried out regularly after any addition or up-gradation of the facility.		
		Carry out the mapping and related studies in collaboration with central agencies/ technical organizations	- SMP-KDS, - Operators.	- Port limit and Port layout map, - Pipeline layout map for Budge-Budge, - Firefighting system layout map for Budge-Budge	- Provision of Hazardous bund for DG containers - Updation of maps	Adhere to CRZ mapping	Land Use Plan

Hazard		Chemical / Oil Disaster – Loss of containment during Navigation incidents, at Budge -budge jetty, Berths, Pipelines.					
1. Thematic area		Understanding Risk					
Sr. no.	Sub-thematic area	Plan components	Responsible section	Recurring / Regular measures	Short term	Medium term	Long term
				• Bathymetry map, • DG cargo storage area map.			
3	Monitoring	Monitoring compliance with safety norms for HAZCHEM	• SMP-KDS, • Operators.	• Compliance of Statutory norms, • Standard Operating Procedure, • Safety Committee meetings, • ISPS Committee meetings, • CCTV surveillance, • Signal Station and Tidal Observatory.	Installation of firefighting system as per OISD 156 standard at budge budge oil jetties.		
		Disposal of hazardous waste	• SMP-KDS, • Operators.	• Recording and Monitoring of generation of hazardous waste, • Disposal of waste through WBPCB approved waste management parties.			
4	Hazard Risk Vulnerability and Capacity Assessment	Undertake and provide technical support to HRVCA as part of preparing and periodic revision of DM plans	• SMP-KDS, • Operators.	• Port DMP as per Disaster Management Act -2005, NDMA Guidelines 2024 and NDMP 2019, • OSCP,	• Periodic update plans and related documents, • Navigational Risk Assessment		

Hazard		Chemical / Oil Disaster – Loss of containment during Navigation incidents, at Budge -budge jetty, Berths, Pipelines.					
1. Thematic area		Understanding Risk					
Sr. no.	Sub-thematic area	Plan components	Responsible section	Recurring / Regular measures	Short term	Medium term	Long term
	(HRVCA)			• Emergency Action Plan (EAP), • Emergency Response Disaster Management Plan (ERDMP). • Risk Assessment.			
		Constitute/ strengthen the mechanism for consultation with experts and stakeholders	• SMP-KDS, • Operators.	• Standard Operating Procedures, • Periodical inspection, • Audits (Structural, Fire, Safety and Electrical), • Safety and ISPS Committee Meetings, • Observations of Mock Drills and Exercises, • Training and Awareness, • Environment management Plan, • Land use planning.	• Prepare plans for removal of abandoned pipelines at Oil Jetties.		• Land Use Plan, • Business Development Plan, Environment Management Plan.

Hazard		Chemical / Oil Disaster – Loss of containment during Navigation incidents, at Budge -budge jetty, Berths, Pipelines.					
2. Thematic area		Inter- agency coordination					
Sr. no.	Sub-thematic area	Plan components	Responsible section	Recurring / Regular measures	Short term	Medium term	Long term
1	Overall disaster governance	Providing coordination, technical inputs, and support, Periodical inspection from competent agencies.	• SMP-KDS, • Operators.	• Emergency Operation Centre, • Coordination with DRR Cell (at Ministry level), • Coordination with SDMA and DDMA, • PNGRB, PESO, WBPCB, OISD, MoEF&CC, ICG, Navy, NDRF, Dock Safety, Electrical inspector.	• Compliance of recommendations.		
		Address/ identify gaps in equipment/ infrastructure and human resources with DM tasks	• SMP-KDS, • Operators.	• Developmental project reports, • Safety Committee Meetings, • Audits.	• Gap analysis / Periodic reviews in equipment/ infrastructure and human resources.		
2	Warnings, Information, data	Effective coordination and seamless communication among various stakeholders	• SMP-KDS, • Vessel Master, • CISF, PSO, • Operators.	• VTMS, • VHF, • Satellite Phone, • Radio Over IP, • Mobile, • Landline,			

Hazard		Chemical / Oil Disaster – Loss of containment during Navigation incidents, at Budge -budge jetty, Berths, Pipelines.					
2. Thematic area		Inter- agency coordination					
Sr. no.	Sub-thematic area	Plan components	Responsible section	Recurring / Regular measures	Short term	Medium term	Long term
				• PA system, • Emergency Siren, • Email.			
		Dissemination of warnings and information	• SMP-KDS, • Vessel Master, • CISF, PSO, • Operators.	Dissemination of information to/from • Vessel Master, • CMG, • MoPSW, DG shipping, NDMA, DDMA, IMD, ICG, MMD, PESO, WBPCB, Navy, Local Authorities, Marine Police.			
3	Response	Organizing and coordinating with Government agencies and stakeholders of the port	• SMP-KDS, • Vessel Master, • CISF, PSO, • Operators.	• Coordinating with CMG, • Coordinating with Vessel Master, • Coordinating with DG Shipping, NDMA, SDRF, DDMA, Local admin., IMD, ICG, MMD, PESO, WBPCB, Navy, etc., • Mutual aid agreement with relevant stakeholders.	• Periodic renewal of Mutual Aid Agreements		

Hazard		Chemical / Oil Disaster – Loss of containment during Navigation incidents, at Budge -budge jetty, Berths, Pipelines.					
3. Thematic area		Investing in DRR – Structural measures					
Sr. no.	Sub-thematic area	Plan components	Responsible section	Recurring / Regular measures	Short term	Medium term	Long term
1	Evacuation and support facilities.	• Identification of hospitals and first aid	• SMP-KDS, • CISF, PSO, • Operators.	• Port Hospital, • Tie up with nearby hospitals, • First Aid centers, • Ambulances.		Expansion of Hospital facilities	
	Multiple routes for reliable access and escape.	• Ensuring fresh water storage facilities for drinking purpose	• SMP-KDS	• Municipal water supplies available, • Water tankers.			
	Decontamination facilities	• Providing wide roads and multiple routes to allow quick access by first responders and to ensure escape pathways	• SMP-KDS	Evacuation by Land facilities • Gate complexes available, • Internal roads, • Port and hired vehicles, • Individual terminal vehicles, • Coordination with Local administration, • Land Use Planning, • Vehicle Traffic management. Evacuation by sea/river route facilities • Port owned/hired crafts.	• Repair of access roads, • Repair of wooden walkway for pontoon jetty at Budge-Budge.		

Hazard		Chemical / Oil Disaster – Loss of containment during Navigation incidents, at Budge -budge jetty, Berths, Pipelines.					
3. Thematic area		Investing in DRR – Structural measures					
Sr. no.	Sub-thematic area	Plan components	Responsible section	Recurring / Regular measures	Short term	Medium term	Long term
		Establish decontamination facilities	- SMP-KDS - Operators.	Personnel decontamination - Port Hospital, - Tie up with nearby hospitals, - First Aid Facilities, - Eyewash and Safety Showers at terminals in Budge-Budge.			
2	Disaster Response equipment	Ensuring and maintaining fire-fighting equipment (as per OISD and other relevant requirements)	- SMP-KDS, - Operators.	- Fire hydrant line at Budge-Budge, - Port Fire Station, - Mutual Aid Agreement with the Stakeholders, - FIFI Tugs.	- Provision of Fire-fighting as per OISD-156 at Budge-Budge Oil Jetties, - Provision of Fixed Fire firefighting at Container and NSD Berth 12.		
		Ensuring and maintaining oil pollution response equipment (as per ICG requirements)	- SMP-KDS, - Operators.	Oil Spill response equipment as per the Tier-I, NOS-DCP available at HDC.			

Hazard		Chemical / Oil Disaster – Loss of containment during Navigation incidents, at Budge -budge jetty, Berths, Pipelines.					
4. Thematic area		Investing in DRR – Non- Structural measures					
Sr. no.	Sub-thematic area	Plan components	Responsible section	Recurring / Regular measures	Short term	Medium term	Long term
1	Laws Regulations, Techno Legal regimes Enforcement, compliance and Monitoring Institutional arrangements	Formulate/ strengthen the SOP for the compliance w.r.t. the statutory requirements ensuring greater safety in hazardous industries and reduce the likelihood of disasters	- SMP-KDS, - Operators.	- Periodical inspection and testing of Oil/chemical Pipelines, - Periodical inspection and testing of Hoses, - Audits - Fire, Safety, - Risk Assessment, - Safety committee meetings.	- Navigational Safety Audit, - Compliance of recommendations.		
2	Risk Transfer	Insurance	- SMP-KDS, - Operators.	- Workmen Compensation Policy, - Public Liability Insurance, - Port Package Policy	Periodic Renewals of Policies.		

Hazard		Chemical / Oil Disaster – Loss of containment during Navigation incidents, at Budge -budge jetty, Berths, Pipelines.					
5. Thematic area		Capacity Development					
Sr. no.	Sub-thematic area	Plan components	Responsible section	Recurring / Regular measures	Short term	Medium term	Long term
1	Training	• Training and orientation programs on management (handling, storage and transfer) and disposal of HAZCHEM • Incorporating disaster response, search and rescue in the training programs	• SMP-KDS, • Operators, • CISF.	• IMO level training (OSR) for the identified personnel, • ISO and OHSAS training, • Fire-fighting training, • Safety Training, • First Aid training, • CBRN training, • Hazard identification and management training, • Annual training schedule.			
2	Mock drills/ Exercises	• Planning and execution of emergency drills by all the	• SMP--KDS, • Operators, • CISF, PSO • Other stakeholders.	• Mock drills conducted regularly with all the stakeholders, • Annual drill schedule.			

Hazard		Chemical / Oil Disaster – Loss of containment during Navigation incidents, at Budge -budge jetty, Berths, Pipelines.					
5. Thematic area		Capacity Development					
Sr. no.	Sub-thematic area	Plan components	Responsible section	Recurring / Regular measures	Short term	Medium term	Long term
		stakeholders					
		Joint planning and execution of emergency drills	- SMP-KDS, - Operators, - CISF, PSO, - Other stakeholders.	Organize and participation (involving all the stakeholders) mock-drills through various government agencies like NDRF, SDMA, Local authorities, etc.			
3	Documentation	Ensure accurate documentation of all aspects of disaster events for creating good historical records for future research and Risk Management planning	- SMP-KDS, - Operators, - CISF, PSO.	- Maintenance of the incident and near miss record. - Accident/incident reporting, analysis, investigation and implementation of recommendations.	Centralized mechanism for documentation		
4	Awareness	Promote culture of	SMP-KDS,	Safety day/week celebration,			

Hazard		Chemical / Oil Disaster – Loss of containment during Navigation incidents, at Budge -budge jetty, Berths, Pipelines.					
5. Thematic area		Capacity Development					
Sr. no.	Sub-thematic area	Plan components	Responsible section	Recurring / Regular measures	Short term	Medium term	Long term
		disaster risk prevention, mitigation, and better risk management	• Operators, • CISF, PSO • Other stakeholders.	• Award and recognition, • Fire week celebration, • Environment day celebration, • Safety Bulletins, • Periodic Health Check- up (PME Periodical medical examination), • Road safety week.			

Hazard		Fire (Office buildings, Hospital, Electrical substations, Pump houses and control rooms at Lock gate and bridges, Dry docks, Warehouses, Coal stack yard)					
1. Thematic area		Understanding Risk					
Sr. no.	Sub-thematic area	Plan components	Responsible section	Recurring / Regular measures	Short term	Medium term	Long term
1	Information Systems and Research	Support and coordination	- SMP-KDS, - Operators.	- Port Fire Station (common for NSD & KPD), - Municipal fire station.			
2	Zoning/ Mapping	Mapping of sites that pose fire risks	- SMP-KDS, - Operators.	- Fire system layout, - Electrical system layout, - Coal stack yard identified as a fire risk zone, - Dedicated storage area for reefer containers.	- Update layout plans, - Display of layout maps at suitable locations.		
3	Monitoring	Monitoring compliance with safety norms	- SMP-KDS, - Operators.	Continuous Monitoring of - CCTV surveillance, - Manning/Patrolling of the areas.	Periodic reviews about the efficacy.		
4	Hazard Risk Vulnerability and Capacity Assessment (HRVCA)	Undertake HRVCA as part of preparing and periodic revision of DM plans	- SMP-KDS, - Operators.	- Port DMP as per Disaster Management Act -2005, NDMA Guidelines 2024 and NDMP 2019, - Emergency Action Plan (EAP)	Periodic updation of plans.		

Hazard		Fire (Office buildings, Hospital, Electrical substations, Pump houses and control rooms at Lock gate and bridges, Dry docks, Warehouses, Coal stack yard)					
1. Thematic area		Understanding Risk					
Sr. no.	Sub-thematic area	Plan components	Responsible section	Recurring / Regular measures	Short term	Medium term	Long term
		Constitute/ strengthen the mechanism for consultation with experts and stakeholders	- SMP-KDS, - Operators.	- Periodical inspection and testing of response equipment, - Fire Audit, - Capacity analysis, - Drills, - Training and Awareness, - ISPS, Safety Committee meetings.	Compliance of recommendations		

Hazard		Fire (Office buildings, Hospital, Electrical substations, Pump houses and control rooms at Lock gate and bridges, Dry docks, Warehouses, Coal stack yard)					
2. Thematic area		Inter- agency coordination					
Sr. no.	Sub-thematic area	Plan components	Responsible section	Recurring / Regular measures	Short term	Medium term	Long term
1	Overall disaster governance	Identify and address the gaps in existing capabilities, equipment, infrastructure, and human resources	- SMP-KDS, - CISF, PSO, - Operators, - Hospital.	- Emergency Operation Centre, - Periodic reviews and upgradation of the fire systems/equipment and manpower as per the relevant standards and best practices.	Install and upgrade systems as per periodic reviews		
		Establish fire stations	SMP-KDS.	- Port Fire station, - Identified list of nearby Fire Stations.			
		Implementation of DM plans	- SMP-KDS, - CISF, PSO, - Operators, - Hospital.	- Conducting fire and evacuation drills, - Training and Awareness.	Implementation of the updated DMP.		
2	Warnings, Information, data	Effective coordination and seamless communication	- SMP-KDS, - CISF, PSO, - Operators, - Hospital.	Coordination and effective dissemination of warnings, information and data via - VHF, - Radio over IP.			

Hazard		Fire (Office buildings, Hospital, Electrical substations, Pump houses and control rooms at Lock gate and bridges, Dry docks, Warehouses, Coal stack yard)					
2. Thematic area		Inter- agency coordination					
Sr. no.	Sub-thematic area	Plan components	Responsible section	Recurring / Regular measures	Short term	Medium term	Long term
				• Landline, • PA system, • Mobile Phones, • Emergency Siren, • Email.			
3	Response	Organizing and coordinating the immediate response Coordinate with Government agencies and stakeholders of the port	• SMP-KDS, • CISF, PSO, • Operators, • Hospital.	• Activation of DM Plan, • Coordinating with Fire station (Port & External), • Coordination with SDMA and DDMA.			

Hazard		Fire (Office buildings, Hospital, Electrical substations, Pump houses and control rooms at Lock gate and bridges, Dry docks, Warehouses, Coal stack yard)					
3. Thematic area		Investing in DRR – Structural measures					
Sr. no.	Sub-thematic area	Plan components	Responsible section	Recurring / Regular measures	Short term	Medium term	Long term
1	Smoke, Heat, Fire detection and fire-fighting systems	Procurement and maintenance of fire Fighting systems as per relevant Standard and Rules	- SMP-KDS, - Operators.	- Periodical testing and maintenance of the Portable fire-fighting facility at Electrical substation, Hospital, Admin building, and Control Centers. - Emergency Siren.	Up-gradation and Periodic maintenance of the fire detection and fire-fighting system.		
2	Evacuation and support facilities. Multiple routes for reliable access and escape.	Identification of Assembly points	- SMP-KDS, - CISF, PSO, - Operators, - Hospital.	Identified assembly points.	- Updation of assembly points and sign boards. - Display of evacuation maps at suitable locations for buildings.		
		Providing vehicles for safe transportation	- SMP-KDS, - CISF, - Operators, - Hospital.	- Passenger vehicles of KDS, - Passenger vehicles of operators, - Passenger vehicles of CISF, PSO.	Periodical repair of Internal roads.		

Hazard		Fire (Office buildings, Hospital, Electrical substations, Pump houses and control rooms at Lock gate and bridges, Dry docks, Warehouses, Coal stack yard)					
3. Thematic area		Investing in DRR – Structural measures					
Sr. no.	Sub-thematic area	Plan components	Responsible section	Recurring / Regular measures	Short term	Medium term	Long term
3	First aid and Decontamination facilities	- Establish First aid and decontamination facilities - Identification of hospital	- SMP-KDS, - CISF, PSO, - Operators, - Hospital.	Personnel first aid and decontamination - Port Hospital, - Other identified hospitals, - First aid facility at KDS.			

Hazard		Fire (Office buildings, Hospital, Electrical substations, Pump houses and control rooms at Lock gate and bridges, Dry docks, Warehouses, Coal stack yard)					
4. Thematic area		Investing in DRR – Non- Structural measures					
Sr. no.	Sub-thematic area	Plan components	Responsible section	Recurring / Regular measures	Short term	Medium term	Long term
1	Rules, laws, guidelines	Strict implementation and strengthening of fire safety rules	• SMP-KDS, • CISF, PSO, • Operators, • Hospital.	• Safety Committee Meeting, • Environment, Health and Safety Policy, • Safety budget, • Work Permit System.	• Firefighting and evacuation Plan		
2	Fire safety audit of structures and buildings	Carry out fire safety audit of buildings and critical infrastructure	• SMP-KDS, • Operators.	• Periodic Fire and Safety audit, • Compliance of Statutory requirements in coordination with Inspectorate of Dock Safety.	• Compliance of recommendations.		
3	Risk Transfer	Insurance	• SMP-KDS, • CISF, PSO, • Operators, • Hospital.	• Workmen Compensation Policy, • Public Liability Insurance, • Port Package Policy.	• Periodical renewal of policies.		

Hazard		Fire (Office buildings, Hospital, Electrical substations, Pump houses and control rooms at Lock gate and bridges, Dry docks, Warehouses, Coal stack yard)					
5. Thematic area		Capacity Development					
Sr. no.	Sub-thematic area	Plan components	Responsible section	Recurring / Regular measures	Short term	Medium term	Long term
1	Training	Incorporating disaster response in the training programs	• SMP-KDS, • CISF, PSO, • Operators, • Hospital.	• Induction/Refresher Training, • Fire-fighting training, • First Aid training.			
2	Mock drills/ Exercises	Planning and execution of emergency drills by all the stakeholders Joint planning and execution of emergency drills	• SMP-KDS, • CISF, PSO, • Operators, • Hospital.	• Fire and evacuation mock drill, • Joint mock drill.	• Annual Drill schedule.		

Hazard		Fire (Office buildings, Hospital, Electrical substations, Pump houses and control rooms at Lock gate and bridges, Dry docks, Warehouses, Coal stack yard)					
5. Thematic area		Capacity Development					
Sr. no.	Sub-thematic area	Plan components	Responsible • section	Recurring / Regular • measures	Short • term	Medium term	Long term
3	Documentation	Ensure accurate documentation of all aspects of disaster events for creating good historical records for future research and Risk Management planning	• SMP-KDS, • CISF, PSO, • Operators, • Hospital.	• Maintain incident and near miss records, • Accident/incident reporting, analysis, investigation and implementation of recommendations.	• Centralized mechanism for the accident / incident and near miss record.		
4	Awareness	Promote culture of disaster risk prevention, mitigation, and better risk management	• SMP-KDS, • CISF, PSO, • Operators, • Hospital.	• Safety day/week celebration, • Award and recognition, • Safety Bulletin, • Periodical Health Checkup.	• Promote awareness by posting details of activities on social media platforms regarding important events.		

Hazard		Natural Disaster (Wind and Cyclone, Flood, Earthquake and Tsunami)					
1. Thematic area		Understanding Risk					
Sr. no.	Sub-thematic area	Plan components	Responsible section	Recurring /Regular measures	Short term	Medium term	Long term
1	Observation networks, Information systems, Research, Forecasting, Early warning	Enhancement of Observational Network Stations (ONS)	SMP-KDS	Wind and cyclone: - VTMS, - Internet sources, - Central Water Commission Bulletins, - NAVAREA warnings.			
		Establishment of at least one High Wind Speed Recorder and one surge		Flood: - Flood: - Automated Tide / Bore tide gauging, - Sea, river and impound basin water level monitoring, - IMD bulletins, - Central Water Commission bulletins. Tsunami: - INCOIS warnings.			

Hazard		Natural Disaster (Wind and Cyclone, Flood, Earthquake and Tsunami)					
1. Thematic area		Understanding Risk					
Sr. no.	Sub-thematic area	Plan components	Responsible section	Recurring /Regular measures	Short term	Medium term	Long term
		recorder					
2	Zoning / Mapping	Identification of the vulnerable areas	Not applicable to SMP-KDS for zoning and mapping.	• Cyclone hazard map (Very High damage risk zone – maximum wind speed of 50 m/s). • Flood: The present port infrastructure poses a flooding risk. • Earthquake: Kolkata and South-24 Parganas district districts fall under Moderate earthquake damage Risk zone (zone category III).	•Maintenance and new construction of drainage system		
3	Monitoring	System to monitor natural disaster	• SMP-KDS	Wind and Cyclone, Flood Monitoring via • TV /Radio, • Central Water Commission warnings, • IMD bulletins, • Port automated tide gauge. Tsunami Monitoring via • INCOIS, • Other Forecasting agencies.			

Hazard		Natural Disaster (Wind and Cyclone, Flood, Earthquake and Tsunami)					
1. Thematic area		Understanding Risk					
Sr. no.	Sub-thematic area	Plan components	Responsible section	Recurring /Regular measures	Short term	Medium term	Long term
4	Hazard Risk Vulnerability and Capacity Assessment (HRVCA)	Undertake HRVCA as part of preparing and periodic revision of DM plans	- SMP-KDS, - Operators.	- Port DMP as per Disaster Management Act -2005, NDMA Guidelines 2024 and NDMP 2019, - Port CMP, - OSCP, - Emergency Action Plan (EAP), - Emergency Response Disaster Management Plan (ERDMP), - Risk Assessment.	Periodic updating of Plans.		
		Constitute/ strengthen the mechanism for consultation with experts and stakeholders	- SMP-KDS, - Operators.	- SOP for Cyclone, - Preventive inspection of cranes, high mast lighting, communication towers and antennae, - Project development reports incorporating effective draining and anti-flooding measures, - Hydrographic survey, - Structural Audit report.			Land use planning

Hazard		Natural Disaster (Wind and Cyclone, Flood, Earthquake and Tsunami)					
2. Thematic area		Inter- agency coordination					
Sr. no.	Sub-thematic area	Plan components	Responsible section	Recurring / Regular measures	Short term	Medium term	Long term
1	Overall disaster governance	Providing coordination, technical inputs, and support.	• SMP-KDS, • Operators.	• Emergency Operation Centre, • Coordination with IMD, Central Water Commission, INCOIS, • Coordination with DRR Cell (at Ministry level), DG Shipping, SDMA and NDMA, • As per NDMA guidelines for Cyclone, Flood, Earthquake and Tsunami.			
2	Warnings, Information, data collection	Effective communication to ensure quick, clear, effective dissemination of warnings, information and data.	• SMP-KDS, • Operators, • Vessel Master, • CISF, PSO.	Effective communication via: • VTMS, • Display of cyclone signals, • VHF, Landline, Mobile Phones, • Satellite Phones, • Email, • PA System, • Tide Tables.			
3	Response	Coordinating with port stakeholders and Government agencies	• SMP-KDS, • Operators. • Vessel Master, • CISF, PSO.	• Coordination with CMG, • Coordination with Vessel Master, • Coordination with DG Shipping, MMD, NDMA, SDMA SDRF, Civil Defense, Local authorities, Marine police, ICG, PESO, WBPCB, Indian Navy etc.			

Hazard		Natural Disaster (Wind and Cyclone, Flood, Earthquake and Tsunami)					
3. Thematic area		Investing in DRR – Structural measures					
Sr. no.	Sub-thematic area	Plan components	Responsible section	Recurring / Regular measures	Short term	Medium term	Long term
1	Multi-Purpose Shelters	Identification of safe Shelter with basic facilities like drinking water, food, sanitation and first aid.	SMP-KDS	- Identified nearby shelters such as schools, community halls, etc. - Identified shelters for tugs and crafts – impound dock basin.			
2	Hospitals and First Aid Centers	Identification hospitals and first aid centers.	- SMP-KDS, - Operators, - Hospital.	- Port Hospital, - Tie up with nearby hospitals, - First Aid centers.			
3	Civil works	Upgrade and maintenance of the existing systems/ facilities	- SMP-KDS, - Operators,	Seismically safe design and construction of berths, jetties, pipeline trestles, buildings and utilities.	- Compliance of recommendations of structural audits - Periodic inspection of vulnerable/critical structures.		
4	Strengthening and retrofitting of prioritized vulnerable and critical structures	Ensure compliance with relevant building codes or hazard resistant construction	- SMP-KDS, - Operators	Implementation in compliance with relevant building codes/ standards / technical guidance. e.g. NDMA guidelines for Tsunami and Earthquake.			

Hazard		Natural Disaster (Wind and Cyclone, Flood, Earthquake and Tsunami)					
4. Thematic area		Investing in DRR – Non- Structural measures					
Sr. no.	Sub-thematic area	Plan components	Responsible section	Recurring / Regular measures	Short term	Medium term	Long term
1	Regulations and enforcement laws	Ensure Compliance with the coastal environmental laws and regulations such as the CRZ	• SMP-KDS, • Operators.	• EIA / EMP recommendations regarding environment, sustainability measures viz air quality, sewage and effluent. • Implementing land-use regulation as per flood control norms. • Implementation of CRZ.			Land-use planning
		Consider shoreline erosion, risk to structures, monitoring shoreline changes	• SMP-KDS	• Plantation of Mangroves, • River Training/ Bank Protection works, • Maintenance Dredging, • Beach nourishment.			
2	Risk Transfer	Insurance	• SMP-KDS, • Operators.	• Workmen Compensation Policy, • Public Liability Insurance, • Port Package Policy.	• Periodic Renewals of Policies		

Hazard		Natural Disaster (Wind and Cyclone, Flood, Earthquake and Tsunami)					
5. Thematic area		Capacity Development					
Sr. no.	Sub-thematic area	Plan components	Responsible section	Recurring / Regular measures	Short term	Medium term	Long term
1	Training and awareness	Training and awareness related to disasters	• SMP-KDS, • Operators, • Hospital.	• Training and awareness as per NDMA guidelines, • Training by NDRF, SDRF, Civil Defense and other agencies.			
2	Mock drills/ Exercises	Joint planning and execution of emergency drills	• SMP-KDS, • Operators, • Hospital.	• Participation in drills/exercises with the District and State Disaster Authorities.			
3	Empowering following categories of employees • Women • disabled	Emergency evacuation facilities	• SMP-KDS, • Operators,	• Display plan and areas of employment for special category employees, • Provision of transports.			

Hazard		Natural Disaster (Wind and Cyclone, Flood, Earthquake and Tsunami)					
6. Thematic area		Climate change risk management					
Sr. No	Sub-thematic area	Plan components	Responsible section	Recurring / Regular measures	Short term	Medium term	Long term
1	Climate change adaptation (CCA)	Sensitization and awareness creation	• SMP-KDS, • Operators.	Port has taken an initiative related to environmental protection as part of Green Port Initiative from GoI. This includes • Trees plantation, • Monitoring of the level of air, water and soil pollution regularly, • Prohibition of disposal of all kind of garbage in river.	• Provision of net barrier for coal dust pollution, • Installation of Dry fogging system (Dust suppression system).		

8.2 MAINSTREAMING DISASTER RISK REDUCTION

The objective of mainstreaming is ensuring the ongoing and new development projects of the port leading to integration measures. The sub-thematic areas where such measures can lead to DRR are as follows:

1. Awareness and understanding of disaster risk;
2. Disaster governance;
3. Disaster risk transfer;
4. Institutional arrangements and capacity development;
5. Budget allocations for integrating DRR into development programs;
6. Project appraisals, scrutiny of development plans, effective and detailed land-use plans, from the point of view of expected hazards;
7. Setting targets and monitoring mechanisms.

In the context of above sub-thematic areas, the following measures may lead to mainstreaming DRR:

8.2.1 INVESTING IN DRR – STRUCTURAL MEASURES

The port is constructing marine and critical infrastructure (e.g., Jetty, Transfer pipeline and support structure, Drainage system, buildings, etc.) as per relevant standards.

8.2.2 INVESTING IN DRR – NON-STRUCTURAL MEASURES

Port land area is being used for activities such as jetty area, industrial area, road network, water supply network, storm water drainage system and greenbelt/green cover.

Measures instituted includes Preparation and Implementation of the following:

- Port Policy, Rules, and Regulations,
- Circulars,
- Notices,
- SOPs,
- Operational Manuals and Guidelines.

8.2.3 CAPACITY BUILDING

Port takes initiative by deputing various personnel to attend and undergo various trainings such as Disaster and Safety Management, Oil Spill Management, Fire and Safety, Dock Safety, First Aid etc.

Port undertakes consultative measures with expert agencies such as IITs, Govt. Departments, technical Universities, and private institutions for advice in Land use planning, port development, projects implementation, environmental management, and training of personnel. It will also conduct and participate in awareness programme through agencies such ICG, Civil Defence, NDRF, SDRF, WBSDMA, DGFASLI, Security services etc.

8.3 DISASTER RISK GOVERNANCE PROGRAMMES AND PRACTICES

8.3.1 Environmental macro level-Coastal zone monitoring

The macro level monitoring includes following aspects.

1. Master planning of the port facilities with respect to identification of projects.
2. Environmental impact analysis, land use planning and finalisation of the location of the projects.
3. Finalisation of the Port's conceptual plan for future development.
4. Obtaining statutory permissions like Environmental Clearance, Consent to Establish/Operate from the MoEF&CC, PESO approval and State Pollution Control Board.

8.3.2 Micro Level Monitoring

The port undertakes various initiatives at the micro level which are as follows:

1. Plantation of trees for a green belt.
2. The level of air, water pollution to be monitored regularly and required steps to retain the pollution level within the permissible limit taken.
3. Maintenance of Drainage system.
4. Obtaining environmental clearances for projects and monitoring of the pollutants during the execution of the project as per the approved Environmental Management Plan (EMP).

In addition, the port maintains the CSR program and issues are highlighted periodically for implementation.

8.4 CLIMATE CHANGE RISK MANAGEMENT AND DRR

The SDG Goal 14 (Conserve and sustainably use the oceans, seas and marine resources for sustainable development) has set targets for significant reduction of marine pollution.

In respect of aspects relating to climate change the following plan/procedures by port have been identified having bearing on disaster risk reduction and resilience:

- Plantation of trees for green belt and utilisation of non-conventional energy sources.
- The level of air, water, and soil pollution to be monitored regularly and required steps to retain the pollution level within the permissible limit taken.
- Land use planning and the detailed development thereafter will factor-in the requirements of natural slope, land topography, storm water drainage,
- High wind and cyclone – Implementation of SOPs for preventing damage during an event

8.5 BUDGETING AND FINANCIAL ARRANGEMENTS

8.5.1 DM Budget

The port will assign sufficient funds towards disaster management under following broad categories as follows:

i. DRR measures (Structural and Non-structural):

- Firefighting and Oil Spill Response Equipment;
- Tugs;
- Navigational aids;
- Training of Personnel;
- Risk Transfer – Insurance;
- Civil works –Jetty-fenders-Repair and maintenance.

ii. Restoration Measures:

- Office building damage;
- Power Supply;
- Damage to tugs;
- Damaged buoys- loss of buoys;
- Repair of damaged roads;
- Injury and infection-medical treatment;
- Flooding and stagnant water - clean drains;
- Electrical and Mechanical works;
- Civil works –Jetty-fenders-Damage Repair.

8.5.2 Insurance of Port Assets

The Insurance cover for the port assets/properties should be as follows

1. Building, workshop, warehouse and other structure inside port;
2. Navigational aids structures and equipment;
3. Fire-fighting aids;
4. Berths, Docks and Jetties;
5. Port Equipment, Plant and Machineries;
6. Floating craft and others;
7. Railway permanent way, loco shed and locomotives;
8. Electrical Installations.

9. RECOVERY AND BUSINESS CONTINUITY

9.1 RESPONSIBILITY FOR TERMINATING THE RESPONSE

The decision to terminate a response is taken by the CIC in consultation with the CEC.

9.2 CONDITIONS FOR TERMINATION

9.2.1 In the case of Natural Disasters Response action can also be terminated as per the information received from the “Competent early warnings agencies e.g., IMD” (Refer 7.1.5).

9.2.2 Fire Extinguishing operation should be terminated when:

- Fire has been completely extinguished,
- Area has been declared as “Risk or Hazardous or Smoke’ free area.

9.2.3 Marine Response Operations in case of oil spill should be terminated when:

- Oil has been recovered to the extent practicable; or
- The surface oil slick has broken up; or
- The oil slick has gone out to sea and is beyond the range of response options, and is unlikely to return; or
- Oil has impacted shorelines and is no longer on the water.

In the last case marine response resources must remain on standby and equipment maintained at the ready until shoreline response operations have been completed.

9.2.4 Shoreline Response Operations should be terminated when:

- All accessible shorelines are clean to the extent practicable.
- Cleanup is having no further net beneficial effect or having a deleterious effect on the shoreline or associated plants or animals.

Shoreline cleanup operations may be terminated only upon the instruction of the **WBPCB/ICG and District authorities.**

9.2.5 Land Spill Response Operations should be terminated when:

- Area has been declared “Risk or Hazardous” free.
- Source of leakage is stopped, and the condition of the area is safe for operation.

9.2.6 Human Induced Disasters response may be terminated when

- a. War and terrorism threats are evaluated by the security agencies and as such the response will be terminated gradually in stages as per the input received from them.
- b. Bomb threat related response will be terminated on case-to-case basis as per instructions from district and state authorities.

9.3 STAND-DOWN PROCEDURES

9.3.1 Return of Equipment

Upon completion of the response, the SIC (or delegate) will:

- Arrange recovery of all equipment and unused materials.
- Ensure that all equipment is cleaned and returned to the owner.

9.3.2 Debrief

The SIC may hold a post-incident debriefing. Debriefing should address:

- Spill causes (if known) and future prevention methods.
- Speed of response activation.
- Effectiveness or suitability of strategies, tactics and equipment.
- Health and Safety issues (if any).
- Any other issues required to be communicated.
- Damage in terms of life, injury and loss of property should be assessed.

9.3.3 Incident Report

The CEC may request the preparation of an Incident Report.

9.3.4 Cost recovery

1. All records of costs must be collated for submission to the relevant insurer.
2. For expenses incurred assisting third parties, costs should be kept and submitted to relevant authority.

9.4 DAMAGE, LOSS AND NEED ASSESSMENT

9.4.1 Initial Damage Assessments

Following any major disaster, rapid assessment of damage is important for restoring the facilities, resuming Port operations and cost recovery. In certain cases, e.g. terrorism and security related, thorough site or damage assessment is not possible immediately after an event. Access to, and assessment of Port facilities and its contents may be delayed for a period of time. The delays may be due to possible loss of structural integrity, necessary forensic investigation, or the existence or potential existence of hazardous materials.

Immediately following a disaster and as soon as it is safe to do so, the designated team shall conduct a preliminary damage assessment.

9.4.2 Secondary Damage Assessments/Temporary Repairs

Once the affected site is approved for entry, a Damage Assessment Team will conduct a thorough assessment. This assessment will focus on those assets needed to facilitate a rapid recovery such as electric power, communications, and transportation. The assessment should also identify any potential environmental issues that require immediate attention. Damage should be noted in enough detail to allow it to be communicated to begin developing action plans for recovery. Local utility companies need to be contacted at this time for anticipated schedules for restoration of critical utility services.

9.4.3 Assessment of Damage to Navigational Channel

Assessment of damage to the berthing and navigation portion area of the channel and Aids to Navigation will be carried out by the port. The CIC, SIC will provide a status report of the condition of the channel to the CEC.

9.4.4 Potential loss estimates analyzed include

- Physical damage to buildings, critical facilities and infrastructure.
- Economic loss, business interruptions, repair and reconstruction costs.
- The decision to rehabilitate or abandon port structures depends on the extent of damage, importance of the structure, and limits on its use. Aspects of an inspection may include:
 - An underwater inspection by divers to check for possible demolition damage or deterioration of footings.
 - An inspection of the piling at low water from a boat to check for decay or damage. The stringers and deck are examined from below to determine the need for repair.
 - Jetty will be inspected for damage.
 - Assessment of buildings to ensure that damaged or repaired buildings are safe for occupancy.

9.5 RECOVERY PLANNING

9.5.1 Short-term recovery planning

Short-term recovery planning runs parallel to short term response and begins during and immediately after an incident.

9.5.2 Medium-term recovery planning

In the medium-term recovery planning, port will engage in contracting and setting up for large scale reconstruction and reconstitution operations. This may include financial planning, contracting, and the formation of joint venture agreements to assist in long-term business continuity.

The reconstruction activities may require an Environmental Impact Assessment. The lessons learned about the disaster impact and failures will be incorporated based on reviews of latest standards and global best practices to ensure a “**Build Back Better**” approach.

These steps will involve the following;

- a. Debris Removal,
- b. Emergency Protective Measures,
- c. Repair to Pre-Disaster Condition including improved resilience.

9.5.3 Long-term recovery planning

In the event that a part or the entire port becomes unusable or requires rebuilding, the long-term reconstruction considerations will be taken by stakeholders considering the financial planning, budgetary support and other resources.

9.6 RE-OPENING OF JETTIES OR BERTHS TO VESSELS

In the event of damage to the port infrastructure during the disaster and subsequent recovery, steps will be taken by the management in consultation with MoPSW to open the port and navigational channel to resumption.

9.7. ENSURING BUSINESS CONTINUITY (General Guidelines)

9.7.1 OBJECTIVES

- Port resuming business operations as quickly and efficiently as possible.
- Preservation of cargo transport and supply chains.
- Developing partnerships between the public and private sector with a view to improve resiliency.
- Assessing and determining resources required to mitigate economic impacts of an incident on the port and its businesses.
- Determining how to create redundant and resilient power, water, sanitation, and data storage systems.

9.7.2 BUSINESS IMPACT ASSESSMENT

In the case of Level 2 and Level 3 disasters where serious disruptions in port business are possible due to collapse and damage to infrastructure and services in addition to human casualties, the process of recovery is conducted by undertaking a Business Impact Assessment (BIA). The following table lists the involvement of various authorities in case of major disasters.

Table 9.1: Involvement of Authorities for Level 2 and 3 type disasters

SCENARIOS	LEVEL 2 & 3* - ACTIONS BY
Vessel- Collision or Grounding-Evacuation	IRT + CMG + Salvage companies + Navy + ICG + Berth operators
Fire & Explosion on Vessel or berth or Jetty	IRT + CMG + Berth Operator + Municipal Fire wing + Master of vessel / Craft + ICG
Fire in Office buildings, Hospital, Electrical substations, Pump houses, shed and control rooms at Lock gate and bridges, Dry docks, Warehouses, Coal stack yard	IRT + CMG + Port Fire team + Municipal Fire wing + Berth Operator
Oil or Chemical Spill	IRT +CMG + Master of vessel + OSRO+ Berth Operator +ICG + District/state assistance
Toxic Gas Leakage	IRT + CMG + Master of vessel + Berth operators + District/state assistance + outside agencies
Cyclone, Tsunami, Flood, Earthquake	IRT + CMG + Master of vessel + Berth Operator +DDMA/SDMA + NAVY + ICG +Marine Police + Local Authorities
Human related – Bomb threat, War and terrorism, Hijacking, Labour Dispute	CISF, PSO(Security) + CMG+ Berth Operator + DDMA/SDMA + NAVY + ICG +Marine Police + Local Authorities

*Note: Refer Fig. 5.2 for Off-site Emergency Organization Chart

9.7.2.1 TOLERABLE RECOVERY TIME

The Port EOC will provide the initial response to a major disaster and stakeholders will have assigned functions on their respective parts for recovery and restoration efforts.

The maximum tolerable recovery duration for some of the emergencies will be as follows:

1. 2-4 days for disasters in service and administration facilities;
2. 4 days for collision, grounding and fire related disasters;
3. 21 days for Natural disasters;
4. 30 days for disasters during cargo storage or transfer.

The following table list the tolerable recovery times for the port for various identified Scenarios as per HRVCA:

Table 9.2: Time to Restore for identified scenarios

EVENT/SCENARIO	TIME TO RESTORE FACILITIES
DISASTER DURING CARGO STORAGE/TRANSFER	
Fire due to leakage /rupture of POL/Chemical from pipeline/hose at NSD oil jetty– on ship or ashore	2-30 days
Fire due to leakage /rupture of POL/Chemical from pipeline/hose at budge-budge wharf– on ship or ashore	2-30 days
Toxic gas (e.g. toluene) leak at budge-budge wharf during operation – on Ship or Ashore	2-7 days
Corrosive Acid - Leakage (e.g. Sulphuric acid) at budge-budge wharf during operation – on Ship or Ashore	2-4 days
Fire /leakage due to Crane Accidents (Container drop/crane fall) at container berth – secondary event.	2-7 days
Fire on vessel (non-tankers) at berth at KPD or NSD	2-4 days
Fire in Coal Stackyard at KPD or NSD	2 days
NAVIGATIONAL DISASTERS	
Collision of Small Craft with Tanker / Container/BC/Barge (Area B)	4-96 hours
Collision between two vessels (Area A, B)	4-96 hours
Vessel - Contact with Jetty/berth (Area C and Budge-Budge Wharf)	4-96 hours
Grounding- Tanker/Container/BC (Area A, B)	4-96 hours
Dragging anchor (River and sea anchorage) (Area A, B)	4-96 hours
Contact with channel and river marking buoys/light vessels (Area A, B)	4-96 hours
Contact/Allision with Lock gate (KPD & NSD) (Area C)	12-96 hours
Collision/allision with the bridge (Hooghly Bridge (Vidyasagar Setu); Howrah Bridge (Rabindra Setu))	2-7 days
Capsize of vessel at/near berth	2-7 days
Fire on vessel in the river and approach Channel (Area A and B)	12-96 hours
Fire on vessel at the Berth/Jetty	12-96 hours
DISASTER IN SERVICE AND ADMINISTRATION FACILITIES	
Fire in Office buildings, Hospital, Dry docks, warehouse, Electrical substation, pump house, Control room of lock gates.	12 – 96 hours
NATURAL DISASTER	
Cyclone/ Floods/ Tsunami/ Earthquake	7-21days

9.7.3 PLANNING CONSIDERATIONS FOR BUSINESS CONTINUITY

The lessons learned from earthquake damage to Kandla Port during Bhuj earthquake 2001 reveals damage to jetties, piles and RCC structures such as warehouse, the signal control tower and office building. In such an eventuality occurring at port, steps to restore the functioning of the affected cargo berths and control stations will need extensive repair and rehabilitation measures.

Port will consider short-, medium-, and long-term priorities to better organize and improve recovery

- Local priorities would be considered when determining where to focus recovery efforts.
- Assess the port functions, both internally and externally, to determine which manpower, materials, procedures, and equipment are necessary to keep the port operating.
- Create a contact list for existing critical business contractors and others that the port can use in an emergency.

9.7.4 SHORT-TERM RECOVERY PLANNING**9.7.4.1 Damage Assessment and Prioritization of Restoration Work**

Tasks during initial damage assessment will include the following.

- Assessment of Engineering Assets
- Assessment of Current Condition of Facilities
- Assessment of Utility Infrastructure

9.7.4.2 Actions that assist in damage assessment will include the following.

- Documentation of Replacement Costs
- As-Built Building Plans, Specifications and Other Facility Records
- Determining, positioning, and planning for assistance to obtain Critical Recovery Resources

9.7.5 MEDIUM-TERM RECOVERY PLANNING

In medium-term recovery planning, the port will engage in contracting and setting up for reconstruction and resumption of operations at the affected site. This may include financial planning, contracting and the formation of mutual aid agreements to assist in business continuity.

9.7.5.1 Mutual Assistance

The port may include the recovery operations plans, provisions for the pooling of recovery and business resources.

In case of damage to road infrastructure, port may also consider examining alternative transportation routes to and from the port and also within the port itself.

9.7.5.2 Medium-term reconstruction projects include:

- Expedient repair of existing structures.
- Repair of unloading facilities e.g. quay cranes, unloading arm, pipelines etc.

9.7.5.3 Marketing and Communications

Post-incident, port may consider publishing press releases and advertisements, that the port is open for business and still functional.

9.7.6 LONG-TERM RECOVERY PLANNING

This may include assessment of short- and medium-term measures as discussed earlier. For full recovery steps including as listed below will be required.

- Determining the financial impact of the emergency on the port and the budget needed for recovery, including insurance reimbursement and non-reimbursement issues, and central govt. assistance;
- Associating with emergency management and first responders based on unmet coordination needs;
- Initiating public relations activities to rebuild confidence in the transition period on the part of customer and the community;
- Administering a comprehensive cargo movement recovery policy;
- Provide support for Construction and Maintenance, repair, alteration and reconstruction of port facilities and infrastructure;
- Laying out of plans and specifications and other contract documents necessary for the construction of new facilities and for any modifications to existing port facilities by engineering department;
- Repair of extensive damage to port buildings and properties and its maintenance;
- Assessment of environmental impacts of reconstruction projects and determining mitigation measures as appropriate by Environment department.

10. RESOURCE INVENTORY

10.1 Floating Crafts

Sl. No.	Type of Floating Craft	Nos.	Make	Year	Capacity (In BP/BHP)	Speed (In Knots)
1.	Dredger*					
(a)	D.C.I. (Dr. XII)	5	IHC Holland	1990	650-1342 BHP	9.0
(b)	D.C.I. (Dr. XIV)		IHC Holland	1991		9.0
(c)	D.C.I. (Dr. XXI)		IHC Holland	2013		11.0
(d)	Marine Hopper (Grab Dredger) (WB-1746)		Goa	2019	325 X 2 =650 BHP	8.85
2.	Tugs					
(a)	Golap [¥]	3	M/s Richard Limited, U.K.	1967	2x475 BHP	7.0
(b)	Kalikata [¥]		M/s Bharati Shipyard Private Limited, Mumbai	1992	2x474 BHP	
(c)	Gobindapur [¥]		P. Das & Company	1993	2x470 BHP	
(d)	Gladiator – VI*	3	Reach Asia, Kolkata	2019	2x470 BHP	11.2
(e)	Gladiator – IX* (WB-1864)			2022	2x600 BHP	11.2
(f)	Gladiator – III*			2015	2x600 BHP	12.0
3.	Pilot Launches					
(a)	Gopal [¥]	5	M/s Alcock Ashdown (Gujarat) Limited, Bhavnagar	1994	2x445 BHP	10.0
(b)	Rupsa [¥]		M/s Corporated Consultancy & Engg Enterprise Pvt. Ltd Kolkata.	1997	2x940 BHP	12.0
(c)	Hugli [¥]					
(d)	M. L. Sidho [¥]		M/s Corporated Consultancy & Engg Enterprise Pvt. Ltd.	1993	2x195 BHP	8.0
(e)	M. L. Mirmadan		M/s Nalanda Engineering Works, Kolkata	1993	195 BHP	5.0
(f)	Deep Blue*	1	B.N. Bose & Co, Ghusuri, Howrah	2015	2x447 KW	15.0
(g)	Aquator 2*	1	Surya Dipta Projects Pvt Ltd. Mumbai	2015	2x441 KW	15.0

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4.	Mooring Launches	-	-	-	-	-
5.	Pontoons	6	Kolkata	-	5 nos.30 mtrs x 9 mtr 1 no.30 mtrs x 6 mtrs	-
6.	Barges	-	-	-	-	-
7.	Survey Vessels/Boats					
(a)	M V Sarojini (own)	1	M/s. Shalimar Works Ltd. Kolkata	2002	2x700 BHP	12.0
(b)	M.L. Kanho (own)	1	M/s. CC&EE, Kolkata	1994	2x195 BHP	8.0
(c)	River Pearl-1 (hired)	1	Katale Shipyard Private Limited, Ratnagiri	2017	2x447 BHP	12.0
8.	Special Purpose Launches					
(a)	WB Sone (GMB/JFD/06, Jaffrabad Port,)	1	Kolkata	2012	2x194	8.0
(b)	D.V. Rabindra Dispatch Vessel (Own)	1	M/s. Bharati Shipyard	2000	2x1320 BHP	10.0
9.	Fire Float	-	-	-	All Tugs are fitted with fire-fighting appliances	
10.	Floating Cranes	-	-	-	-	-
11.	Any Others*	-	-	-	-	-
a	Pilot Vessel “Ma Ganga”	1	M/s. Bharati Shipyard	2006	2 X 600 BHP	10 .0
Mooring Boats (hired)-2 (120 HP each); Also, there are 9 nos. hired wooden body launches.						

Note: *- Hired; ¥ - Owned

10.2 Fire-fighting resources

The Fire-fighting unit at KDS covers overall firefighting operations and fire prevention of Docks and outside properties of KDS, Syama Prasad Mookerjee Port, Kolkata.

The main firefighting equipment and appliances are as follows

Sr. No.	Appliances and Equipment	Present status
1.	Fire Water Tender	2 nos. Hired
2.	Trailer Fire Pump	1 No
3.	Ejector Pump	1 no.
4.	BA set	6 nos.
5.	35 feet Extension Ladder	6 nos.
6.	Ground Water Monitor	2 nos.
7.	Ground Foam Monitor	2 nos.
8.	Water CO2 Extinguisher (9Ltr cap)	596 nos.

9.	DCP Extinguisher (5Kg Cap)	485 nos.
10.	CO2 Extinguisher (2Kg & 5 Kg Cap)	102 nos.
11.	CO2 Extinguisher (27Kg Cap)	3 nos.
12.	Foam Compound (Protein Base)	10000 Ltrs
13.	Foam Compound (AFFF)	5000 Ltrs
14.	Foam Extinguisher (45 Ltrs)	10 Nos.
15.	Fire Proximity suit	4 sets
16.	Chain Saw (Petrol driven)	2 nos.
17.	Fog Cannon	1 nos.

10.3 Manpower resource at Port fire service

Sr. No.	Designation	Numbers
1.	Security Officer (Firefighting)	1
2.	Asst. Fire Officer	2
3.	Fire Supervisor	7nos. (3nos, permanent & 4nos. on contract)
4.	Leading Fireman	6
5.	Fire Engine Driver & Pump Operator	3 Permanent 4 Ex-servicemen 7 on contract
6.	Fireman	29 Permanent 13 Ex-servicemen

The mutual understanding between port fire service and local administration allows support to each other during the cases of real fire incidents inside the port and in the city of Kolkata.

10.4 Oil Pollution Response equipment for Tier-I capability

Sr. no.	Equipment	Make, Type, Model	Qty.
1.	RO BOOM SPI 100 M SECTION (3 SECTIONS) WITH ACCESSORIES	DESMI, RO BOOM 1300 SPI	300m
2.	WEIR SKIMMER WITH POWER PACK AND ASSOCIATED MECHANISMS	DESMI, MINI-MAX WEIR SKIMMER	2 nos.
3.	FLEX BARGE (10 TONNES CAPACITY) AND ACCESSORIES	DESMI, PU-TANK 10 CBM	4 sets
4.	BOOM REEL FOR RO BOOM AND ASSOCIATED MECHANISMS	DESMI, HYDR. REEL FOR 300 M RB1300 - WITH ISO CORNERS	1 no.
5.	PERMANENT BOOM 25 Mt. SECTION WITH ACCESSORIES	ECS, ECS/PERMA/750,	1700m
6.	U-BOOM 200 M WITH ACCESSORIES	ECS, U001/HAL/ENV	1 set
7.	BOOM REEL FOR U BOOM AND ASSOCIATED MECHANISMS	ECS, ECS/REEL/UBOOM	1 set
8.	AIR BLOWER WITH ACCESSORIES	ECS, ENVIRO AIRBLOWER SPI	2 sets

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9.	MULTI-SKIMMER WITH POWER PACK (BRUSH/DISC/DRUM) AND ASSOCIATED MECHANISMS	ECS, ECS/DBD/30TPH	2 sets
10.	SHORE CLEANING EQUIPMENT (VACUUM PUMP, OIL TRANSFER PUMP, HOPPER WITH VACUUM HEAD, OIL SPILL DISPERSANT APPLICATOR BACK PACK TYPE, TEMPORARY STORAGE TANK) WITH ACCESSORIES	DESMI, RO-VAC MINI - ELECTRIC START	5 sets
11.	OIL SPILL DISPERSION APPLICATOR, PUMP, NOZZLE AND SPARY ARMS AND ITS ASSOCIATED MECHANISMS	DESMI, OIL SPILL DISPERSANT TYPE	6 sets
12.	SORBENT BOOM PACK	DESMI, RO-CLEAN SORBENT BOOM 3M x 20CM	500m
13.	SORBENT PADS	SPILL TECH, OIL ONLY MELT BLOWN PADS 15”X19” WP100H	20 packs
14.	ANTI-POLLUTION VESSEL / WORK BOAT	TUG IH BLUE WHALE / MOONLIGHT - I & II.	2 nos.
15.	U-BOOM 200 M WITH ACCESSORIES	ENVIROCARE	1 no.

10.5 IMO Level Trained Personnel

Sr. no.	IMO Level - I	IMO Level - III
1.	Director Marine	Commander
2.	Dy. Director II - Marine	Asst. M.M
3.	Chief Officer	Jr. Marine Officer
4.	Dy. Dock Master	

10.6 KDS carries following contingency mock drills

Mock drills are usually carried out every Quarter, by CISF, in association with NDRF/ SDRF etc.

Sr. no.	Drill	Location
1.	Sinking of Vessel and Water Rescue	NSD
2.	CBRN Disaster	
3.	Earthquake and Building Rescue	
4.	Gas Leak at NSD Area	
5.	Sinking Of Vessel and Water Rescue	
6.	Fire Outbreak and Building Rescue	

10.7 Other equipment including rescue items

Sr. no.	Nomenclature	Availability at PFS	Remarks
1.	Air lifting bag	NIL	
2.	Battery operated spreader and cutter	NIL	
3.	Hydraulic Rams	NIL	
4.	Fire Entry suit	NIL	

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5.	Aluminium Proximity suit	4	Physical checking quarterly
6.	Chain saw	2	Physical checking quarterly
7.	Hydraulic Pump	NIL	
8.	Circular Saw	2	Physical checking quarterly
9.	Bolt Cutter	NIL	
10.	Tripod	NIL	
11.	Dragon Search Light	2	Physical checking Monthly
12.	Life Buoy	NIL	
13.	Life jacket	NIL	
14.	Inflatable Light Towers	NIL	

10.8 Firefighting Equipment servicing

Sr. No.	Equipment Name	Servicing date	Next Servicing date
1.	Fire Water tender (2 nos)	15.10.23 16.10.23	Half Yearly (April 2024)
2.	Trailer Fire Pump (2 nos)	Newly procured in November 2023	Half yearly
3.	Ejector Pump (1no)	N/A	
4.	35ft Extension Ladder (6nos)	12.12.2023	Half Yearly
5.	Ground water monitor (2nos)	Normal testing	Quarterly
6.	Ground Foam Monitor (2nos)	Normal testing	Quarterly
7.	Water CO2 Extinguisher (9ltr capacity) -596 nos.	Maintenance every quarter	New refilling in every year. Hydraulic testing in every 2 nd year.
8.	DCP Fire extinguisher (5 kg capacity)- 485 nos.	Maintenance every quarter	New refilling in every year. Hydraulic testing in every 2 nd year.
9.	CO2 Fire extinguisher (2kg & 5kg) – 102 nos.	Maintenance every quarter	Hydrostatic test and refilling after use on less weighs
10.	CO2 Fire extinguisher (27 kgs) – 3 nos	Maintenance every quarter	Hydrostatic test and refilling after use
11.	Foam Compound (Protein Base) 10K ltrs.	NA	
12.	Foam Compound (AFFF) 7K ltrs.	NA	
13.	Foam extinguisher (45 kgs) – 10 nos	Maintenance every quarter	
14.	Fire Proximity suit -4 sets	Physical checking	In every month

15.	Chain saw (petrol driven) – 2 nos	Testing at station level	As and when required
16.	Fog cannon – 1 no		Yearly
17.	BA ste (6 nos)		New procurement shall be initiated soon.

10.9 Security Equipment with CISF unit at KDS

Sr. no.	ITEM	Quantity
1.	HHMD	10
2.	Bomb Suppression Blanket	02
3.	Bullet Proof Jacket	45
4.	VHF 20/25-watt Wireless Mobile base radio set	02
5.	VHF 05-watt Wireless Mobile HH radio set	24
6.	Dragon light	04
7.	Explosive vapour detector (EVD)	01
8.	Under Vehicle Trolley Mirror	16
9.	Hand held search mirror	17

The entire port facility of KPD/NSD is covered by CCTV cameras and is monitored in a designated control room by the CISF, Kolkata dock system (KDS) has 69 operational CCTV cameras.

10.10 Mutual Aid Agreement

Berth operators will supply resources to support emergency response operations when requested by CEC/CIC/SIC or whole of Port Emergency Operation Centre as per the Mutual Aid Agreement.

10.11 Resource Inventory (IDRN)

India Disaster Resource Network is an online inventory designed as a decision-making tool for the Government administration and crisis managers to coordinate effective emergency response operations in the shortest possible time.

The Ministry of Home Affairs, Government of India has developed a web-based database of resource named India Disaster Resource Network (IDRN). This database contains information about equipment (such as boats, bulldozers, etc.), manpower (divers, swimmers, etc.) and critical supplies (oxygen cylinder, firefighting foams, etc.) required during the response.

Resources which are available with the various departments in the Kolkata and South-24 Parganas District are uploaded in IDRN (<https://idrn.nidm.gov.in/>).

11. PLAN MAINTENANCE

11.1 DEVELOPMENT, APPROVAL, IMPLEMENTATION, REVIEW AND REVISION

- This plan is developed in accordance with the guidelines issued by NDMA (2024), NDMP (2019) and NDMA guidelines and structured to suit the port. The implementation will be undertaken by the CIC in association with Stakeholders. Lessons learned from previous near disaster/disaster situations have been studied and cognizance of the after effect of these disasters have been considered. Understanding of risk and preventive measures has thus been analyzed and mitigation plan prepared. Prioritization of risks has been done as per risk assessment (Refer Annex A).
- Plan would be circulated to Stakeholders.
- Regular Drills/exercises would be conducted to test the efficacy of the plan and check the level of preparedness.
- NDRF, SDRF and other agencies e.g., civil defense, local govt. departments suggestions would be integrated into the plan.
- Review and updating of the plan would be carried out annually as per Disaster Management Act, 2005.
- Consequent to any modification/expansion in the infrastructure, CIC will undertake updation of DMP.

ANNEX A: HAZARD ANALYSIS

Table A.1: HAZARD ASSESSMENT WORKSHEET

Scenario No. *	Area #	Category	Hazard /Disaster Detail	Possible Causes	Hazard Reduction Barriers	MCS	WCS	Hazard/Disaster Assessed										Mitigation
								Most Credible					Worst Credible					
								Impact				Frequency	Impact				Frequency	
								People	Property	Environment	Business		People	Property	Environment	Business		
DISASTER DURING CARGO STORAGE/TRANSFER																		
1	D	Leakage - Fire/Explosion	Fire /Explosion due to POL/ Chemical leakage at Jetty (NSD Berth 12 and Budge-Budge)	Leakage at the connections of the hose to the manifold, damage to the hose/pipeline, Static Electricity	Standard Operating Procedure, Ship-Shore checklist, Mobile/or fixed fire-fighting system – Manually operated, Portable gas detectors	Minor Damage to vessel and /or other vessels/ Shore structures, Injury to personnel	Major damage to shore structures e.g. pipelines etc., Major damage to vessel, oil/ Chemical pollution, Capsizing and port closure, Fatalities	2	2	1	1	2	4	4	1	3	3	Report incident to Port and relevant authority, Shipboard EAP, Port DMP, POLREP, Port OSCP

Scenario No. *	Area #	Category	Hazard /Disaster Detail	Possible Causes	Hazard Reduction Barriers	MCS	WCS	Hazard/Disaster Assessed										Mitigation
								Most Credible					Worst Credible					
								Impact				Frequency	Impact				Frequency	
								People	Property	Environment	Business		People	Property	Environment	Business		
2	D	Leakage - Fire/Explosion	Rupture/ leakage of POL/ Chemical Pipeline from Oil Jetties (NSD and Budge-Budge) (Manifold to terminal within port area)	Failure of the equipment, Human error, Falling of Tree or branches on pipelines during operation, Inadequate precautions during maintenance work e.g., pigging, Earthquake.	SOP, work permits, Patrolling of the area, Periodic Inspection and Maintenance of hose/pipeline and equipment	Minor damage to pipeline and shore structures, personal injury.	Major damage to the pipelines and shore structures due to fire and explosion, fatality, oil/ chemical pollution, closure of jetty	1	1	0	1	2	3	3	1	3	3	Report incident to Port and relevant authority, Shipboard EAP, Port DMP, POLREP, Port OSCP
3	D	Corrosive	Corrosive acid (Phosphoric /Sulphuric) leakage at Budge-Budge.	Leakage at the connections of the hose to the manifolds	Standard Operating Procedure, Ship-Shore checklist, Fixed/Mobile fire-fighting system, PPE.	Minor Damage to vessel, Shore structures, minor injury to personnel	Major damage to shore structures e.g., hoses, Major damage to vessel & pollution, Serious injuries to personnel/f atality	1	1	0	1	2	3	2	1	2	3	Report incident to Port and relevant authority, Shipboard EAP, Port DMP

Scenario No. *	Area #	Category	Hazard /Disaster Detail	Possible Causes	Hazard Reduction Barriers	MCS	WCS	Hazard/Disaster Assessed										Mitigation
								Most Credible					Worst Credible					
								Impact				Frequency	Impact				Frequency	
								People	Property	Environment	Business		People	Property	Environment	Business		
4	D	Toxic	Toxic effects of Toluene, Benzene – leakage from pipeline/ hose during operation at Budge-Budge	Failure of the pipeline, Human error, Falling of Tree or branches on pipelines during operation.	Standard Operating Procedure, Ship-Shore checklist, Fixed/Mobile fire-fighting system - Manually Operated, PPE.	Injury to personnel, Minor environment damage	Multiple fatalities	2	0	1	1	2	4	0	2	3	3	Report incident to Port and relevant authority, Shipboard EAP, Port DMP
5	E	Fire/Leakage	Leakage/ Fire due to Crane Accidents (Container drop/ crane fall)-secondary event (NSD-Container Yard/Berth)	Human Error, Equipment failure.	Overload alarm, Standard Operating Procedure	Minor Damage to container and berth, Injury to personnel	Major Damage to crane, container and berth, Serious injury to personnel/ fatality, Berth closure	1	1	0	1	2	3	3	1	3	3	Report incident to Port and relevant authority, Activation of terminal EAP and port DMP

Scenario No. *	Area #	Category	Hazard /Disaster Detail	Possible Causes	Hazard Reduction Barriers	MCS	WCS	Hazard/Disaster Assessed										Mitigation
								Most Credible					Worst Credible					
								Impact				Frequency	Impact				Frequency	
								People	Property	Environment	Business		People	Property	Environment	Business		
6	F	Fire	Fire in Coal Stack yard (KPD)	Self-ignition of coal	Manual Sprinkler system, Port Fire Water Tender	Minor damage to property, Minor injury to the person	Major damage to the property (coal), Serious injury to the person	1	1	1	1	2	2	2	3	2	3	Activation of Terminal EAP and port DMP

Scenario No. *	Area #	Category	Hazard /Disaster Detail	Possible Causes	Hazard Reduction Barriers	MCS	WCS	Hazard/Disaster Assessed										Mitigation
								Most Credible					Worst Credible					
								Impact				Frequency	Impact				Frequency	
								People	Property	Environment	Business		People	Property	Environment	Business		
NAVIGATIONAL DISASTERS																		
7.1	B	Collision	Collision of Small Craft with Tanker / Container/ BC/Barge (Area B)	Vessel equipment failure/ malfunction (navigational, propulsion, steering, auxiliary, tugs), Human error (pilot, tug master), Language communication issues, Failure to follow Collision Regulations, Environmental conditions (poor visibility, high current flow, unpredicted current eddies, channel size/depth, rough weather, high wind speed)	PMS, Exchange of information between Pilot & Master (Pilot exchange card), Training of personnel and experienced pilots, River marks and buoy, weather monitoring, suspension of vessel movement on increase of wind speed beyond permissible limits.	Avoiding action fails resulting in glancing blow with moderate damage to one or both vessel, Injury to Person	Oil pollution (damage to Flora and Fauna & loss of fishing activity), Fly ash, coal & other hazardous cargo spillage sinking of small craft, Injuries / loss of life, blockage of navigationa l and river channel	1	1	0	1	2	3	4	1	2	3	Report incident to Port and relevant authority, Shipboard EAP, Port DMP, POLREP, Port OSCP.

Scenario No. *	Area #	Category	Hazard /Disaster Detail	Possible Causes	Hazard Reduction Barriers	MCS	WCS	Hazard/Disaster Assessed										Mitigation
								Most Credible					Worst Credible					
								Impact				Frequency	Impact				Frequency	
								People	Property	Environment	Business		People	Property	Environment	Business		
7.2	A	Collision	Collision between two vessels (Area A)	Non-compliance with collision regulation, Human error (fatigue, lack of situational awareness, knowledge etc.), Ship’s equipment breakdown, Local congestion and sandbars, difficulty in communication, maneuvering to (dis)embark pilot, Environmental conditions (poor visibility, high current flow, unpredicted current eddies, rough weather, high wind speed).	VTMS, VHF, Pilot information exchange card, Designated anchorage area & designated VHF frequency, Navigational channel is buoyed & well marked, weather monitoring, suspension of vessel movement on increase of wind speed beyond permissible.	Moderate damage to one or both vessel, Delay in berthing, Injuries to personnel, Temporary passage block	Serious damage to vessels and Oil / chemical pollution, Fire and Explosion, Blockage of the navigationa l Channel, Injuries / Loss of life.	1	2	0	1	3	3	3	2	4	4	Report incident to Port and relevant authority, Shipboard EAP, Port DMP, POLREP, Port OSCP.

Scenario No. *	Area #	Category	Hazard /Disaster Detail	Possible Causes	Hazard Reduction Barriers	MCS	WCS	Hazard/Disaster Assessed										Mitigation
								Most Credible					Worst Credible					
								Impact				Frequency	Impact				Frequency	
								People	Property	Environment	Business		People	Property	Environment	Business		
7.3	B	Collision	Collision between two vessels (Area B)	Non-compliance with collision regulation, Human error (fatigue, lack of situational awareness, knowledge etc.), Ship’s equipment breakdown, Local congestion (fishing activity, vessel traffic) and sandbars, Environmental conditions (poor visibility, high current flow, unpredicted current eddies, rough weather, high wind speed) Sharp bends/turns in the river impeding navigation	River marks and buoys, light vessels, Experienced pilots, Training of personnel, PMS, Pilotage information exchange card, Designated anchorage areas, boarding area, designated VHF frequency, Weather monitoring, Suspension of operation on increase of wind speed beyond 25 knots, No night navigation, Proper communication	Moderate damage to one or both vessel, Delay in berthing, injuries to personnel, Temporary channel block	Serious damage to vessels and Oil / Chemical pollution (damage to Flora and Fauna & loss of fishing activity), Fire and Explosion, Blockage of the navigationa l/river Channel, Injuries / Loss of life.	1	2	0	2	2	3	3	2	4	4	Report incident to Port and relevant authority, Shipboard EAP, Port DMP, POLREP, Port OSCP.

Scenario No. *	Area #	Category	Hazard /Disaster Detail	Possible Causes	Hazard Reduction Barriers	MCS	WCS	Hazard/Disaster Assessed										Mitigation
								Most Credible					Worst Credible					
								Impact				Frequency	Impact				Frequency	
								People	Property	Environment	Business		People	Property	Environment	Business		
7.4	C	Contact	Tanker /Container/ BC berthing - Contact with Jetty/berth/ wharf (Area C and Budge-Budge Wharf)	Vessel equipment failure / malfunction (navigational propulsion, steering or main engine), misjudgment by pilot/Master/tug master, Environmental conditions (poor visibility, high current flow, unpredicted current eddies, rough weather, high wind speed), breakdown of tugs, parting of tow line, Inadequate illumination at Berth / Jetty, Damaged or missing fenders.	PMS, Assistance of tugs and use of anchor, Use of electronic aids and proper bridge team management, Weather monitoring, Suspension of operation on increase of wind speed beyond permissible limits, Use of anchor and call for standby tugs, Use of engines, Ships portable fenders, Use of ship’s and tugs illumination, preventive maintenance of fenders.	Minor damage to side shell plating of vessel, Minor damage to quay moorings or fendering system.	Serious damage to side shell plating of vessel, Serious damage to quay/ Fender/ moorings, Loss of cargo / containers, Oil / Chemical pollution (damage to Flora and Fauna & loss of fishing activity), fire/ explosion, personnel injuries or loss of life.	0	1	0	1	2	3	2	1	3	4	Report incident to Port and relevant authority, Shipboard EAP, Remove vessel from damage areas and re-berth, Port DMP, POLREP, Port OSCP.

Scenario No. *	Area #	Category	Hazard /Disaster Detail	Possible Causes	Hazard Reduction Barriers	MCS	WCS	Hazard/Disaster Assessed										Mitigation
								Most Credible					Worst Credible					
								Impact				Frequency	Impact				Frequency	
								People	Property	Environment	Business		People	Property	Environment	Business		
7.5	B	Grounding	Grounding-Tanker/ Container/ BC - Pilot onboard (Area B)	Misjudgment by pilot / master / tug master, Environmental conditions (poor visibility, high current flow, unpredictable current eddies, rough weather, high wind speed), Fishing vessel/small craft impedes passage, vessel equipment failure / malfunction (navigational, propulsion, steering, auxiliary), outdated electronic chart, wrong position fixing, failure of navigational aids, shifting of sand bars in the approach channel.	Electronic aids and proper bridge team management, Leading Lights, River marks and buoys, light vessels, Continuous monitoring of the drift by pilot and "Course made Good", Weather monitoring, suspension of vessel movement on increase of wind speed beyond permissible limits, Use of Anchor, Proper ship signal, security boat signals, PMS, Assistance of tugs, updated navigational chart, preventive maintenance of navigational aids, Experience pilots, Periodical maintenance dredging, vessel length and draft restriction.	Minor damage to shell plating – possible water ingress, Temporary passage block	Major hull damage leading to stranding of vessel, Oil / Chemical pollution (damage to Flora and Fauna & loss of fishing activity), Possible loss of cargo or containers, Blockage of Navigation al/River channel, Fire / explosion, Injuries / loss of life	0	1	0	1	2	3	3	2	3	3	Report incident to Port and relevant authority, Shipboard EAP, Port DMP, POLREP, Port OSCP

Scenario No. *	Area #	Category	Hazard /Disaster Detail	Possible Causes	Hazard Reduction Barriers	MCS	WCS	Hazard/Disaster Assessed										Mitigation
								Most Credible					Worst Credible					
								Impact				Frequency	Impact				Frequency	
								People	Property	Environment	Business		People	Property	Environment	Business		
7.6	A	Grounding	Grounding-Tanker/Con tainer/BC - Pilot not onboard (Area A)	Vessel equipment failure / malfunction (navigational propulsion, steering, auxiliary), vessel transiting too fast, outdated electronic chart, wrong position fixing, Environmental conditions (poor visibility, high current flow, unpredicted current eddies, rough weather, high wind speed), improper maintenance of navigational aids, Human error (fatigue, lack of situational awareness, knowledge etc.), small craft impedes passage	PMS, Use of anchor, vessel to transit in safe maneuvering, VTMS, updated navigational chart to be used at all times, suspension of vessel movement on increase of wind speed beyond permissible limit, preventive maintenance of navigational aids, Bridge team management, training of personnel, proper ship signal, use of boat signals	Minor Damage to shell plating, possible water ingress, Temporary passage block, Injury to personnel	Major hull damage leading to vessel stranding, Possible loss of cargo or containers, Oil / Chemical pollution (damage to Flora and Fauna & loss of fishing activity), Blockage of Navigation al Channel, Fire / explosion, Injuries / loss of life.	1	1	0	1	2	3	3	2	3	4	Report incident to Port and relevant authority, Shipboard EAP, Port DMP, POLREP, Port OSCP

Scenario No. *	Area #	Category	Hazard /Disaster Detail	Possible Causes	Hazard Reduction Barriers	MCS	WCS	Hazard/Disaster Assessed										Mitigation
								Most Credible					Worst Credible					
								Impact				Frequency	Impact				Frequency	
								People	Property	Environment	Business		People	Property	Environment	Business		
7.7	A, B	Collision	Collision of vessel with Dredger (Area A, B)	Vessel equipment failure / malfunction (navigational propulsion, steering, auxiliary), Human error (improper communication, fatigue), Environmental conditions (poor visibility, high current flows, unpredicted current eddies), results of avoiding action (e. g. Small craft), navigational failure (markers, lights)	PMS, VTMS, Exchange of information between Pilot & Master (Pilot Exchange Card) training, adequate work/rest hour, situational awareness, weather monitoring, communication with dredger, suspension of vessel movement on increase of wind speed beyond permissible limit, proper ship signal, use of security boat	Temporary Grounding of either of the vessel, Temporary passage block.	Grounding or sinking of either of the vessel, Possible loss of cargo or containers, Oil / chemical pollution (damage to Flora and Fauna & loss of fishing activity), Fire / Explosion, Blockage of Navigation al channel, Injuries / Loss of life.	0	1	0	1	2	3	3	1	3	4	Report incident to Port and relevant authority, Shipboard EAP, Port DMP, POLREP, Port OSCP

Scenario No. *	Area #	Category	Hazard /Disaster Detail	Possible Causes	Hazard Reduction Barriers	MCS	WCS	Hazard/Disaster Assessed										Mitigation
								Most Credible					Worst Credible					
								Impact				Frequency	Impact				Frequency	
								People	Property	Environment	Business		People	Property	Environment	Business		
7.8	A, B	Collision	Dragging anchor (River and sea anchorage) (Area A, B)	Bad weather e.g. Norwester season, Poor monitoring, Poor holding ground, Insufficient scope of anchor chain, vessel equipment failure, heavy underwater current, loss of anchor	MET warning through VTMS, Bridge team management, Vessel to drop anchor in designated anchorage area, Vessel to ensure that sufficient chain is paid out, training of personnel, PMS, main engine standby vessel, Tug assistance, use of navigational aids	Minor Damage to vessel and/or other vessels, Injury to personnel	Grounding, Oil / Chemical pollution (damage to Flora and Fauna & loss of fishing activity), Grounding and capsizing, Possible loss of cargo or containers, Blockage of Navigational channel, Injuries / Loss of life.	1	1	0	1	2	3	3	1	3	3	Report incident to Port and relevant authority, Shipboard EAP, Port DMP, POLREP, Port OSCP

Scenario No. *	Area #	Category	Hazard /Disaster Detail	Possible Causes	Hazard Reduction Barriers	MCS	WCS	Hazard/Disaster Assessed										Mitigation
								Most Credible					Worst Credible					
								Impact				Frequency	Impact				Frequency	
								People	Property	Environment	Business		People	Property	Environment	Business		
7.9	A, B	Contact/Riding over the buoy	Contact with channel and river marking buoys/ light vessels/ Fishing Nets (Area A, B)	Vessel equipment failure/ malfunction (navigational propulsion, steering, auxiliary), Human error (improper communication, Fatigue), Environmental conditions (poor visibility, high current flows, unpredicted current eddies, channel size/ depth), results of avoiding action (e. g. small craft), navigational failure (markers, lights), Drifting of Channel Marking Buoy	PMS, VTMS, Exchange of information between Pilot & Master (Pilot Exchange Card) adequate work/rest hour, situational awareness, weather monitoring, experienced pilot, proper ship signal, security boat, Information about the missing buoys	Minor Damage to vessel (including propeller fouling) &/or buoy/light vessel	Grounding or sinking of light vessel or buoy, Oil/Chemical pollution (damage to Flora and Fauna & loss of fishing activity), Blockage of navigational channel, Injury to personnel	0	1	0	1	2	2	4	1	2	4	Report incident to Port and relevant authority, Shipboard EAP, Port DMP, POLREP, Port OSCP.

Scenario No. *	Area #	Category	Hazard /Disaster Detail	Possible Causes	Hazard Reduction Barriers	MCS	WCS	Hazard/Disaster Assessed										Mitigation
								Most Credible					Worst Credible					
								Impact				Frequency	Impact				Frequency	
								People	Property	Environment	Business		People	Property	Environment	Business		
7.10	C	Contact / Allision	Contact/ Allision with Lock gate (KPD & NSD) (Area C)	Environmental conditions (poor visibility, high current flows, unpredicted current eddies, channel size/ depth), unexpected Wind effect, Parting of tow line, High rate of turn, Misjudgment, Human error (fatigue, lack of knowledge, etc.), Breakdown of tugs, vessel equipment failure/malfunction (navigational propulsion, steering, auxiliary)	Use of anchor and use of standby tugs, assistance of tugs, capstan rope adjustment, Suspension of movement of vessel on increase of wind speed beyond permissible limits, Use of additional tugs, Use of electronic aid, proper bridge team management, use of all navigational aids, PMS.	Minor Damage to vessel &/or Tug / Lock gate	Major damage to Tug / Lock gate, Temporary port closure, Injury to Personnel, Grounding of vessels due to failure to maintain impounding basin water level.	0	1	0	0	2	2	2	0	3	3	Report incident to Port and relevant authority, Shipboard EAP, Port DMP.

Scenario No. *	Area #	Category	Hazard /Disaster Detail	Possible Causes	Hazard Reduction Barriers	MCS	WCS	Hazard/Disaster Assessed										Mitigation
								Most Credible					Worst Credible					
								Impact				Frequency	Impact				Frequency	
								People	Property	Environment	Business		People	Property	Environment	Business		
7.11	A, B	Fire	Fire on vessel in the river and approach Channel (Area A and B)	Fire caused by faulty equipment (e.g. engine room fire, electrical fire), fire caused by human error (fatigue) e.g Galley fire, , failure to take appropriate precautions with gas bottles and/or inflammable vapour, failure to take the appropriate precaution when carrying specific cargoes (Coal/Sulphur etc.), fire in containers	PMS, Proper electrical connections and earthing, training, adequate work/rest hour, situational awareness, SMS, fire-fighting assistance from FIFI tugs, Inert Gas system.	Minor damage to vessel, Injury to personnel	Major damage to vessel, Stranding / Grounding or sinking of vessel, Oil / Chemical pollution (damage to Flora and Fauna & loss of fishing activity) , Drifting of vessel and collision with other vessel, Blockage of navigationa l channel, Loss of life, loss of cargo/ containers	2	2	0	1	2	4	3	1	3	3	Report incident to Port and relevant authority, Shipboard EAP, Port DMP, POLREP, Port OSCP.

Scenario No. *	Area #	Category	Hazard /Disaster Detail	Possible Causes	Hazard Reduction Barriers	MCS	WCS	Hazard/Disaster Assessed										Mitigation
								Most Credible					Worst Credible					
								Impact				Frequency	Impact				Frequency	
								People	Property	Environment	Business		People	Property	Environment	Business		
7.12	B	Collision/Allision	Collision/allision with the bridge (Hooghly Bridge (Vidyasagar Setu); Howrah Bridge (Rabindra Setu))	Vessel equipment failure / malfunction (navigational propulsion, steering, auxiliary), Human error (improper communication, fatigue), Environmental conditions (poor visibility, high current flows, unpredicted current eddies), results of avoiding action (e.g. small craft), navigational failure	PMS, VTMS, training, adequate work/rest hour, situational awareness, weather monitoring, communication with dredger, suspension of vessel movement on increase of wind speed beyond permissible limit, proper ship signal	Temporary Grounding of the vessel, Temporary passage block, Minor damage to the bridge and vessel, Injury to people	Grounding or capsizing of the vessel, Major damage to the bridge/collapse, Possible loss of cargo or containers, Oil / Chemical pollution (damage to Flora and Fauna & loss of fishing activity), Fire / Explosion, Blockage of Navigational channel, Injuries / Loss of life.	1	1	0	1	2	3	3	2	3	4	Report incident to Port and relevant authority, Shipboard EAP, Port DMP, POLREP, Port OSCP

Scenario No. *	Area #	Category	Hazard /Disaster Detail	Possible Causes	Hazard Reduction Barriers	MCS	WCS	Hazard/Disaster Assessed										Mitigation
								Most Credible					Worst Credible					
								Impact				Frequency	Impact				Frequency	
								People	Property	Environment	Business		People	Property	Environment	Business		
7.13	C	Capsize	Capsize of vessel at/near berth	Flooding in vessel, vessel collision, Human error- low initial stability, inappropriate ballasting, shifting of cargo due to poor cargo planning, vessel equipment failure/ malfunction (navigational propulsion, steering, auxiliary), Environmental conditions (poor visibility, high current flows, unpredicted current eddies), unexpected wind effects.	Vessel watertight integrity system, safe distance, tug assistance, use of all navigational aids, proper bridge team management, vessel loading software, PMS, mooring adjustment, suspension of movement of vessel on increase of wind speed beyond permissible limits.	Minor Damage to vessel and/or other vessels, Injury to personnel	Major damage to vessel, major damage to quay/ Fender/ moorings, Loss of cargo / containers, Oil / Chemical pollution, fire/ explosion, personnel injuries or loss of life.	2	1	1	2	2	3	2	2	3	3	Report incident to Port and relevant authority, Shipboard EAP, Port DMP, POLREP, Port OSCP

Scenario No. *	Area #	Category	Hazard /Disaster Detail	Possible Causes	Hazard Reduction Barriers	MCS	WCS	Hazard/Disaster Assessed										Mitigation
								Most Credible					Worst Credible					
								Impact				Frequency	Impact				Frequency	
								People	Property	Environment	Business		People	Property	Environment	Business		
7.14	D	Fire	Fire on vessel at the Berth/Jetty	Fire caused by faulty equipment (e.g. engine room fire, electrical fire), fire caused by human error (fatigue) e.g galley fire, inadequate precautions during hot work, failure to take appropriate precautions during operations, Fire spread from one jetty to other fire in container	PMS, Proper electrical connections and earthing, adequate work/rest hour, situational awareness, SMS, SOP, Inert gas, intrinsically safe equipment, fire-fighting assistance from FIFI tugs and port fire-fighting system.	Minor damage to vessel, Injury to personnel.	Major damage to vessel, Stranding / Grounding or sinking of vessel, Oil / Chemical Pollution (damage to Flora and Fauna & loss of fishing activity), Loss of life.	1	1	0	1	2	3	3	1	3	3	Report incident to Port and relevant authority, Shipboard EAP, Port DMP, POLREP and Port OSCP

Scenario No. *	Area #	Category	Hazard /Disaster Detail	Possible Causes	Hazard Reduction Barriers	MCS	WCS	Hazard/Disaster Assessed										Mitigation
								Most Credible					Worst Credible					
								Impact				Frequency	Impact				Frequency	
								People	Property	Environment	Business		People	Property	Environment	Business		
DISASTER IN SERVICE AND ADMINISTRATION FACILITIES																		
8	G	Fire	Fire in the Office building/ VTMS-Sagar Island/ Control rooms/Dry-dock/ Hospital/ Electrical Substation/ Transit Sheds	Short circuit, Smoking, Hot-work in dry dock area	Portable Fire extinguishers, Fixed fire-fighting system	Minor fire incident leading to minor damage, Injury to the personnel.	Major fire incident, Property damage, Injuries/Loss of life.	2	1	0	1	2	3	3	1	3	3	Activation of port DMP

Scenario No. *	Area #	Category	Hazard /Disaster Detail	Possible Causes	Hazard Reduction Barriers	MCS	WCS	Hazard/Disaster Assessed										Mitigation
								Most Credible					Worst Credible					
								Impact				Frequency	Impact				Frequency	
								People	Property	Environment	Business		People	Property	Environment	Business		
HUMAN RELATED DISASTER																		
9	H	Civil Disturbance	Fire/ Explosion	War , Terrorism and Bomb Threat	Continuous Monitoring on News channel, Radio, Newspapers, mails, Security, Continuous Vigilance	Damage to vessels, Shore structures	Major damage to shore structures e.g. cranes, Major damage to vessel & Oil/ Chemical pollution, Capsizing & port closure	3	3	3	4	-	4	4	4	4	-	CISF EAP, Activation of port and terminal DMP, POLREP, Activation of port and terminal OSCP

Scenario No. *	Area #	Category	Hazard /Disaster Detail	Possible Causes	Hazard Reduction Barriers	MCS	WCS	Hazard/Disaster Assessed										Mitigation
								Most Credible					Worst Credible					
								Impact				Frequency	Impact				Frequency	
								People	Property	Environment	Business		People	Property	Environment	Business		
NATURAL DISASTER																		
10.1	H	Natural Disaster	Cyclone	Natural cause (high wind)	Weather Monitoring and Public Warning system, SOP for cyclone implemented by respective terminals and port.	Minor Damage to tugs, pilot boats, Shore structures, Injury to personnel, uprooting of tress	Major damage to shore structures e.g. pipelines, pontoon jetty, crane etc, Major damage to tugs, pilot boats, pollution, Capsizing & port closure, Serious injury to personnel/ fatality, Flooding, damage to road structures, uprooting of trees	2	2	1	2	1	3	4	3	4	2	Shipboard EAP, Port DMP and terminal EAP, POLREP, Port OSCP

Scenario No. *	Area #	Category	Hazard /Disaster Detail	Possible Causes	Hazard Reduction Barriers	MCS	WCS	Hazard/Disaster Assessed										Mitigation
								Most Credible					Worst Credible					
								Impact				Frequency	Impact				Frequency	
								People	Property	Environment	Business		People	Property	Environment	Business		
10.2	H	Natural Disaster	Flood	Natural cause (thunderstorm, cyclone), Inadequacy and improper maintenance of the drainage system, rise of tide level and wave heights	Weather Monitoring and Public Warning system, drainage system, physical barriers, Bore tide notice	Minor Damage to tugs, pilot boats, Shore structures & port property, Injury to personnel, minor damage to the road structures	Major damage to shore structures e.g. pipelines, lock gates etc., Major damage to tugs, pilot boats & pollution, Capsizing & port closure, Serious injury to personnel, major damage to road structures	1	2	1	2	1	3	3	2	3	2	Shipboard EAP, Port DMP and terminal EAP, POLREP, Port OSCP

Scenario No. *	Area #	Category	Hazard /Disaster Detail	Possible Causes	Hazard Reduction Barriers	MCS	WCS	Hazard/Disaster Assessed										Mitigation
								Most Credible					Worst Credible					
								Impact				Frequency	Impact				Frequency	
								People	Property	Environment	Business		People	Property	Environment	Business		
10.3	H	Natural Disaster	Earthquake	Natural cause	Earthquake resilient structural design (as per relevant standards), Periodic Assessment and reinforcement of old structures	Minor damage to properties/ structures/ cranes, Injury to personnel	Major damage to shore structures e.g. pipelines, lock gates etc., major damage to pipelines, Oil/ chemical pollution, Major damage properties/s tructures/cr anes, port closure, Serious injury/ fatality to personnel	2	2	0	1	3	4	4	2	4	4	Shipboard EAP, Port DMP and terminal EAP, Port OSCP

Scenario No. *	Area #	Category	Hazard /Disaster Detail	Possible Causes	Hazard Reduction Barriers	MCS	WCS	Hazard/Disaster Assessed										Mitigation
								Most Credible					Worst Credible					
								Impact				Frequency	Impact				Frequency	
								People	Property	Environment	Business		People	Property	Environment	Business		
10.4	H	Natural Disaster	Tsunami	Natural cause (Earthquake in seabed)	Weather Monitoring and Public Warning system, Shipboard emergency procedure	Not Applicable	Major damage to shore structures e.g. pipelines, lock gates etc., Major damage to tugs, pilot boats & pollution, Capsizing & port closure, Serious injury/fatal ity to personnel	-	-	-	-	-	4	4	3	4	4	Port DMP and terminal EAP, POLREP, Port OSCP

*Refer Hazard Specific Response Plan			
#Area code	Area	#Area code	Area
A	Approaches to Kolkata port (East anchorage to middleton pilot boarding point).	E	Container berth
B	River passage area (from middleton to Garden Reach anchorage or budge-budge wharf, Anchorage to lock gate).	F	Coal stackyard/coal berth
C	Lock gate to berth	G	Office building/ VTMS-Sagar Island/ Control rooms/Dry-dock/ Hospital/ Electrical Substation/Transit Sheds
D	Jetties	H	Port Limit

A.2 Risk Estimation: Consequence (Impact) and Frequency Assessment

Assessment of consequence has been done considering the effect of potential accidents on -

- Life (e.g., personal injury, fatality, etc.),
- Property damage (e.g., damage to port, damage to ship),
- Environment (Oil pollution, Air pollution, soil contamination etc.),
- Port Business (reputation, financial loss, etc.).

Table A.2.1: Scale of Impact (I0-I4)

Scale	People	Property	Environment	Port Business /Port stakeholders
I0	No injury	No damage	Negligible environmental impact (<1T)	Negligible
I1	Minor (Single slight injury)	Minor damage	Minor (<100 T) Tier 1 oil spill, Minimal environmental harm	Minor
I2	Slight (multiple minor or single major injury)	Local damage	Moderate (100T – 700T) Tier 1 (limited outside assistance) oil spill or environmental amenity impaired, Moderate environmental impact	Moderate Bad local publicity or short-term loss of dues, revenue, etc.
I3	Serious (multiple major injuries or single fatality)	Major damage	Serious (>700T) Tier 2 (regional assistance) oil spill, localized flooding or multiple amenities impaired, Long term or serious environmental damage	Serious Bad widespread publicity, temporary port closure or prolonged restriction of navigation
I4	Major (More	Total	Major	Major

	than one fatality)	loss	Tier 3 (national assistance) oil spill, widespread flooding or extensive damage to amenities, Major environmental harm. e.g., major pollution incident causing significant damage or potential to health or the environment	Port closes, navigation seriously disrupted for more than 1-2 days. Long term loss of trade
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Table A.2.2: Frequency scale (F1- F5)

Category	Descriptive term	Definition
F1	Frequent	An event occurring once in a operating year
F2	Likely	An event occurring once a year to once every 10 operating years
F3	Remote	An event occurring once every 10 operating years to once in 50 operating years
F4	Unlikely	An event occurring once every 50 operating years to once in 100 operating years
F5	Rare	An event occurring once in more than 100 operating years

A.3 Risk Assessment Matrix

For each identified hazard, risk quantification is done based on a scale of 1 (low risk) to 10 (high risk) as described in the as below:

Table A.2.3: Risk Assessment Matrix

Impact	I4	5	6	7	8	10
	I3	4	5	6	7	9
	I2	3	3	4	6	8
	I1	1	2	2	3	6
	I0	0	0	0	0	0
Frequency		F5	F4	F3	F2	F1

Where: -

- 0 and 1 - Negligible Risk
- 2 and 3 - Low Risk
- 4 and 5 – Assessed to be in ALARP region
- 6 – Heightened Risk
- 7, 8 and 9 - Significant Risk
- 10- High Risk

Based on the values of frequency and impact as assessed, Risk Ranking have been done in **Table A.2.4** for each of the four impact entities as described in **Table A.2.1** both for the ‘most likely’ and the ‘worst credible’ scenarios as mentioned in **Table A.1** Hazard Assessment Worksheet.

A.4 Risk Ranking

The risk score of each of the four categories (People, Property, Environment and Business) is analyzed to obtain four indices for each hazardous scenario as follows:

- The average risk value of the four categories in the ‘most likely’ set.
- The average risk value of the four categories in the ‘worst credible’ set.
- The maximum risk value of the four categories in the ‘most likely’ set.
- The maximum risk value of the four categories in the ‘worst credible’ set.

The hazardous scenarios list is then sorted in order of the aggregate of the four indices to produce an Assessed Risk Ranking List, in descending order, with the highest risk scenario prioritized at the top.

Table A.2.4: Risk ranking

Scenario No.	Rank No.	Category	Hazard Detail	Assessed Risk							
				Most Credible				Worst Credible			
				People	Property	Environment	Business	People	Property	Environment	Business
10.1	1	Natural Disaster	Cyclone	8	8	6	8	7	8	7	8
10.2	2	Natural Disaster	Flood	6	8	6	8	7	7	6	7
1	3	Fire/ Explosion	Fire /Explosion due to POL/ Chemical leakage at Jetty (NSD Berth 12 and Budge-Budge.	6	6	3	3	7	7	2	6
7.11	4	Fire	Fire on vessel in the river and approach Channel (Area A and B)	6	6	0	3	7	6	2	6
7.13	5	Capsize	Capsize of vessel at/near berth	6	3	3	6	6	4	4	6
7.3	6	Collision	Collision between two vessels (Area B)	3	6	0	6	5	5	3	6
4	7	Toxic	Toxic effects of Toluene, Benzene – leakage from pipeline during operation at Budge-Budge	6	0	3	3	7	0	4	6
8	8	Fire	Fire in the Office building/ VTMS-Sagar Island/	6	3	0	3	6	6	2	6

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			Control rooms/Dry-dock/ Hospital/ Electrical Substation/Transit Sheds								
10.4	9	Natural Disaster	Earthquake	4	4	0	2	6	6	3	6
7.1	10	Collision	Collision of Small Craft with Tanker / Container/BC/Barge (Area B)	3	3	0	3	6	7	2	4
7.2	11	Collision	Collision between two vessels (Area A)	2	4	0	2	5	5	3	6
6	12	Fire	Fire in Coal Stack yard (KPD & NSD)	6	6	6	6	4	4	6	4
2	13	Fire/ Explosion	Rupture/ leakage of POL/ Chemical Pipeline/hose from Oil Jetties (NSD and Budge-Budge) (Manifold to terminal within port area)	3	3	0	3	6	6	2	6
5	14	Fire/ Leakage	Leakage/ Fire due to Crane Accidents (Container drop/ crane fall)- secondary event (NSD-Container Yard/Berth)	6	6	0	6	6	6	2	6
7.14	15	Fire	Fire on vessel at the Berth/Jetty	3	3	0	3	6	6	2	6
7.8	16	Collision	Dragging anchor (River and sea anchorage) (Area A, B)	3	3	0	3	6	6	2	6
7.5	17	Grounding	Grounding- Tanker/Container/BC - Pilot onboard (Area B)	0	3	0	3	6	6	4	6
3	18	Corrosive	Corrosive acid (Phosphoric/Sulphuric) leakage at Budge-Budge.	3	3	0	3	6	4	3	4
7.6	19	Grounding	Grounding- Tanker/Container/BC - Pilot not onboard (Area A)	3	3	0	3	5	5	3	5
7.12	20	Collision/ Allision	Collision/ allision with the bridge (Hooghly Bridge (Vidyasagar Setu); Howrah Bridge (Rabindra Setu))	3	3	0	3	5	5	3	5
7.9	21	Contact	Contact with channel and river marking buoys/ light vessels/ Fishing Nets (Area A, B)	0	3	0	3	3	6	2	3
7.7	22	Collision	Collision of Tanker/BC/Container	0	3	0	3	5	5	2	5

Disaster Management Plan

			vessel with Dredger (Area A, B)								
7.10	23	Contact/ Allision	Contact/ Allision with Lock gate (KPD & NSD) (Area C)	0	3	0	0	4	4	0	6
7.4	24	Contact	Tanker /Container/BC berthing - Contact with Jetty (Area C and Budge-Budge Wharf)	0	3	0	3	5	3	2	5
10.3	25	Natural Disaster	Tsunami	-	-	-		6	6	5	6
9	26	Civil Disturbance	War/Terrorism/Bomb Threat	-	-	-	-	-	-	-	-

Note 1: Scenario number 25 cannot be ranked because **Tsunami** can most probably lead to worst case impact on people, property, environment and business and hence rating for the most credible impacts has not been given in the Hazard Assessment Worksheet.

Note2: Scenario number 26 cannot be ranked because frequency of **Civil Disturbance** scenario cannot be assessed, hence risk rating for the most credible and worst credible impacts on people, property, environment and business have not been given in the Hazard Assessment Worksheet.

ANNEX B CHECKLIST

B.1 Checklist for POL's & Chemicals

B.1.1 Vessel and Berthing details

1.	Name of the Tanker	
2.	Name of the Berth	
3.	Berthing Date & Time	
4.	Checking Date & Time	

B.1.2 Shift In-charge should check the following before berthing of the Tanker.

Sr. No	Check Points	Yes	No
1.	Fire Fighting System in Remote Mode		
2.	Functioning of Siren		
3.	No Hot Job is permitted within 100m radius		
4.	Compliance to "NO SMOKING" regulations		
5.	Concerned Staff wear PPE		
6.	MSDS is displayed for the product being handled		

Note: If any laps are found, immediately the same is to be brought to the notice of Fire Officer for necessary action.

B.2 Checklist for Toxic Cargo**B.2.1 Vessel and Berthing details**

1.	Name of the Tanker	
2.	Name of the Berth	
3.	Berthing Date & Time	
4.	Checking Date & Time	

B.2.2 Shift In-charge should check the following before berthing of the Tanker.

Sr. No	Check Points	Yes	No
1.	Standby of Water tender and Tractor pump at manifold area is in readiness		
2.	Functioning of freshwater shower on the berth		
3.	Functioning of eye wash		
4.	Chemical suit is made available at the manifold area by the receiver of cargo		
5.	Functioning of Siren		
6.	Wind sack is erected		
7.	BA Sets are made available by Fire team		
8.	Concerned Staff wear PPE		
9.	MSDS for product displayed		

Note: If any laps are found, immediately the same is to be brought to the notice of Fire Officer for necessary action

B.3 Checklist for Sulphuric Acid / Phosphoric Acid**B.3.1 Vessel and Berthing details**

1.	Name of the Tanker	
2.	Name of the Berth	
3.	Berthing Date & Time	
4.	Checking Date & Time	

B.3.2 Shift In-charge should check the following before berthing of the Cargo Tanker.

Sr. No	Check Points	Yes	No
1.	Fresh water Shower functioning on Berth		
2.	Eyewash Functioning		
3.	Neutralizing agent is readily available nearer to the manifold area		
4.	Unloading Staff wear PPE while handling above Chemicals		
5.	Chemical Suit is made available at the manifold area by the receiver of the cargo		
6.	30Mtrs area around the manifold barricaded		
7.	MSDS is displayed for the Chemical, that is being handled		

***Note:** If any laps are found, immediately the same is to be brought to the notice of Fire Officer for necessary action.*

B.4 Grounding/ Sinking/Capsize of a Vessel within Port Limit**B.4.1 Vessel and Incident details**

1.	Name and Type of the Vessel	
2.	Master of the Vessel	
3.	Name of the Agent	
4.	Incident Date & Time	
5.	Vessel Length and Draft	
6.	Pilot on Board, if any	
7.	Location of the incident	
8.	Current location of the vessel	
9.	Port Launches Order (time)	

B.4.2 Other details

1.	Time of Grounding	
2.	Cause of Grounding	
3.	Extent of Grounding	
4.	Weather Conditions	
5.	Direction of Vessels head	
6.	Movement of other vessels stopped	
7.	Pollution type (oil/chemical)	
8.	Location and Extent (impact on environment) of Pollution	
9.	Fire/Explosion	
10.	Evacuation of Passengers (if any)	
11.	Plans to refloat vessel	
12.	Additional actions taken by port	
13.	Divers required	
14.	Salvage company informed	
15.	Remarks	

B.5 Collision between two Vessels within Port Limit**B.5.1 Vessels and Incident details**

1.	Name and Type of the Vessels	Vessel 1: Vessel 2:
2.	Master of the Vessel	
3.	Name of the Agent	
4.	Incident Date & Time	
5.	Vessel Length and Draft	
6.	Pilot Onboard, if any	
7.	Location of the incident	
8.	Current location of the vessel	
9.	Port Launches Order (time)	

B.5.2 Other details

1.	Time of Collision	
2.	Cause of Collision	
3.	Extent of Collision (condition of vessels)	
4.	Weather Conditions	
5.	Direction of Vessels head	
6.	Movement of other vessels stopped	
7.	Pollution type (oil/chemical)	
8.	Location and Extent (impact on environment) of Pollution	
9.	Fire/Explosion	
10.	Evacuation of Passengers (if any)	
11.	Plans to move the vessel	
12.	Additional actions taken by port	
13.	Remarks	

B.6 Fire Onboard a vessel within Port Limit**B.6.1 Vessels and Incident details**

1.	Name and Type of the Vessels	
2.	Master of the Vessel	
3.	Name of the Agent	
4.	Incident Date & Time	
5.	Vessel Length and Draft	
6.	Pilot Onboard, if any	
7.	Location of the incident	
8.	Current location of the vessel	
9.	Number of Passengers Onboard	
10.	Fire Fighting facilities on vessel	
11.	Location of Fire	
12.	Substance burning	
13.	Details of dangerous goods on board, if any	
14.	Port Launches Order (time)	

B.6.2 Other details

1.	Cause of Fire	
2.	Extent of Fire (condition of vessel)	
3.	Weather Conditions	
4.	Direction of Vessels head	
5.	Movement of other vessels stopped	
6.	Actions taken, by Master of vessel	
7.	Master consulted with the Port/Fire Officer	
8.	Evacuation of Passengers (if any)	
9.	Plans to move the vessel	
10.	Additional actions taken, by port	• Protection of Port property • Precautions against re-ignition • Security
11.	Remarks	

B.7 Fire onboard a tanker within Port Limit**B.7.1 Vessels and Incident details**

1.	Name and Type of the Vessels	
2.	Master of the Vessel	
3.	Name of the Agent	
4.	Incident Date & Time	
5.	Vessel Length and Draft	
6.	Pilot Onboard, if any	
7.	Location of the incident	
8.	Current location of the vessel	
9.	Number of Passengers Onboard	
10.	Fire Fighting facilities on vessel	
11.	Location of Fire	
12.	Substance burning	
13.	Details of cargo on board	Type Quantity
14.	Port Launches Order (time)	

B.7.2 Other details

1.	Cause of Fire	
2.	Extent of Fire/Explosion (condition of vessel) or Likelihood of Explosion	
3.	Weather Conditions	
4.	Cargo Operations ceased	
5.	Hoses/Metals arms disconnected	
6.	Movement of other vessels stopped or area cleared	
7.	Actions taken, by Master of vessel	
8.	Master consulted with the Port/Fire Officer	
9.	Evacuation of Passengers (if any)	
10.	Plans to move the vessel or other vessels	
11.	Additional actions taken, by port	• Protection of Port property • Precautions against re-ignition • Security
12.	Remarks	

ANNEX C

EMERGENCY CONTACT NUMBERS

Designation	Telephone (033)	Mobile
Chairman	22305370	-
Dy. Chairman (KDS)	22309164/ 22303452	-
Dy. Chairman (HDC)	22305438/ 03224-263209 (HDC)	9948298304
Secretary	2230634/3451 7101-2370/2371	9836298639
Director Marine and General Manager (Marine), HDC	22303214/ 22313271	9836298699
Dy. Director - Marine	71012016	9836298699
Dy. Director I - Marine		9432244737
Chief Engineer & In-Charge, Environment Cell	22300413	9836298695
Chief Vigilance officer	22305608	9073328290
Chief Medical Officer	24014503	9836298634
Mooring Master		9836298673
Asst. Mooring Master		9830253963
Traffic Manager	24392926	9434064873
Financial Adviser & Chief Accounts Officer	2231-2022	9836298657
Chief Law officer	22308510	9836298679
Chief Hydraulic Engineer (I/C)	24093031	9674720102
Chief Mechanical Engineer	24093037	9434052489
Material Manager	22511569	9674720088
Harbour Master (Port)		9674155636
Harbour Master (River)		9874437766
Dy. Harbour Master (Port) -Vacant		
Dy. Harbour Master (River) -Vacant		
Security Adviser	24392055/71003819	9434031382
Sr. Commandant - CISF (KDS)	24397359	9836298616
Sr. Commandant – CISF (HDC)	252229	9434052230
Asst. Commandant, HDC	252418	9434063389
OSD Environment	79621998	9674720054
Dy. Manager, Marine Operation, HDC	03224252401	8989429782
Sr. Asst. Traffic Manager	71003365	8902175968
Sr. Dy. Traffic Manager -II	71003372/71003235	9434517321
Sr. Asst. Secretary (Public Relations)	22206645	9674155648
Sr. Dy. Traffic Manager -I (Docks)	71003367	9434065098

Disaster Management Plan

Dy. Traffic Manager (CT)	71003270	9836298689
Port Fire Officer	24395881/71003475	9674155645
L.A. & I.R.O /Sr. PO	22206234/71012355	9836298665
Safety Officer	71003302	7001204748
Advisor (Environment)	03324397079	9836298692
Hospital Enquiry	24014577/24018735	
Centenary Hospital Front desk-	71003637/71003678	
Centenary Hospital Casualty	71003632	
Dy. CMO	71003657	9830247076
Safety & APO		9883204209
Executive Engineer		9038888036
Executive Engineer (Mechanical)		9874929751
Executive Engineer (Mechanical)		9438273774
Dy. Commandant CISF (Forward Control)		8547749936
Asstt. Commandant CISF (Base Control)		8989766885 9978856611
Insp/Exe Crime & Intelligence		8902716483
Control room of CISF Unit KoPT Kolkata	24391360/24390480	9674466428
For Kolkata /Howrah & Districts (a)Asst. Supdt PSO (b) Security Officer	71003344	9674720081
PSO Control Room	2439 5841	9674155660
Port Fire Control Room	24395881/ 7100-3351	9674155652

Company Name	Designation	Mobile No	Email Id
BPCL	Chief Installation Manager	9982754999	paikarasm@bharatpetroleum.in
HPCL	GM Installation	9840774918	kaushik@hpcl.in
IOC	DGM(I/C) Terminal	9831504668	bc@indianoil.in
IOC (Lub Div)	GM Plant	9830918018	beckrd@indianoil.in
Rajiv Agarwal	GM	9831022279	rajiv_agarwal1963@yahoo.co.in
S K Oil Terminals (P) Ltd	GM	9830021201	Tkmukherjee.skoilterminal2@gmail.com
JRE Tank	GM	9674947990	gururajan@imc.net.in

Terminals Pvt Ltd			
Hindustan Storage & Distribution Co. Ltd	Operation Manager	7980859815	mihir@hindustanstorage.in
Mundial Export Import Finance Pvt	Operation Manager	07002100690	Tm-mubb@imc.net.in
IFB Agro Industries	Manager	9836479852	Swapanmitra1952@gmail.com
Mother Dairy Fruit & Vegetable	SR. Executive	9830211286	Sujit.dey@motherdairy.com
Gem Refineries (1997) Pvt Ltd	Terminal Manager	8961002239	gemrefineries1997_p@yahoo.in

Name	Official Address	Contact Number
Department of Home, Govt. of West Bengal		
Secretary (Home)	NABANNA 325, Sarat Chatterjee Road, Shibpur, Mandirtala, Howrah- 711-102.	033-22535072
Home Secretary		033-22145656
Commissioner of Police	Kolkata, Lalbazar Kolkata – 700 001.	033-2214-5060/ PBX No.033 2214-5000
West Bengal Police		
Supdt. Of Police	South 24 Parganas, Bhabani Bhavan, Alipore Kolkata – 700 027.	033- 479-3333/ PBX No. 033 2479-1311-15
Add. DG & IG of Police(Admin.)	West Bengal Writers Buildings Kolkata – 700 001.	033-2235-7411
Port Police		
	Watgunge Police Control Room	033 2459-3298/2408-2100/2459-8819
	Watgunge Women Police Control Room	033 2489-2100
	West Port Police Control Room	033 2439-3617/2409-6100/2439-2454
	Garden Reach Police Control Room	033 2469-6569/2408-1100/2489-3272

	Hare Street Police Control Room	033 2211-8760/2215-0100/ 2211-8761
	Metiabruz Police Control Room	033 2469-5317 / 2409-9179
	Cyber Police Station	033 2214-3000/2250-5120
	Lalbazar Police Control Room	033 2214-3024 / 2214-3230 / 2214-1310
	Traffic Police Control Room	033 2214-3644 / 2242-7248
	North Divn. Police Control Room	033 2360-6405 /2360-6417
	Port Divn. Police Control Room	033 2409-3109
Kolkata Municipal Corporation		
	5, S.N.Banerjee Road Kolkata – 700 013	033 2286 1212/1313/1414 Whatsapp no: 8335988888 033 2286 1000(28 lines)
SSKM Medical College & Hospital		033 2223 6026/6242/ 1615/9735/ 6180/ 9692/ 9822
Kolkata Medical College & Hospital		033 2212 3853
NRS Medical College & Hospital		033 2286 0140; 988303 1301; 90073 66597; 98320 25916
RG KAR Medical College & Hospital		033 2555-7656/7675/7676 033 2555-7656, Extn: 2516/1021/2515
Calcutta National Medical College & Hospital		033-2289-7122/23 (Extn:104)
Coast Guard		
HQ Coast Guard Region NE, Coast Guard	Newtown Rajarhat, Kolkata 700157	033-2324 8002 email: ops- ne@indiancoastguard.nic.in
Officer In Charge MRSC, Haldia, HQ	Coast Guard District No 8 (West Bengal) Anchorage Camp Haldia, West Bengal 721605	032-24 264541; email: dhq8@indiancoastguard.nic.in

Navy Office		
Chief Staff Officer to NOIC	INS, Netaji Subhas, Hastings, Kolkata – 700 022	033-2242- 0430/ 0432/0503/0441
Inspectorate of Dock Safety		
Dy. Director (Safety) Inspectorate	Dock Safety, Kolkata Nizam Palace, 1st floor, 2nd M.S.O.Bldg. 234/4 A.J.C. Bose Road, Kolkata-700020.	033-2574-5512; 8285412802; 033- 22830719(O)/ Fax: 033 2283-0718 email: idskolkata@dghasli.nic.in , idskol@rediffmail.com
Shipping Corporation of India		
Regional General Manager	Shipping House 13, Strand Road Kolkata – 700 001	033 2254 3415
Directorate of Fire & Emergency Services		
West Bengal Fire Services	13-D, Mirza Galib Street Kolkata – 700 016	033-2358-1130
Director	West Bengal Fire Services 13-D, Mirza Galib Street Kolkata – 700 016	033-2252 1165
Petroleum & Explosives Safety Organisation, East Circle		
Joint Chief Controller of Explosives	8, Esplanade East, 1 st Floor, Kolkata – 700 069.	2213 0895; 033-2248 0427/ 2248 9524/ 2248 6600/ 2242 0686
Disaster Management Department		
Nodal Officer of Disaster Management Dy. Director Public Health & communicable Disease		2214-5601 2214-3371 (Ext.226)
West Bengal Pollution Control Board		
Paribesh Bhavan, Block – LA, Bldg.No.10A, Sector-III, Salt Lake, Kolkata – 700 091		033-2335-6731/9088/0261
District Relief Department Office of the District Magistrate		
SDO	South 24Pgs Alipore 2479-1681 South 24Pgs, Diamond Harbour.	0317 4255222
Custom Commissioner	Chief Commissioner of Customs, Kolkata	2242-1173 email: ccu-cuskoa@nic.in
Immigration	FRRO Kolkata.	033-22900549, email: frrokol@nic.in

Port Health Organization	Port Health Officer Port Health Organisation, Kolkata	033- 2223 0904, 033- 2223 0414 email: phokolkata@rediffmail.com
Irrigation Department	Principal Secretary, Irrigation & waterways Dept, Govt. of West Bengal, Jalsampad Bhavan, 9th Floor, Salt Lake City, Kolkata 700 091	033-23215616, 033-23581315 / 17, email: iwd.prsecy@gmail.com
Government of India Department of Atomic Energy Variable Energy Cyclotron Centre	Sector-I, Block-AF, Bidhan Nagar, Kolkata - 700 064	033-2337- 1230 / 1231 / 1232 / 1233 / 1238 / 4831 / 4832 /4838, 033-2359-4008/2321-4435/ 033-2321-4435
MMD Kolkata	Marine House, Hastings, Kolkata – 700 022	033-22230238
MMD Haldia	Chiranjibpur (Opp. BSNL Office Building), East Medinipur, Haldia-721604	03224 - 252323 / 252968 email: mmdhaldia@gmail.com

Name of Agency and Contact Details	
WBWMPL	M/s West Bengal Waste Management Limited, Jindal Towers, Block-A, 4 th Floor, 21/1A/3, Darga Road, Kolkata- 700017. (email: bobbykurien@ramky.com)
Used + Waste Oil Receiver	a) M/s. Bristol Petroleum Pvt. Ltd., 26/5/D-E, A M Ghosh Road, Budge Budge, 24 Pgs (S), WB, Pin:700137. (Email: bristolpetroleum74@gmail.com). b) M/s Falak Industrials Fuels Pvt. Ltd. 1, Chandni Chowk Street, Block C, 2nd floor, Room -20, Kolkata-700072. (email: parali1904@gmail.com). c) M/s R.S. Oil Industries, Junglepur, Jalan Industrial Complex, Vill.Baniyara, P.O. Begri, Domjur, Dist. Howrah, Pin.711 411. (Email: rsoilind90@gmail.com). d) M/s. Lubrina Recycling Pvt. Ltd., Vill: Joychandipur , P.O. Bakrahat, P.S. Bishnupur, Dist. 24-Parganas(S), WB., Pin– 743377. (email: disposal@lubrinare.com)

MINISTRY OF PORTS, SHIPPING & WATERWAYS AND OFF-SITE MUTUAL AID		
	Office	Web site- fax no
Parivahan Bhavan, 1, Parliament Street, New Delhi 110 001		www.shipmin.gov.in Fax 011-23719023/23710356
Minister of Ports, Shipping and Waterways	011-23717422 23717423	
PS to Hon'ble Minister	011-23717422 23717423	Fax 011-23717424
Dredging Corp of India Limited	0891-2523250	http://www.dredge-india.com
Directorate General Shipping	022-25752005	dg-dgs@gov.in Fax. 022-25752040/42/43/45
Indian Ports Association		www.ipa.nic.in
Tariff Auth Major Ports (TAMP)		www.tariffauthority.gov.in
Indian Maritime University, Chennai	044-24539020	www.imu.edu.in Fax 044-24530342
Ministry of Home Affairs		www.mha.gov.in
Control Room (IB)	011-23093756	
Control Room (DM)	011-23438122	mpd.00445@gov.in
Coastal Security	011-23075337	
Director (CPC desk) – Cyber & Information Security	011-23094385	
Director (Law and Order) – Internal Security	011-23093508	
Bhaba Atomic Research Centre	022-25505050/ 25592000	022-25505151 / 25519613

OTHER EXPERTS AND AGENCIES	
Name of body	Telephone / fax
Name of body	Telephone / fax
Indian Register of Shipping, Mumbai	022-30519400 / 25703611 ho@irclass.org
IIT – Kharagpur	03222-255221 / 255303
Meteorological Centre, Kolkata, West Bengal	033-24790596 kolkatarmc@gmail.in , ddgm.rmckolkata@imd.gov.in
The National Environmental Engineering & Research Institute (NEERI), Nagpur	0712-2249999 / 660 / 2244900
Ministry of Petroleum & Natural Gas	011-23382426 / 23383100
National Institute of Ocean Technology (NIOT), Chennai	044-66783300 / 22460275 / 22460645
National Ship Design and Research Centre, Visakhapatnam	0891-2578360 / 2577754 nsdrc@itpvis.ap.nic.in
State Fisheries Association, West Bengal	8926096209 (Purba Medinipur)

	6294484307 (Paschim Medinipur)
Dept. of Tourism, West Bengal	9073386803 / 9073386804 / 9073327315 Toll Free No: 1800-2121-655
Central Water Commission, Kolkata	0353-2540686

NDRF – 2 nd BATTALION		
Designation	Address	Contact No. & Email
Commandant	2nd BN NDRF, Near RRI Camp. Haringhata, Mohanpur, Nadia, (West Bengal) Pin - 741246	033-25875032 09474061104 wb02-ndrf@nic.in

Contact of CERT – IN / CERT – O and Incident Procedure:

Primary Contact - CERT – IN	
Designation	Contact details
Director	Off: 011 – 24368544 Res: 011 – 24323085 Fax: 011 – 24366806 Mobile: 9810643244 Email: grai@cert-in.org.in , grai@mit.org.in
Alternate contact - CERT – IN	
Operations Manager	Off: 011 – 24368579 Res: 011 – 24368579 Mobile: 9810874430 Email: anil@cert-in.org.in , anil@mit.org.in
Incident Response Help Desk - CERT – IN	
Tel No. (Toll Free) – 1800-11-4949 Tel No.: 011 – 24368572 Fax (Toll Free) – 1800-11-6969 Fax: 011 – 24368546 Email: incident@cert-in.org.in , info@cert-in.org.in	

SALVAGE COMPANIES	
Company	Contact Number
M/s. Sealord Diving & Salvage Pvt. Ltd.	02227682825 / 9769900765 / 9833413650 / 9819890721
i-Marine Infratech (India) Pvt. Ltd.	02240561222
SMIT Salvage	T: +31 78 6969 000 F: +31 78 6969 555

ANNEX D

CONSEQUENCE ANALYSIS

Potential for damage of property, loss of lives and injury to health due to possibility of accidents has been estimated for various credible scenarios as mentioned in para below.

1. Consequence modeling generally involves three distinct steps:

- i. Estimation of the source term, i.e., how much material in what form (gas/liquid/two-phase) is being released from containment as a function of time, and development of the release scenarios or possible hazard outcomes (cloud dispersion, fire, explosion, etc.) following the release.
- ii. Estimation of the hazard level (hazard modeling) as a function of time and at selected receptor locations, i.e., estimation of:
 - Ambient concentrations for a toxic or flammable gas release (for modeling the effects of a toxic cloud or flash fire),
 - Thermal radiation flux for fires (for a jet fire, pool fire, or fireball),
 - Overpressure for explosions (for a confined explosion, boiling liquid expanding vapour explosion [BLEVE], or vapour cloud explosion [VCE]).
- iii. Estimation of damage level on the selected receptor, based on the hazard level at the receptor location (vulnerability modeling).

2. Incident Outcomes – Definitions

2.1 Fireball

One of significant fire hazard related to liquefied gas. The fireball either results from the bursting of pressure vessel or from vapor cloud explosion. In the first case bursting may occur under fire conditions and be part of a BLEVE or it may occur in the absence of fire. Momentum forces predominate, if fireball is formed from the bursting of vessel, while buoyancy forces predominate, if it is formed from a vapor cloud.

2.2 Pool Fire

A pool fire occurs when a flammable liquid spills onto the ground and is ignited. A fire in a liquid storage tank is also a form of pool fire, as is a trench fire. A pool fire may also occur on the surface of flammable liquid spilled onto water.

2.3 Jet Fire

Normally on high-pressure release of pressurized vessel or pipelines on ignition, burn likes a jet flame in open space. Any equipment can come in heavy thermal load if the flame jet impinges on it. The consequent radiation hazard is very small.

2.4 Unconfined Vapor Cloud Explosions (UVCE) and Flash Fire

When gaseous flammable material is released a vapor cloud forms and if it is ignited before it is diluted below its lower explosive limit, a vapor cloud explosion or a flash fire will occur. Insignificant level of confinement will result in flash fire. The vapor cloud explosion will result in overpressure.

2.5 Boiling Liquid Expanding Vapor Explosion (BLEVE)

A BLEVE occurs when there is a sudden loss of containment of a pressure vessel containing a superheated liquid or liquefied gas. It is sudden release of large mass of pressurized superheated liquid to atmosphere. The primary cause may be external flame impinging on the shell above liquid level weakening the vessel and leading to shell rupture.

2.6 Toxic Effect

The critical toxicity values which should be considered for evaluating effect on humans in the event of release of chemicals are:

- Permissible exposure limits
- Emergency response planning guidelines
- Lethal dose levels.

3. Damage Severity Criteria

The quantitative estimation of effects of Thermal radiations and overpressure on human population, process and equipment is given in following three tables.

Table 1: Exposure at different incident levels of Thermal radiation

RADIANT HEAT (kW/m ²)	HUMAN EXPOSURE LIMITS*
35 to 37.5	100% lethality in 1 min; 1% lethality in 10 seconds
25	100% lethality in 1 min; significant injury in 10 seconds
12.5 to 15.0	1% lethality in 1 min; first degree burns in 10 seconds
9.5	Pain threshold reached after 8 seconds; second-degree burns after 20 seconds
4.0 to 5.0	Sufficient to cause pain to personnel if unable to reach cover within 20 seconds; However, blistering of the skin (second-degree burns) is likely; 0% lethality
1.6	Will cause no discomfort for long exposure

Table 2: Thermal radiation damage levels

INCIDENT HEAT FLUX (Kw/m ²)	DAMAGE TO EQUIPMENT	REMARKS
35.0 to 37.5	Damage to process equipment	Generally includes steel tanks, chemical process equipment, industrial machinery
25.0	Minimum energy to ignite wood at indefinitely long exposure without a flame	
18.0 to 20.0	Plastic cable insulation degrades	
12.5 to 15.0	Minimum energy to ignite wood with a flame; melts plastic tubing	
* Based on an average 10 min exposure time		

Table 3: Explosion overpressure damage impacts

Overpressure (bar)	Mechanical Damage to equipment	Damage to people
0.3	Heavy damage to plant & structure	Fatality probability = 1 for humans indoor as well as outdoor >50% eardrum damage >50% serious wounds from flying objects
0.1	Repairable damage	1% death >1% eardrum damage >1% serious wounds from flying objects
0.03	Major glass damage/10% glass damage	Slight injury from flying glass

4. Software used for consequence assessment

Analysis of liquid/gaseous release events are made by analytical methods, like computer dispersion models PHAST which will predict real time scenario of the situations. The values of downwind concentration of vapor clouds are determined by the physical properties of the dangerous substances, meteorological data, leakage rate, etc. PHAST software is developed by DNV and is used for both consequence and risk calculations. It contains a series of up-to-date models that allow detailed modeling and quantitative assessment of release rate pool evaporation, atmospheric dispersion, Vapour Cloud Explosion, Combustion, heat radiation effects from fires etc.

5. Consequence Assessment using PHAST software has been carried out for the following scenarios.

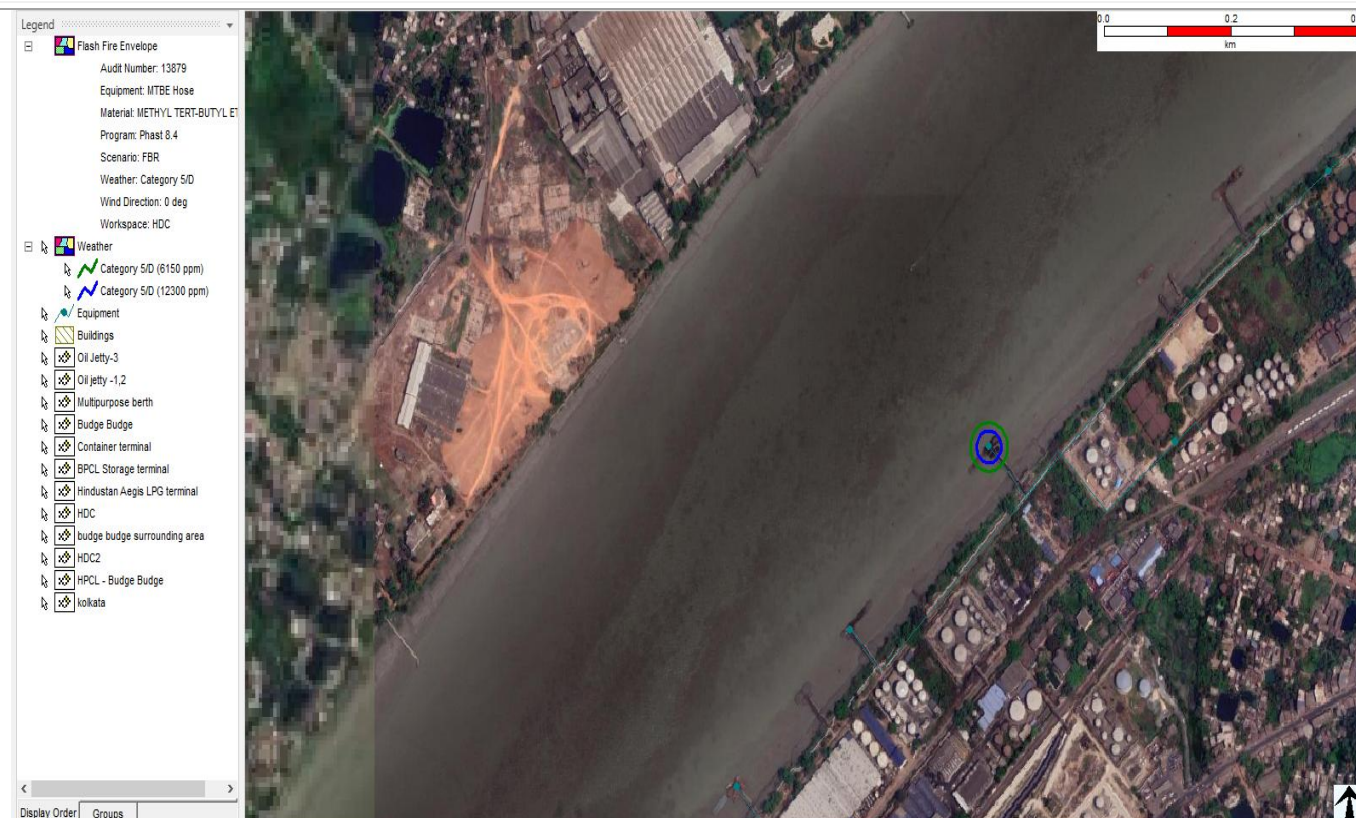
Table 4: Potential Scenarios for liquid bulk cargoes

Sr. No.	Cargo handling activity	Location	Chemical leakage scenario
1.	MS unloading and transfer to terminal	Oil Jetty	Small, Large and Full-Bore Rupture of unloading hose and transfer pipeline.
2.	Naphtha, ATF unloading and transfer to terminal	Oil Jetty	Small, Large and Full-Bore Rupture of unloading hose and transfer pipeline.
3.	Toluene unloading and transfer to terminal	Oil Jetty	Small, Large and Full-Bore Rupture of unloading hose and transfer pipeline.
4.	Xylene unloading and transfer to terminal	Oil Jetty	Small, Large and Full-Bore Rupture of unloading hose and transfer pipeline.
5.	MTBE unloading and transfer to terminal	Oil Jetty	Small, Large and Full-Bore Rupture of unloading hose and transfer pipeline.

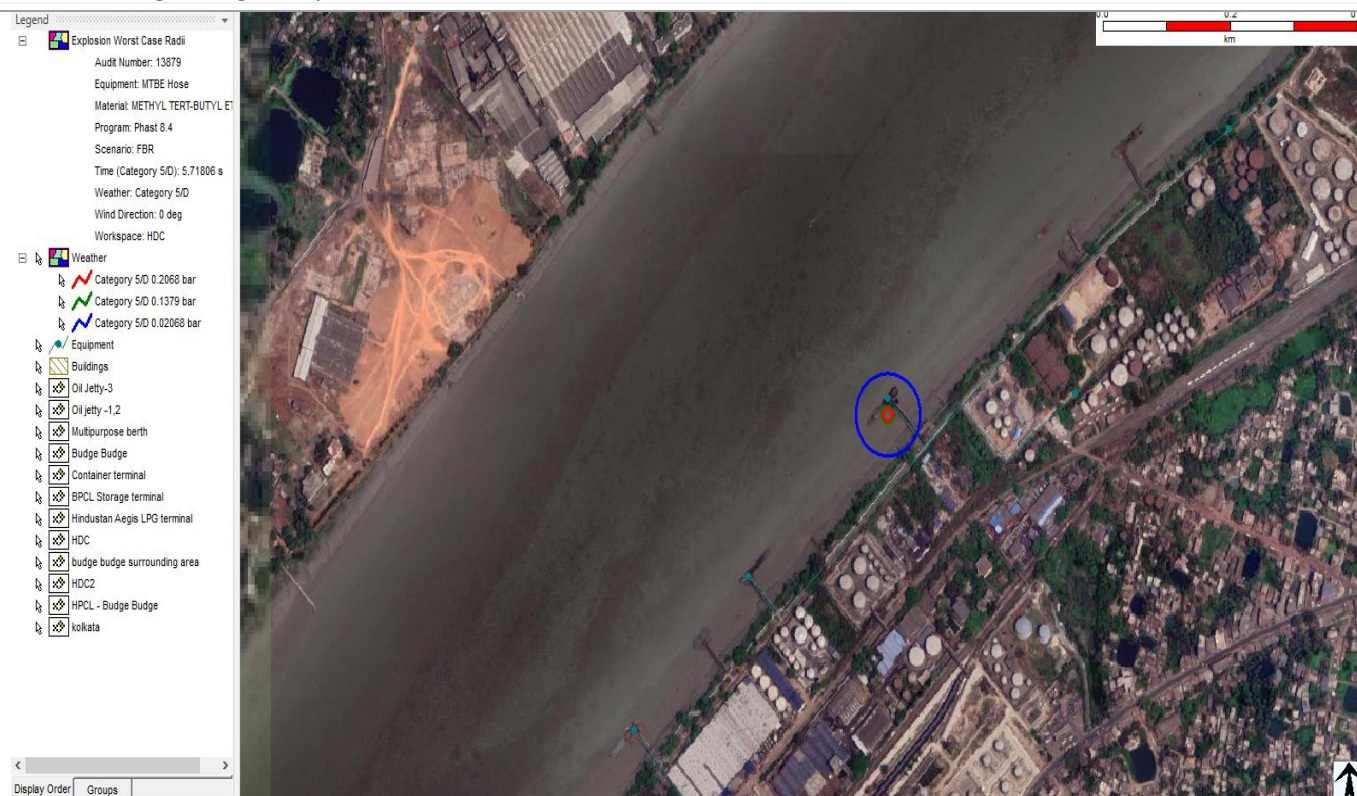
1. Jet fire from Full Bore Rupture of MTBE unloading hose with wind speed 5 m/s and D stability class at Budge Budge Jetty-5.



2. Flash fire from Full Bore Rupture of MTBE unloading hose with wind speed 5 m/s and D stability class at Budge Budge Jetty-5.



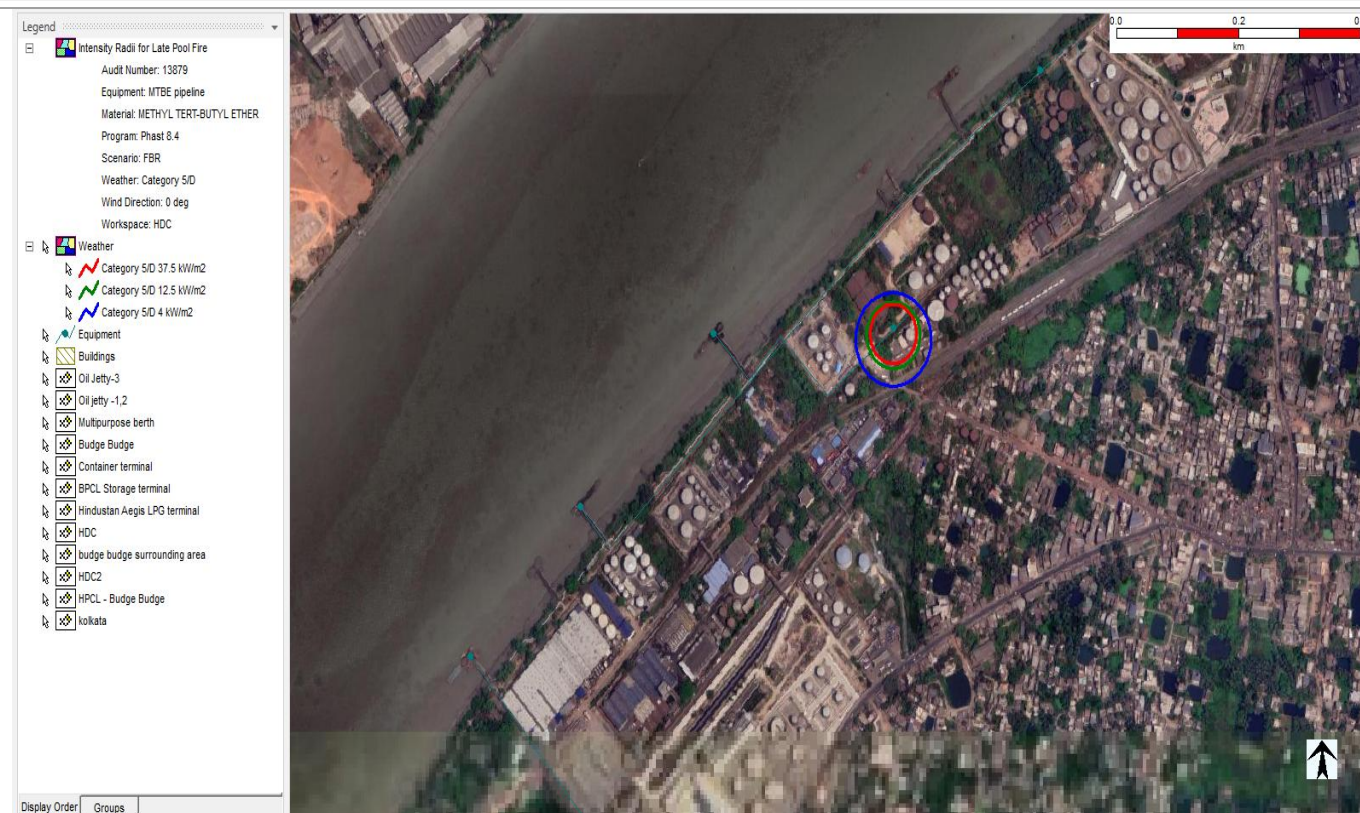
3. Vapor Cloud Explosion from Full Bore Rupture of MTBE unloading hose with wind speed 5 m/s and D stability class at Budge Budge Jetty-5.



4. Jet fire from Full Bore Rupture of MTBE transfer pipeline with wind speed 5 m/s and D stability class from jetty to terminal.



5. Pool fire from Full Bore Rupture of MTBE transfer pipeline with wind speed 5 m/s and D stability class from jetty to terminal.



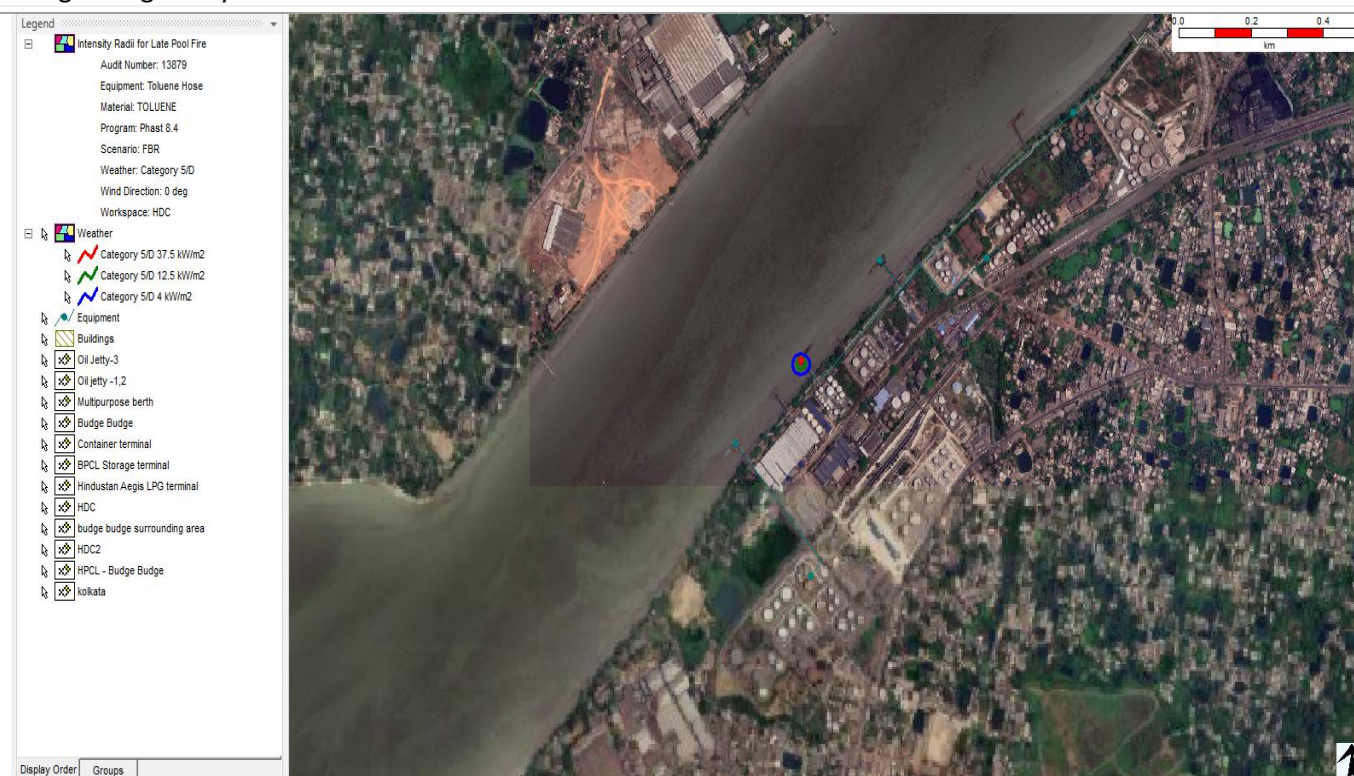
6. Flash fire from Full Bore Rupture of MTBE transfer pipeline with wind speed 5 m/s and D stability class from jetty to terminal.



7. Vapour cloud Explosion from Full Bore Rupture of MTBE transfer pipeline with wind speed 5 m/s and D stability class from jetty to terminal.



8. Pool fire from Full Bore Rupture of Toluene unloading hose with wind speed 5 m/s and D stability class at Budge Budge Jetty-3.



9. Pool fire from Full Bore Rupture of Xylene unloading hose with wind speed 5 m/s and D stability class at Budge Budge Jetty-3.



10. Jet fire from Full Bore Rupture of MS transfer pipeline with wind speed 5 m/s and D stability class from jetty to terminal.



11. Pool fire from Full Bore Rupture of **MS** transfer pipeline with wind speed **5 m/s** and **D** stability class from jetty to terminal.



12. Pool fire from Full Bore Rupture of **Toluene** transfer pipeline with wind speed **5 m/s** and **D** stability class from jetty to terminal.



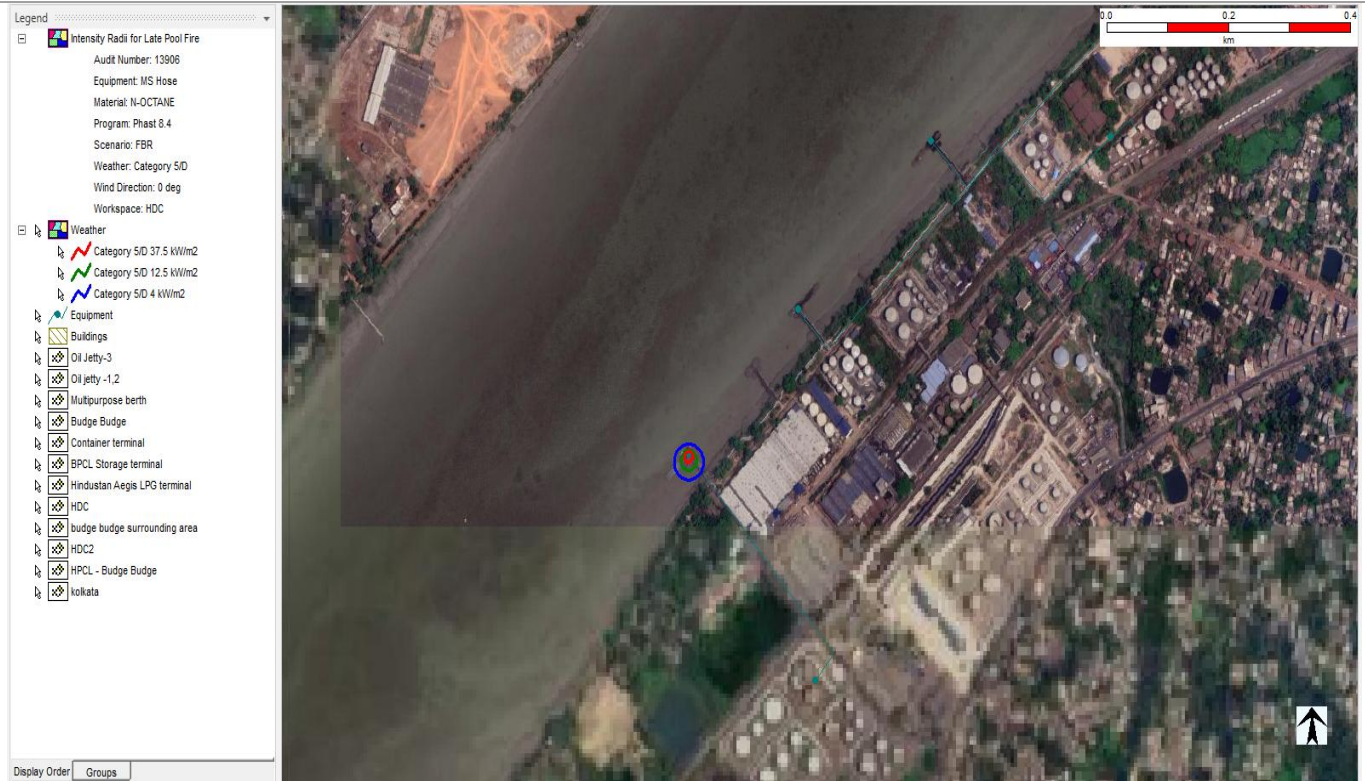
13. Pool fire from Full Bore Rupture of Xylene transfer pipeline with wind speed 5 m/s and D stability class from jetty to terminal.



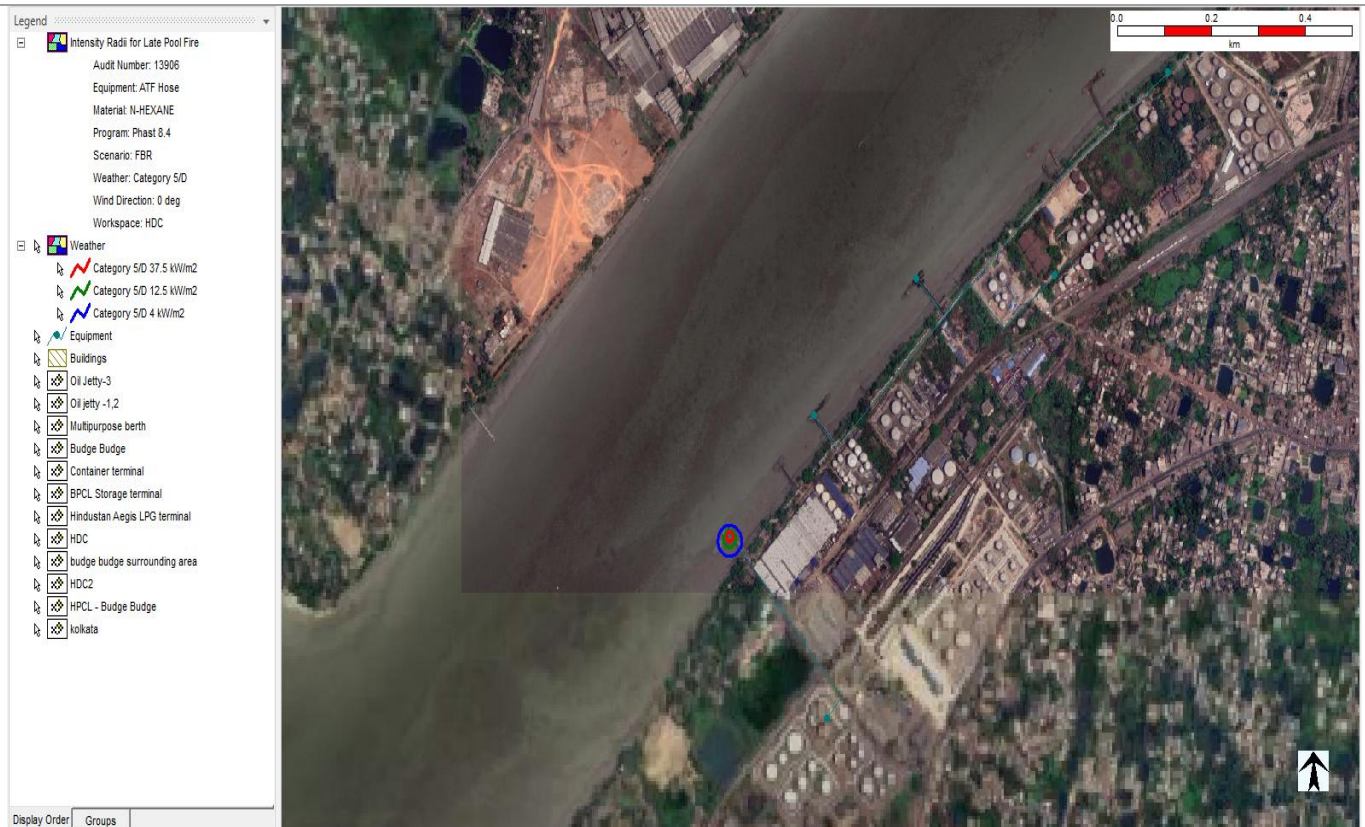
14. Pool fire from Full Bore Rupture of Naptha transfer pipeline with wind speed 5 m/s and D stability class from jetty to terminal.



15. Pool fire from Full Bore Rupture of MS unloading hose with wind speed 5 m/s and D stability class at Budge Budge Oil Jetty-1.



16. Pool fire from Full Bore Rupture of ATF unloading hose with wind speed 5 m/s and D stability class at Budge Budge Oil Jetty-1.



17. Flash Fire from Full Bore Rupture of ATF unloading hose with wind speed 5 m/s and D stability class at Budge Budge Oil Jetty-1.



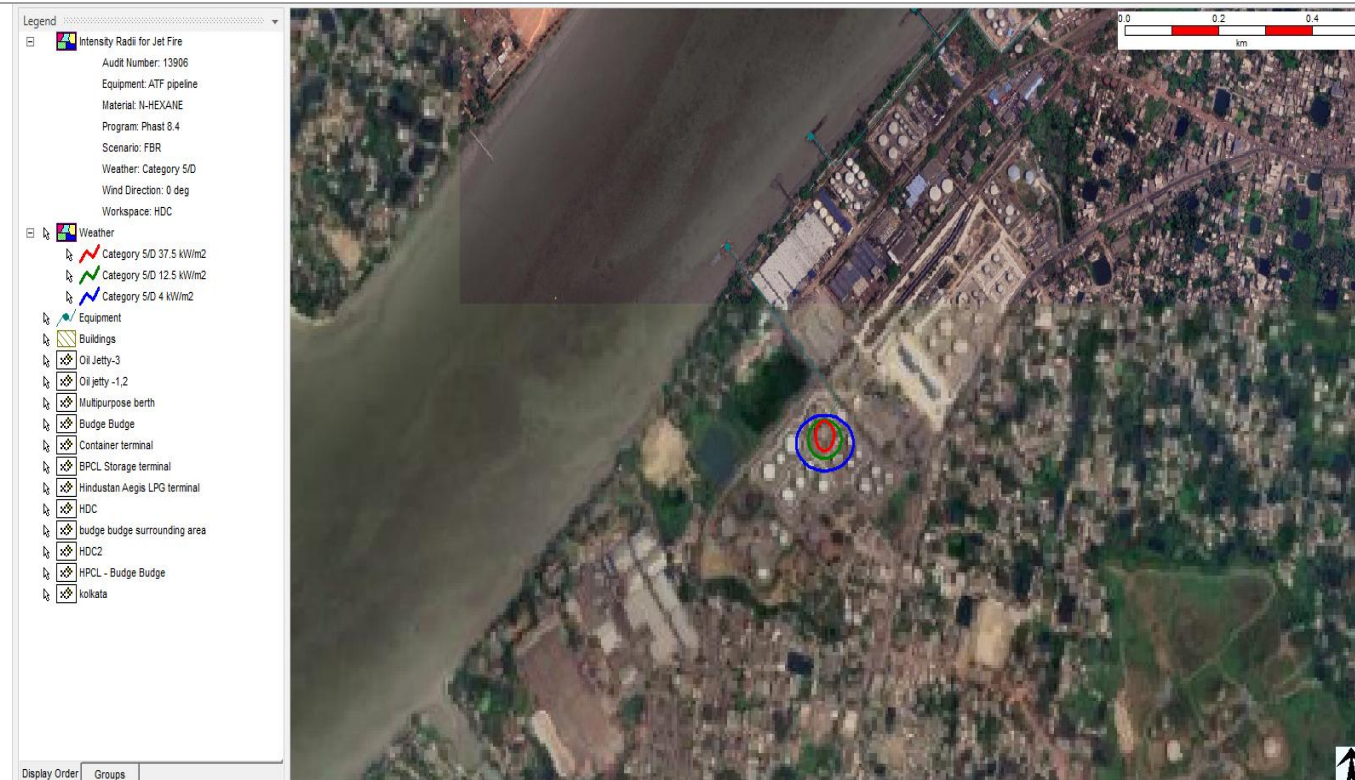
18. Pool Fire from Full Bore Rupture of HSD bunker hose with wind speed 5 m/s and D stability class at Budge Budge Oil Jetty-1.



19. Pool Fire from Full Bore Rupture of **MS** transfer pipeline with wind speed **5 m/s** and **D** stability class from jetty to terminal.



20. Jet Fire from Full Bore Rupture of **ATF** transfer pipeline with wind speed **5 m/s** and **D** stability class from jetty to terminal.



21. Pool Fire from Full Bore Rupture of ATF transfer pipeline with wind speed 5 m/s and D stability class from jetty to terminal.



22. Vapor cloud explosion from Full Bore Rupture of ATF transfer pipeline with wind speed 5 m/s and D stability class from jetty to terminal.

